

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,

Petitioner,

v.

ZENTIAN LIMITED,

Patent Owner

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Inter Partes Review Case No. IPR2023-00037

U.S. Patent No. 10,971,140

Inter Partes Review Case No. IPR2023-00033

U.S. Patent No. 7,587,319

REMOTE DEPOSITION

of

CHRISTOPHER SCHMANDT

Reported by:

Robin LaFemina, RPR, CLR

Job No.: 7862

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September 6, 2023

11:05 a.m.

REMOTE DEPOSITION of

CHRISTOPHER SCHMANDT, held via Zoom, with  
all parties appearing from their respective  
locations, before Robin LaFemina, a  
Registered Professional Reporter, Certified  
LiveNote Reporter and Notary Public within  
and for the State of New York.

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1  
2 THE COURT REPORTER: Good  
3 morning. Today's date is September 6,  
4 2023.

5 My name is Robin LaFemina and I  
6 am the court reporter representing  
7 TransPerfect Legal Solutions.

8 This deposition is being taken  
9 remotely and the court reporter will  
10 not be physically present with the  
11 witness whose deposition is being  
12 taken.

13 The parties agree not to  
14 challenge the validity of any oath  
15 administered by the court reporter,  
16 even if the court reporter is a notary  
17 of a state other than where the  
18 deponent is currently physically  
19 located.

20 Would each attendee, starting  
21 with the examining attorney, please  
22 indicate your agreement by stating  
23 your name, your firm affiliation and  
24 your agreement on the record, after  
25 which I will swear in the witness.

1  
2 MR. NOROOZI: Kayvan Noroozi,  
3 Noroozi PC, representing Zentian  
4 Limited. We agree.

5 MS. CANINO: Christina Canino  
6 with Erise IP representing Apple Inc.  
7 We agree.

8 THE COURT REPORTER: Raise your  
9 right hand, please, Mr. Schmandt.

10 Do you swear the testimony you  
11 are about to give will be the truth,  
12 the whole truth, and nothing but the  
13 truth, and do you acknowledge that  
14 although I am not physically present in  
15 the room with you, that this oath is  
16 administered with the same force and  
17 effect as though I were?

18 THE WITNESS: Yes, I do.

19 THE COURT REPORTER: You may  
20 begin, counsel.

21 CHRISTOPHER SCHMANDT,

22 called as a Witness, having been first  
23 duly sworn by Robin LaFemina, a Notary  
24 Public within and for the State of New  
25 York, was examined and testified as

1 Schmandt

2 follows:

3 EXAMINATION BY

4 MR. NOROOZI:

5 Q. Good morning, Mr. Schmandt.

6 How did you prepare for this deposition?

7 A. Before I dive into that, I'd  
8 like to get a few corrections from my  
9 declaration on the record. Is this an  
10 appropriate time to do that?

11 Q. Okay. What's the nature of the  
12 corrections? Is it typographical or --

13 A. Yes.

14 Q. -- something else?

15 A. Typos.

16 Q. Okay. Go ahead. Walk me  
17 through the areas you'd like to make  
18 corrections to.

19 A. Okay. These are both in the  
20 '140 declaration.

21 Q. Okay.

22 A. Section X, i.e. 10, it says --

23 Q. Sorry. Could you give me a  
24 paragraph number?

25 A. No. This is the header. This

1 Schmandt

2 is in the Table of Contents.

3 Q. I see.

4 A. And it will also be imported  
5 into that page number which we can do  
6 afterwards, if you'd like. Okay? So the  
7 header that says Section X, change Ground 4  
8 to Ground 3.

9 Q. In the version that I have, it  
10 says Opinions Regarding Ground 3. Let's  
11 see. I'm looking at the Table of Contents,  
12 so -- and I'm also looking at the  
13 declaration itself at exhibit page 101. It  
14 says Section X, Opinions Regarding Ground 3  
15 and then subsection A, claims 53 and 58-59.

16 A. Sorry. This is the '140?

17 Q. I believe. Oh, is it --

18 A. There is no claim 50s in the  
19 '140.

20 Q. Got it. Okay.

21 So okay, Section X with respect  
22 to the '140, it says opinions regarding  
23 Ground 4 and it should say Ground 3?

24 A. Correct.

25 Q. Page 93?

1 Schmandt

2 A. Well, I'm looking at the Table  
3 of Contents, but yes, it should also be on  
4 page 93.

5 Q. Okay. What else?

6 A. Section XI, that is 11, it  
7 should say Opinions Regarding Claim 5, I'm  
8 reading off of my notes here, so instead of  
9 Ground 6, it's Ground 5. And subsection A  
10 should read claim 6, not claim 4. And that  
11 should also be carried through under page  
12 94.

13 Q. Anything else?

14 A. That's all. Thank you.

15 Q. In reviewing your two decs for  
16 the '319 patent and '140 patent, prior to  
17 today, did you identify any areas of  
18 substantive testimony that you want to  
19 correct or modify?

20 A. No.

21 Q. In preparing for today's  
22 deposition, did you identify any documents  
23 that are not exhibits in the '140 patent  
24 proceeding or the '319 patent proceeding  
25 that you intend to introduce into either

1 Schmandt

2 proceeding going forward?

3 A. No. I think you may have  
4 phrased that in terms of exhibits. I looked  
5 at the Patent Owner Preliminary Response and  
6 the Decision. I don't know if those have  
7 exhibit numbers.

8 Q. Right. I'm referring  
9 specifically to exhibits from you, meaning  
10 evidence on your behalf in support of your  
11 opinions through testimony, whether already  
12 expressed or things that you intend to  
13 express.

14 A. And I think the question was  
15 whether I intended to introduce anything  
16 additional. If that is my understanding of  
17 the question, my answer is no.

18 Q. In preparing for today's  
19 depositions, are there any further  
20 explanations or articulations that you  
21 decided that you should provide or would  
22 like to provide that are not already set  
23 forth in your declarations?

24 A. No.

25 Q. Let's start with the '140 patent

Schmandt

declaration. This is in Case No.

IPR2023-00037, and it's Exhibit 1003 in that proceeding, and I'd like to direct you to paragraph 4 of your declaration.

A. Sure. Okay.

Q. You said in paragraph 4, I built the first conventional computer system utilizing speech recognition and synthesis ("Put That There") starting in 1980.

Do you see that?

A. Yes.

Q. What is your basis for saying that you built the first one?

A. Because I don't know of any other one. To be perfectly clear, there was a system out of Bell Labs by Levinson that was airline reservation information with a speech interface and he and I have talked about it and decided that we were simultaneously the first to do this, so he should -- it should -- maybe shouldn't say first, it should say tied for the first or one of the first.

Q. Okay.

1 Schmandt

2 You say you built this  
3 conversational computer system utilizing  
4 speech recognition and synthesis.

5 What do you mean by built?

6 A. I did not specify the hardware.  
7 The hardware was specified as part of the  
8 research proposal. I accepted the hardware  
9 into the lab, I wrote device drivers for  
10 said hardware so that my software could  
11 communicate with it, and then I wrote half  
12 the software for the Put That There system,  
13 the other half being written by a colleague.

14 Q. And what was the Put That There  
15 system capable of doing?

16 A. The Put That There system  
17 accepted voice and gesture as input. The  
18 target application was manipulating objects  
19 in a geographic database, so there were  
20 spatial extents. The Put That There system  
21 took voice and gesture as inputs. When it  
22 took the inputs, it built what's known in  
23 the art as a dialogue frame using a slot and  
24 filler approach where a semantic model  
25 parses the speech and tries to take each

Schmandt

word and use it in a context of a model of user intent, so it would build a dialogue frame and then the application interface to the geospatial model could look at that dialogue frame and determine whether it was complete. If it was complete, the system could perform the action which was usually graphical, but could be auditory. If it was not complete, then the dialogue system would indicate which parts of the frame needed to be filled. The system would then speak back to the user and ask a question directed to filling the parts of the dialogue frame that were missing or misrecognized, the user would say something or point at something, and this process would repeat until there was a dialogue frame that had adequate information to perform some action within the confines of the application for which it was written.

Q. In the next sentence of your paragraph 4, you say, I built one of the first graphical user interfaces for audio editing, employing keyword recognition on

1 Schmandt

2 voice memos in 1982 (Intelligent Ear).

3 What do you mean by I built in  
4 this context?

5 A. Again, with one colleague, I  
6 came up with the idea, I came up with the  
7 techniques of doing the keyword recognition  
8 and I implemented half of the software.

9 Q. You used hardware that someone  
10 else had built?

11 A. Yes. I actually used the same  
12 hardware that I -- some of the same hardware  
13 that I had used in the Put That There system.

14 Q. In the next sentence, you say, I  
15 built the first research-grade unified  
16 messaging system, etc.

17 What do you mean by I built in  
18 that context?

19 A. I came up with the idea. I  
20 can't claim sole ownership of the idea. The  
21 idea was certainly refined by conversation  
22 among my peers at the laboratory. I took on  
23 a grad student to work on it with me. I  
24 acquired and incorporated a new speech  
25 synthesizer and I wrote half the software,

1 Schmandt

2 roughly half.

3 Q. Did you build the hardware?

4 A. Some of the hardware.

5 Q. What aspects?

6 A. There was -- so there were a  
7 number of audio interconnects and telephone  
8 line interconnects. This was a system that  
9 could answer the phone and take voice  
10 messages, and if I called in, it could play  
11 me those voice messages and it could play me  
12 synthetic speech messages over the phone, so  
13 it needed a telephone line interface which I  
14 built and it needed some switchable audio  
15 interconnects so these various audio devices  
16 could get inputs and outputs from the phone  
17 line as needed.

18 Q. Did you build the processor and  
19 memory architecture?

20 A. No.

21 Q. Where did you get that?

22 A. That was applied by the Magic 6  
23 operating system running on an Interdata  
24 Model 732 computer, mini computer.

25 Q. What kind of grad student helped

1 Schmandt

2 you with the project that you call Phone  
3 Slave?

4 A. A good one. I'm not sure what  
5 you're asking. He was male.

6 Q. Let me --

7 A. He's now dead.

8 Q. I'm sorry to hear that. I'm  
9 very sorry to hear that. Let me specify.

10 Was it a Ph.D. graduate student  
11 or a master's graduate student who helped  
12 you with Phone Slave?

13 A. A master's.

14 Q. And what did the graduate  
15 student provide?

16 A. He wrote half the code.

17 Q. For doing what?

18 A. Oh, well the system as a whole  
19 had a graphical user interface and a voice  
20 user interface. So the graphical user  
21 interface had to display the messages, it  
22 was a touch sensitive interface, so it would  
23 accept user interaction. So he built a  
24 parser, specifically he built a parser that  
25 would lay out the screen and detect where a

Schmandt

1 user had touched, and on the basis of where  
2 the user had touched would formulate a  
3 command. This is interesting because I  
4 wrote the voice user interface, which was  
5 the user talking to the system, and we made  
6 sure through this compiled -- compiled code  
7 that the -- when the speech recognizer --  
8 for example, when the speech recognizer --  
9 when I said play my messages to the speech  
10 recognizer, that was the equivalent of the  
11 user touching a column of all messages, so  
12 those were reduced to the same command, the  
13 command was a symbolic, it was a number.  
14 Okay? So the front end would generate the  
15 same number whether I touched a column of  
16 messages or said play my messages, that  
17 command could then be fed into the  
18 application support system, which would  
19 actually play the audio or synthesize the  
20 text without having to write two versions of  
21 that, one for voice input and one for speech  
22 input, so he wrote that parser part and he  
23 wrote most of the graphical user interface,  
24 and I wrote the voice user interface and the  
25

1 Schmandt  
2 code that would actually answer the phone.  
3 So this was an interesting system in that it  
4 didn't just say, hi, you've reached Chris  
5 Schmandt, please leave a message, beep.  
6 This was in the early days of answering  
7 machines and voicemail. So it would  
8 actually say, hello, Chris's telephone,  
9 who's calling, please? And it would record  
10 that snippet.

11 And then it would say, what's  
12 this in reference to?

13 And it asked a series of five  
14 questions, and because it asked a series of  
15 five questions, later on I could say who  
16 left messages, and it could simply play  
17 those audio snippets, and there was a  
18 sociological aspect of this as well because  
19 in -- at least in the U.S., the protocol is  
20 that the called party says hello, and then  
21 it is the obligation of the calling party to  
22 identify themselves, so if you answer the  
23 phone saying who's calling, please, people  
24 answer that. And that was the hook. You  
25 know, once they started leaving a message,

1 Schmandt

2 they would continue to leave the message as  
3 opposed to hang up and think about it and  
4 maybe call back, maybe not.

5 Q. Okay.

6 So what was the nature of the  
7 speech recognition capability of the Phone  
8 Slave system that you say you built in 1983?

9 A. I'm sorry. What was the  
10 question? You froze for a second. Could  
11 you repeat the question, please?

12 THE COURT REPORTER: I think he  
13 is frozen now as well.

14 THE WITNESS: I think so.

15 MR. KNOPS: Hold on. I'll text  
16 him to let him know.

17 (Pause in the proceedings.

18 CONTINUED BY MR. NOROOZI:

19 Q. Can you guys hear me?

20 A. Now we can hear you. I did not  
21 hear the question.

22 Q. Thank you.

23 What was the nature of the  
24 speech recognition capability of the Phone  
25 Slave system that you say you built in 1983?

1 Schmandt

2 A. Speaker independent, recognizer  
3 connected speech, 120 word vocabulary.

4 Q. And did your graduate student  
5 build the speech recognition software, did  
6 you build the speech recognition software,  
7 did you both do it, or did you get it from  
8 somewhere?

9 A. No, we got it. It was a  
10 product, NEC-DP100.

11 Q. With respect to Back Seat Driver  
12 in paragraph 4 of your declaration, you say  
13 that along with your students, you built the  
14 first system for real time spoken driving  
15 directions.

16 What do you mean by you built?

17 A. In that case, I architected  
18 the -- I came up with the concept and  
19 architected the system, although it was  
20 built on some previous work that he had  
21 done. In that system, he wrote pretty much  
22 all the code.

23 Q. Can I ask you to specify who he  
24 is?

25 A. Jim Davis. James Raymond Davis.

1 Schmandt

2 Q. And why do you refer to him as  
3 he? Is he someone that you have already  
4 spoken about today?

5 A. I -- I don't get your question  
6 at all. He was male --

7 Q. No, no.

8 A. -- so I call him he.

9 Q. Sorry. I think my connection  
10 cut out.

11 Is this person, Mr. Davis,  
12 somebody that you already alluded to earlier  
13 today?

14 A. No.

15 Q. Okay.

16 The reason I asked is because  
17 you said he and that suggested to me that  
18 you had an antecedent basis for this he in  
19 your earlier testimony. So to clarify,  
20 Mr. Davis is not someone that you've already  
21 alluded to today before we asked about Back  
22 Seat Driver?

23 A. Not before --

24 MS. CANINO: Objection. Form.

25 A. -- we asked about Back Seat

1 Schmandt

2 Driver. If you wanted to know whether there  
3 was an antecedent basis, we could read back  
4 my response, but I don't think it matters.  
5 This was the only project listed here which  
6 Jim Davis worked on.

7 Q. And just so you understand, I'm  
8 not trying to play word games. I'm asking  
9 because I want to understand if there's a  
10 common collaborator or graduate student that  
11 worked on the prior projects that we talked  
12 about who also worked on Back Seat Driver  
13 that you were referring to.

14 A. No. Would you like to know the  
15 names of the people who worked on the prior  
16 projects?

17 Q. No. Don't need to.

18 A. Okay.

19 Q. Thank you.

20 Did you design the processor to  
21 memory architecture for Back Seat Driver?

22 A. Only indirectly in terms of  
23 working at the architecture, so the system  
24 could provide realtime driving directions.  
25 The first version of the system, the

Schmandt

software ran on a symbolics Lisp machine,  
Lisp, L-I-S-P, machine that was in our lab,  
and the vehicle would send a location of  
velocity every second over a telephone  
connection. And then there was another  
telephone connection to send the voice back  
to the vehicle, but the problem was cellular  
modems in 1988 weren't so great, and  
sometimes the data would drop out and we  
wouldn't get any data from the car for eight  
to ten seconds. Ordinarily that doesn't  
matter, but if you're traveling at 40 miles  
an hour, you might miss a turn, so that had  
issues, so Jim and I worked out that we  
could take the latest SPARCstation  
processor, which was at that point a  
SPARCstation 1+ that was just able to run  
common Lisp and put that in a vehicle  
although we needed to build a vibration  
damping platform because it had an internal  
hard disk. So I didn't design SPARCstation 1  
or SPARCstation 1+, but Jim and I had to  
design the physical setup for how the  
machine was placed in the car.

1 Schmandt

2 Q. Did you write the speech  
3 recognition software for Back Seat Driver?

4 A. Oh, no, I didn't.

5 Q. Where did you get that?

6 A. There actually wasn't any  
7 recognition software in Back Seat Driver,  
8 the input was touchtones, so you would spell  
9 a street name with touchtones. The output  
10 was synthetic speech because, of course, it  
11 was real time spoken driving directions.

12 Q. In the next sentence of  
13 paragraph 4 of your '140 patent declaration,  
14 you refer to Conversational Desktop 1985,  
15 Chatter 1993 and MailCall 1996.

16 Did you build the processor to  
17 memory architecture in any of those systems  
18 that you reference?

19 A. No.

20 Q. Did you write the speech  
21 recognition software for any of those  
22 systems?

23 A. For the Chatter system, we had  
24 software -- my recollection is we had  
25 software recognition from some small company

Schmandt

which we had to modify to put into an appropriate software architecture with their help for our application, but we did not rewrite the recognizer. The Conversational Desktop used the aforementioned DP200 recognizer and MailCall used a recognizer from -- recognizer software from Texas Instruments called Dagger.

Q. And what about Chatter 1993?

A. That was the one I was just talking about. We took some small company's recognizer and we made some modifications to it, but I would not say we actually changed the recognition algorithm. I think we worked mostly with the API.

Q. And with the assistance of the company who wrote the speech recognizer; right?

A. I can't remember exactly how that worked. Sorry. That was 30 years ago.

Q. What processor and memory hardware did you use for Conversational Desktop 1985, Chatter 1993 and MailCall 1996, if you recall?

1 Schmandt

2 MS. CANINO: Objection --

3 A. Conversational --

4 MS. CANINO: -- form.

5 A. Conversational Desktop was  
6 Magic -- 1985. 1985. It was a hybrid of  
7 Magic 6 operating system running on  
8 PerkinElmer 3220 computers, some version of  
9 DOS running on a PC and Berkeley UNIX  
10 running on one of the early multi-bus Sun  
11 microsystems computer, so Conversational  
12 Desktop had multiple stations. It was  
13 designed for two parties to interact with  
14 each other. It was easy to whip the code  
15 off for the PerkinElmer, we had great  
16 software to do that, but we only had one of  
17 those, so we had to build a version of the  
18 software to run under UNIX because we were  
19 then switching to the Sun computers. It was  
20 all a very distributed and network system.

21 Q. Did you write the speech  
22 recognition software for Put That There?

23 A. No.

24 Q. What did you use for that?

25 A. NEC-DP100.

1 Schmandt

2 Q. Referring to the systems you say  
3 you built for handheld mobile devices in  
4 paragraph 4 of your declaration, those being  
5 ComMotion 1999, Nomadic Radio 2000,  
6 Impromptu 2001, and Symphony 2004, did you  
7 build the processor to memory architecture  
8 for any of those systems?

9 A. No.

10 Q. Did you use existing processor  
11 to memory architecture that was in the  
12 relevant mobile handheld devices?

13 A. Well, we had to build these.  
14 ComMotion, we had to build the hardware. We  
15 used an existing processor board. The same  
16 with Nomadic Radio. Impromptu used a  
17 combination of software that was native on  
18 the Hewlett Packard IPAQ, that's I-P-A-Q,  
19 and some software that we wrote on our own  
20 UNIX machines for server. And Symphony, I  
21 can't remember the details of. I can't  
22 remember whether the recognizer was done,  
23 that was a server-based system as well. I  
24 can't remember the details of that.

25 Q. For the speech recognition and

Schmandt

handheld mobile devices systems identified in paragraph 4 of your declaration, did you build the speech recognizer software for any of those systems?

A. No.

Q. Where did you get the speech recognition software?

A. Those came from all over the place. Nomadic Radio was open -- Nomadic Radio was an AT&T recognizer, I believe the ComMotion was Open Source Sphinx. I can't remember the other two.

Q. In the next sentence of your declaration, you refer to Memory Prosthesis 2004. Did you build the memory and processor architecture for Memory Prosthesis 2004?

A. No.

Q. Did you write the speech recognition software for Memory Prosthesis 2004?

A. No.

Q. Where did you get the speech recognition software for Memory Prosthesis

1 Schmandt

2 2004?

3 A. I believe we used a network  
4 version of IBM ViaVoice.

5 Q. And where did you get the  
6 processor to memory architecture for Memory  
7 Prosthesis 2004?

8 A. So the -- there were a number of  
9 parts -- there were a number of parts to  
10 that system. Some parts of that system ran  
11 real time on Hewlett Packard IPAQ, which I  
12 mentioned before. The recognition was all  
13 done offline over a network. On UNIX work  
14 station, I think it was a NeXT computer,  
15 N-E-X-T, but I'm not sure.

16 Q. Was the Memory Prosthesis 2004 a  
17 real time speech recognition system?

18 A. Oh, no. Well, some parts of it  
19 worked in real time, but the whole test, it  
20 was a memory prosthesis, the whole test was  
21 would it help you remember something when  
22 you looked back two years later.

23 Q. So it did not need to be real  
24 time and it was not real time; fair?

25 A. The --

1 Schmandt

2 MS. CANINO: Objection. Form.

3 A. How close to real time it was  
4 would be a question of network latency, but  
5 it was not a design constraint.

6 Q. With respect to Synthetic News  
7 19 -- withdrawn.

8 With respect to Synthetic News  
9 Radio 1999, did you build the processor to  
10 memory architecture for that system?

11 A. No.

12 Q. With respect to Synthetic News  
13 Radio 1999, did you build the speech  
14 recognition software for that system?

15 A. Well, there were several aspects  
16 of it, meaning how broadly you used the term  
17 recognition. So basically what we were  
18 doing was capturing newscasts and doing  
19 basically a rough recognition on them using  
20 large vocabulary speaker independent  
21 recognizer, and then we were processing, and  
22 I would consider this to be, based on the  
23 literature that I read, I would consider  
24 this to be part of the recognition stage.  
25 We took those results which were very noisy

Schmandt

and did latent semantic analysis of those results. Latent semantic analysis attempts to identify words that are different from other words, it attempts to cluster things by topic, so our goal here was not to understand every word, but to understand the topic, so we wanted to find in hourly newscasts which of the audio was continuation of a previous story and which of it was introducing a new story, and we also wanted to get some tags or identifiers out of the recognized results so that we could use it down the road. So if there was a story that a user said, oh, I want to follow that, then the Synthetic News Radio would make a personalized newscast every hour. If it was a story the user wanted to follow, we would try to find follow-up, you know, future stories about it. Future could also say, oh, I'm not interested in that, and then we would kill it. So the recognition problem there was really one of topic identification, so we did not build the word recognizer, but we built a topic

1 Schmandt

2 recognizer using latent semantic analysis.

3 Q. In paragraph 6, you say that you  
4 built a number of speech recognition  
5 client/server distributed systems. Did you  
6 build the processor to memory architecture  
7 for any of the systems you're referring to  
8 in paragraph 6?

9 A. No.

10 Q. Did you build the speech  
11 recognition software for any of the systems  
12 that you're referring to in paragraph 6?

13 A. I built two systems that might  
14 be considered to be speech recognition, but  
15 weren't conventional speech recognition, so  
16 in one system, I was at a main computer, I  
17 was trying to give somebody spoken driving  
18 directions, you see, this was a theme for  
19 three or four years in my work, so we were  
20 trying to give somebody spoken driving  
21 directions. The assumption was that they  
22 were writing those directions down, so the  
23 problem with -- the problem with that  
24 scenario is you don't know how fast they  
25 write. If you speak too fast, you've lost

Schmandt

them. If you speak too slowly, they're bored. Okay? So the way people -- so we looked at the way people do it and people give feedback, what linguists call back-channels, which are in the case of a telephone, they're all acoustic. In the case of face to face, they're visual, they're facial expression gaze, directional gaze, etc., so this was telephone-based. So I built a system that used some components that are employed in speech recognition, energy detection, pitch extraction, pitch contour mapping, basically to try to understand the non-phonemic characteristics of the response, so to differentiate uh-huh from hold on a minute without recognizing the words, so we're not a word recognizer, but I would call it a speech recognizer. That was one system.

Another system was, and in a funny way this has become relevant again with deep fake stuff, although we were much, much, much earlier, I built an interface to take the output of a filter bank. Right?

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So a filter bank gives you the energy in various frequency bands. This is very much a piece of a lot of early speech recognition. Only what I did was I identified 16 mouth positions during speech, and then looking at the frequency band information from this piece of speech recognition hardware, I was looking at those parameters and trying to determine not what the person was saying, but based on their sound, what position they would be in because this was then used to drive a computer graphic or visual image stored on a video disk of that person's face and make it appear that they were saying the audio stream. Again, not traditional word recognition, but related to speech recognition. There was never any reason for me to build a word -- a word recognizer. Lots of other people were doing that. I had to do something new and different.

Q. With respect to -- withdrawn.

To summarize, with respect to paragraph 4 and the systems identified in

1 Schmandt

2 your paragraph 4, you did not build the  
3 processor to memory architecture for any of  
4 those systems; right?

5 A. That's correct.

6 Q. And with respect to the systems  
7 identified in paragraph 4, you did not build  
8 the word recognition software for any of the  
9 systems identified in that paragraph; right?

10 A. That's correct.

11 Q. And neither did anyone on your  
12 team; right?

13 A. That's correct.

14 Q. And with respect to paragraph 4,  
15 no one on your team built the processor to  
16 memory architectures used in the systems  
17 identified in that paragraph; right?

18 A. I think that's been asked and  
19 answered, but correct.

20 Q. Just to be clear, before I asked  
21 about you. This time I asked about your  
22 team.

23 A. Oh, I'm sorry. My apologies.

24 Q. With respect to the systems  
25 referred to in paragraph 6 of your

1 Schmandt

2 declaration, you -- withdrawn.

3 With respect to the systems  
4 identified in paragraph 6 of your  
5 declaration, neither you nor anyone on your  
6 teams built the word recognizer software, if  
7 any, that was used in those systems; right?

8 A. That's correct.

9 Q. Turning to paragraph 16 of your  
10 '140 patent declaration, you provide a  
11 summary of certain --

12 A. Just a moment, please.

13 Q. -- legal --

14 A. Just a moment.

15 Q. Sure.

16 A. Okay.

17 Q. In paragraph -- withdrawn.

18 In paragraph 16, including the  
19 bullets listed under paragraph 16, you  
20 identify certain alleged legal principles  
21 that you applied in forming your opinions in  
22 this declaration; correct?

23 MS. CANINO: Objection to form.

24 A. I'm sorry. What was the verb in  
25 that question? I what? You said you what?

1 Schmandt

2 Q. There were two verbs.

3 A. Okay.

4 Q. So let me ask the question  
5 again.

6 In paragraph 16 of your '140  
7 patent declaration, you identify certain  
8 purported legal principles that you say you  
9 applied in forming your opinions in that  
10 proceeding; true?

11 MS. CANINO: Objection. Form.

12 A. Yes; but these are principles  
13 that I've been informed of. I'm not --  
14 obviously I'm not a lawyer.

15 Q. One of the principles that you  
16 say you applied is a list -- withdrawn.

17 Take a look at the fourth bullet  
18 point on page 16 of your '140 patent  
19 declaration.

20 A. Okay.

21 Q. Do you see that in the fourth  
22 bullet point on page 16 of your '140 patent  
23 declaration, you say proof of obviousness  
24 does not depend on or require a showing --  
25 or require showing a teaching, suggestion,

1 Schmandt

2 or motivation to combine?

3 A. Yes.

4 Q. And that's one of the legal  
5 principles or alleged legal principles that  
6 you applied in forming your opinions?

7 MS. CANINO: Objection. Form.

8 A. Again, I'm not a lawyer, but I  
9 think that was KSR.

10 Q. Well, regardless of whether you  
11 think any specific case says that or not,  
12 the language you just read from the fourth  
13 bullet point on paragraph 16 is one of the  
14 legal principles or purported legal  
15 principles that you applied in forming your  
16 opinions?

17 A. Yes. This is saying that the  
18 proof of obviousness does not depend on the  
19 references themselves showing a teaching,  
20 suggestion, or a motivation to combine.  
21 That's my understanding.

22 Q. Okay. It does not say there  
23 anything about the references themselves, so  
24 are you now modifying the language in that  
25 fourth bullet point on page 16?

1 Schmandt

2 A. So this is legal language. I  
3 didn't even write this. Okay? This is the  
4 lawyers informing me of the basis of  
5 obviousness, and these are principles which  
6 I then apply. If you're asking me whether I  
7 need to show motivation to combine, I think  
8 my declaration speaks for itself.

9 Q. And I am reading this bullet  
10 point in your declaration with respect to  
11 legal principles to say that proof of  
12 obviousness does not depend on or require  
13 showing motivation to combine.

14 Is that an accurate statement of  
15 a legal principle that you applied?

16 A. I believe that the legal  
17 principle is that the art documents, the art  
18 itself does not need to show a motivation to  
19 combine.

20 Q. So you are modifying the  
21 language that is in the fourth bullet point  
22 on page 16?

23 A. Well, this is talking about  
24 what's explicit or implicit in the art  
25 itself, an explicit or implicit teaching.

1 Schmandt

2 It is not talking about my opinions or the  
3 basis for my opinions. This is talking  
4 about the actual teachings. Teachings, of  
5 course, paint one in these legal terms that  
6 refers to the actual art document itself.

7 Q. Let's turn to paragraph 67 of  
8 your '140 patent declaration. It's at page  
9 51, beginning at page 50, but I would like  
10 to ask you about page 51.

11 A. Okay. Sorry. I need to read  
12 the paragraph first.

13 (Witness reviewing document.)

14 A. Okay.

15 Q. You say toward the end of  
16 paragraph 67 on page 51 of your '140 patent  
17 declaration that modifying Jiang to use  
18 Chen's clustered processor and memory  
19 architecture would not significantly  
20 increase cost.

21 Do you see that?

22 A. Yes.

23 Q. In your declaration, you do not  
24 provide a quantitative cost comparison of  
25 Jiang's architecture compared to the

1 Schmandt

2 modified architecture that you propose based  
3 on Chen; true?

4 A. That's true.

5 Q. In your declaration, you don't  
6 specify what you consider to be a  
7 significant increase in cost with respect to  
8 the modification of Jiang in view of Chen  
9 that you propose; true?

10 If you're speaking, I can't hear  
11 you. I don't know if you went on mute or  
12 what happened.

13 I cannot hear you. I see your  
14 lips moving, but --

15 A. Hello, hello.

16 Q. Yes.

17 A. We're back? Sorry. I bumped  
18 the mute button on my mic. I was going to  
19 say there's design tradeoffs. Obviously  
20 adding -- adding hardware is not going to be  
21 free, so of course there's going to be some  
22 cost. The question about cost is not an  
23 absolute one, how many dollars would it cost  
24 or what percentage over existing solution  
25 would it cost, but rather what is the

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imputed value or what is the actual value,  
what will people pay, what would people pay  
for a system that could do better  
recognition in real time, how valuable is  
that to your end users, and if it's valuable  
enough to the end users, then you throw in a  
little more hardware, if the problem gets  
you a measurable improvement, then it's  
beneficial to do so, you might make the  
decision, so cost isn't an absolute number.  
Cost would be part of a design tradeoff and  
also looking at your customer base.

Q. In your declaration, you did not  
undertake a quantitative or qualitative cost  
versus purported improvement in comparison  
to customer-based analysis to get into those  
details; fair?

A. Right. That's correct.

Q. In the last sentence in  
paragraph 67 of your declaration at the  
bottom of page 51, you say that because Chen  
and Jiang each contemplate hardware  
architectures with a plurality of signal  
processors, a POSITA would have been capable

1 Schmandt

2 of simply substituting Chen's clustered  
3 processing architecture for Jiang's without  
4 undue experimentation.

5 Is that a fair summary of what  
6 you say there?

7 A. Yes.

8 Q. When you refer to Jiang's  
9 processing architecture, what are you  
10 referring to?

11 A. The various hardware components  
12 that are disclosed in Jiang and the way  
13 they're put together.

14 Q. What aspect of Jiang's  
15 processing hardware would be replaced by  
16 Chen's clustered processing architecture?

17 A. If you want to talk about that,  
18 that's fine, but I need to pop up Jiang.

19 Q. Well, I -- no. Let me be clear.  
20 Withdrawn.

21 Can you show me in your  
22 declaration where you explain which specific  
23 aspect of Jiang's processing architecture  
24 would be replaced by Chen's clustered  
25 processing architecture?

1 Schmandt

2 A. So you used the term replaced.

3 I don't think combination requires bodily  
4 incorporating what Chen teaches into Jiang.

5 So we're not really talking about pulling  
6 out a piece of Jiang and sticking it in Chen  
7 instead. What we're talking about is how  
8 one would modify Jiang in light of Chen, and  
9 in order to appreciate that, we would have  
10 to go back to the section of my declaration  
11 where I describe Jiang.

12 Q. Okay.

13 So your declaration in paragraph  
14 67 in the last sentence says, substituting  
15 the more efficient clustered processing  
16 architecture of Chen for Jiang's processing  
17 architecture.

18 Do you see that?

19 A. I do.

20 Q. So your declaration proposes a  
21 substitution of one processing architecture  
22 for another; right?

23 A. Of architecture, not of parts.

24 So the architecture is the arrangement of  
25 parts.

1 Schmandt

2 Q. And my question is, can you show  
3 me where in your declaration you explain  
4 what aspect of Jiang's processing  
5 architecture would be substituted by what  
6 aspect of Chen's clustered processing  
7 architecture? From your declaration itself.

8 A. Sure.

9 (Witness reviewing document.)

10 A. Well, in the next paragraph, I'm  
11 discussing calculating scores during a  
12 lexical tree search. There's sort of a  
13 whole paragraph here, paragraph 68, that I  
14 think addresses that. So Jiang already has  
15 the audio hardware. So you can use a  
16 portion of Jiang for calculating tree  
17 scores. So, again, my discussion in  
18 paragraph 74, perhaps it's a little bit  
19 indirect, but it's talking about pruning,  
20 which is an aspect of going through the  
21 search base of lexical trees to find the one  
22 that is the best -- the best match. A  
23 POSITA would have been motivated to employ  
24 the clustered processor architecture  
25 including -- in addition to the pruning

1 Schmandt

2 techniques. So Jiang has a single  
3 processor -- Jiang proposes multiple  
4 architectures, but there is always the  
5 single architecture in the various -- in  
6 various hardware architectures is a single  
7 processor that does tree search, and it is  
8 specifically the tree search that I have  
9 focused on as benefitting from the parallel  
10 processing.

11 Q. Okay.

12 So your proposed substitution  
13 for the '140 patent with respect to Jiang  
14 and Chen is to replace Jiang's purported  
15 single processor tree search engine 74 with  
16 Chen's clustered processor and memory  
17 architecture for the tree search engine 74  
18 in Jiang; is that fair?

19 A. Or to modify such that it used  
20 multiple processors in an architecture such  
21 as disclosed by Chen. It does not have to  
22 be exactly what Chen discloses.

23 Q. But what aspect of Chen does it  
24 have to be?

25 A. An architecture that has

1 Schmandt

2 multiple processors with an appropriate  
3 memory model.

4 Q. What's an appropriate memory  
5 model?

6 A. Well, then you have to look at  
7 the interconnects that are shown in Chen 54  
8 and how those -- how those cluster.

9 Q. Why does the person of ordinary  
10 skill need to use the particular processor  
11 to memory architecture disclosed in Chen  
12 as a substitute for Jiang's tree search  
13 engine 74?

14 A. Well, they don't have to, but  
15 Chen is a teaching as to how to do it.  
16 Processors have memory. If you're going to  
17 have clusters of processors, you're going to  
18 have to figure out how to manage the memory  
19 between them. They are not each operating  
20 completely independently. They're, in this  
21 case, being -- they should be working in  
22 harmony to solve a problem which is an  
23 aspect of speech recognition which is  
24 specifically the tree search problem.

25 Q. In the bottom of paragraph 68,

1 Schmandt

2 you say, configuring Chen's circuitry to  
3 specifically recognize speech pursuant to  
4 Jiang would have required only software  
5 programming and well-known computing  
6 techniques and structures.

7 Do you see that?

8 A. No. Hang on. I'm not there.

9 You said paragraph 68?

10 Q. Yes.

11 (Witness reviewing document.)

12 A. Yes.

13 Q. In your declaration, you don't  
14 specify what software programming or  
15 computer techniques and structures would be  
16 needed to configure Chen's circuitry to  
17 recognize speech pursuant to Jiang; fair?

18 A. I don't list the details, but I  
19 do express an opinion that a POSITA would  
20 understand those details, would understand  
21 how to do it.

22 Q. With respect to your  
23 substitution of Chen's clustered processing  
24 architecture for Jiang's tree search engine  
25 74, do you see on page 56 of your

1 Schmandt

2 declaration in paragraph 73 that you have an  
3 annotated version of --

4 A. Wait. Slow -- hold on. Hold  
5 on. No, I don't see it because I'm not  
6 there.

7 Q. Okay. Let me rephrase.

8 Take a look at your annotated  
9 Figure 4 from Chen on page 56 of your  
10 declaration under paragraph 73.

11 A. Okay. I'm there.

12 Q. Do you see that in Figure 4 Chen  
13 shows four clusters of processors?

14 A. Yes.

15 Q. Can you show me in your  
16 declaration where you specify how many of  
17 those four clusters would be substituted for  
18 Jiang's tree search engine 74?

19 A. Without looking, I doubt that I  
20 do and I don't recall that I do because that  
21 would be a design decision. More processors  
22 is going to be faster, more processors is  
23 going to be -- add to cost.

24 Q. So --

25 A. Two processors makes it run

1 Schmandt

2 faster, four processors makes it run faster  
3 still.

4 Q. So is it your testimony that a  
5 person of ordinary skill would have been  
6 motivated to utilize any number of Chen's  
7 clusters for Jiang's tree search engine 74?

8 A. I am not sure I understand the  
9 question. What do you mean by use any  
10 number?

11 Q. Okay.

12 So you just said that it would  
13 be a design choice for the person of  
14 ordinary skill as to how many of Chen's  
15 clusters of processors they would allegedly  
16 substitute for Jiang's tree search engine  
17 74; right?

18 A. Correct.

19 Q. Do you have an opinion as to how  
20 many of Chen's clusters of processors the  
21 person of ordinary skill would have been  
22 motivated to substitute for Jiang's tree  
23 search engine 74?

24 A. No, because I don't have a  
25 specified -- I don't have a speed for any of

Schmandt

those processors. One would have to calculate, given the very CPU specifications and the algorithm, one would have to time out the algorithm and figure out how much time could be saved in each level of parallel processing versus batch processing. It's fairly simple. You have a number of trees that you have to traverse. You can do each one in sequence. If you do each one in sequence, the trees are various lengths, they're going to take various amounts of time, you can look at your data, you can get a mean traversal length, a mean path traversal length, and from that you can say, okay, it's going to take so many microseconds or so many seconds to perform this, and then you have to look at the characteristic of your multiple processors. Let's assume they're the same processor, just for argument sake, you know, if they're the same argument -- if they're the same processor, then it's pretty clear if you're working with the mean path traversal time, two processors cuts that in half, four

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processors cuts that in a quarter. There may be issues you have to deal with that we haven't counted for yet for memory loading and unloading that may give a further boost one way or another, but it's pretty easy to look at the numbers, you know, so I as the designer can say give me 16 processors, I can make this run 16 times faster, I better talk to somebody in marketing or user experience to see what the customer really wants. And then you're getting back to the question of how long of a delay is tolerable. Right? So in order to run in real time, there's two constraints here, one is in order to run in real time, Jiang talks about 10 millisecond frames, so you really have to perform this calculation in 10 milliseconds. If you can't perform it in more or less 10 milliseconds, then you're going to start to lag and data is going to pile up and you're going to be getting farther and farther behind, and that's not attractive, so one metric is how much can I get done in 10 milliseconds. Okay? But at

1 Schmandt

2 the same time, there's always some lag, it  
3 always takes a little bit of time to finish  
4 the recognition and come up with the final  
5 score. So that's the second number that's  
6 really a question of user experience and the  
7 question is, you know, for this particular  
8 application, how much delay between when the  
9 user finishes speaking and the system is  
10 capable of responding or acting on that is  
11 tolerable, is it a half a second, is it a  
12 second, is it 3.2 seconds. Right? And you  
13 can take all of these numbers and do a  
14 calculation that will come up with an  
15 optimal number of processors or clusters.

16 Q. In your declaration, you did not  
17 undertake the calculations and analyses that  
18 you just described that you say a POSA would  
19 need to undertake in order to determine how  
20 many clusters of processors, if any, from  
21 Chen the POSA would be motivated to  
22 substitute for Jiang's tree search engine  
23 74; right?

24 A. What I said was that a POSITA  
25 would have the knowledge to be able to do

1 Schmandt

2 this, and that's certainly true. What I've  
3 just described is not rocket science, it's,  
4 you know, undergraduate computer science.

5 Q. In your declaration, you did not  
6 undertake the analysis that you just said a  
7 person of skill would need to undertake to  
8 determine how many of Chen's clustered  
9 processors to use in place of Jiang's tree  
10 search engine 74, if any; fair?

11 A. There was no need for me to do  
12 that, so I did not do it.

13 Q. Let's take a break.

14 A. Okay.

15 Q. Five, ten minutes.

16 (Whereupon, a brief recess was  
17 taken.)

18 CONTINUED BY MR. NOROOZI:

19 Q. Mr. Schmandt, turning to  
20 paragraph 70 of your declaration on page 53,  
21 could you please let me know when you are  
22 there.

23 A. Yes. Okay.

24 Q. Mr. Schmandt, you see that the  
25 preamble of claim 1 requires a speech

1 Schmandt

2 recognition circuit?

3 A. Yes, it does.

4 Q. Overall, in your entire theory  
5 as to how the speech recognition circuit of  
6 claim 1 is met, can you tell me where in  
7 your declaration I can find your explanation  
8 of what constitutes the speech recognition  
9 circuit?

10 A. Well, I say here Jiang describes  
11 in detail a number of computer-implemented  
12 structures and hardware components including  
13 a microphone, A/D converter, RAM, ROM, input  
14 and output device, microprocessor-based  
15 electronics, PCs, ports, and program modules  
16 that would have comprised the circuitry.

17 Q. So is Jiang alone the speech  
18 recognition circuit of your theory?

19 A. Yes.

20 Q. What about Chen?

21 A. Chen is also circuitry.

22 Q. There are lots of things that  
23 are circuitry in this world; right?

24 A. Yes.

25 Q. What is your speech recognition

1 Schmandt

2 circuit for purposes of your theory as to  
3 claim 1 of the '140 patent?

4 A. The sentence that I just read.

5 Q. Does the speech recognition  
6 circuit of your theory include Chen in  
7 addition to components from Jiang?

8 A. Well, modifying Jiang --  
9 modifying Jiang in light of Chen would not  
10 reduce the fact that Jiang discloses  
11 circuitry.

12 Q. That's not what I'm asking  
13 about, just to be clear. You understand  
14 that in order to meet claim limitations  
15 based on the prior art, you have to explain  
16 what in the prior art, whether alone or  
17 combined, would actually map on to the claim  
18 limitations?

19 A. Yes.

20 Q. So what is the speech  
21 recognition circuit of your theory with  
22 respect to Jiang and Chen for purposes of  
23 the '140 patent?

24 A. It's that list of components or  
25 parts or aspects of Jiang which I just read.

1 Schmandt

2 Q. Where does Chen fit in, if at  
3 all?

4 A. Well, Chen would -- Jiang would  
5 be modified in light of Chen to incorporate  
6 the Chen cluster architecture. The Chen  
7 cluster architecture adds more circuitry.  
8 It doesn't detract from the original pile of  
9 parts which make up circuitry. So if Jiang  
10 discloses circuitry and Chen is composed of  
11 circuitry, then if I take parts of Chen and  
12 put them in Jiang, that's not going to  
13 change the circuitry characteristic of Jiang  
14 with respect to the preamble.

15 Q. I think you're thinking about  
16 this in a very different way from what my  
17 question is asking, so I'd like to get on  
18 the same page with you. I'm not asking  
19 whether you think Jiang has circuitry and  
20 I'm not asking whether you think Chen has  
21 circuitry. I'm asking, what do you identify  
22 in your declaration as the speech  
23 recognition circuit for purposes of your  
24 theory that you believe meets the  
25 requirement of a speech recognition circuit

1 Schmandt  
2 and other aspects of speech recognition  
3 circuit as required in the challenged claims  
4 of the '140 patent?

5 A. I think it's all those parts  
6 that I enumerated. I listed. I didn't  
7 enumerate them. Those are all aspects of  
8 speech recognition as disclosed by Jiang and  
9 they're all pieces of circuitry.

10 Q. Where does -- withdrawn.  
11 Does the speech recognition  
12 circuit of your theory as disclosed in your  
13 declaration include anything from Chen?

14 A. No. Well, let me -- hold --  
15 hold off on that. Let me see if I did  
16 actually say anything on it.

17 (Witness reviewing document.)

18 A. Well, as I said in paragraph 73  
19 near the top of 57, Chen is expressly  
20 described as utilizing commercially  
21 available microprocessors and memory chips.  
22 I don't say there that microprocessors and  
23 memory chips are circuitry.

24 Q. That's not what I'm asking, sir.  
25 Do you understand that you need

1 Schmandt  
2 to identify in your declaration what you  
3 contend is the speech recognition circuit  
4 that you allege to meet the challenged  
5 claims?

6 A. Yes. And I think I did. I read  
7 you a sentence.

8 Q. So the speech recognition  
9 circuit of your theory only includes  
10 components from Jiang, not anything from  
11 Chen?

12 MS. CANINO: Objection. Asked  
13 and answered.

14 A. Jiang is sufficient to show the  
15 claim circuitry if indeed the preamble is  
16 limiting, and adding Chen does not change  
17 that, so my answer is the same.

18 Q. But I think that the way you're  
19 answering makes me worry that we have a  
20 disconnect and I don't want any confusion  
21 between the question and answer. So I'm not  
22 trying to trick you. I'm trying to really  
23 get clarity on your opinion just so you  
24 understand where I'm coming from.

25 A. Okay. And do you want -- okay.

1 Schmandt

2 You haven't asked a question. Go ahead.

3 Q. Yeah.

4 So for background for you to  
5 understand where I'm coming from, there's a  
6 difference between the question of whether  
7 you believe Jiang has speech recognition  
8 circuitry and what it is that you ultimately  
9 identify in your declaration as a speech  
10 recognition circuit for purposes of mapping  
11 onto the claim.

12 Do you understand the  
13 distinction I'm drawing so far?

14 A. No, I don't.

15 Q. Is it your opinion that the  
16 speech recognition circuit required by  
17 claim 1 is fully met by what you identify  
18 from Jiang in paragraph 70 of your  
19 declaration without any reliance on Chen?

20 A. Yes.

21 Q. And is that your theory for  
22 purposes of this proceeding that you set  
23 forth in your declaration?

24 A. It's what I said; yes. I stand  
25 by what I said.

1 Schmandt

2 Q. Let's turn to limitation 1(a).

3 On page 58, you say toward the bottom of the  
4 page that modifying Jiang's speech  
5 recognition circuit to use clusters of  
6 processors as taught by Chen reduces the  
7 expense incurred by grouping commercially  
8 available, simple processors into clusters.

9 Do you see that?

10 A. No. I'm still working on  
11 looking at that paragraph.

12 (Witness reviewing document.)

13 A. Okay.

14 Q. In paragraph 74 of your  
15 declaration near the bottom of page 58, do  
16 you see that you say modifying Jiang's  
17 speech recognition circuit to use clusters  
18 of processors as taught by Chen reduces the  
19 expense incurred by grouping commercially  
20 available, simple processors into clusters?

21 A. Yes.

22 Q. When you say reducing the  
23 expense, you don't explain what you're  
24 comparing the expense to; right?

25 A. No. You're right.

1 Schmandt

2 Q. You also don't provide a  
3 quantitative analysis of how or how much the  
4 expense would be reduced; right?

5 A. No. It would be silly to try to  
6 perform a quantitative analysis on a  
7 hypothetical and it's really not my job to  
8 price out all these various parts as of 2000  
9 whatever.

10 Q. Is your testimony with respect  
11 to reducing expense purporting to say that  
12 you think that using the clusters of  
13 processors taught by Chen -- withdrawn.

14 When you say reducing the  
15 expense near the bottom of page 58 in  
16 paragraph 74, what are you comparing?

17 A. So I agree that sentence is not  
18 as precise as it could be. I am comparing  
19 it to other clustering architectures or  
20 specially built processors that might be  
21 used and that were proposed in the various  
22 background references that I cited as a way  
23 of getting the parallelism provided by the  
24 clusters in Chen. So I'm not saying  
25 obviously that it is less expensive than

1 Schmandt

2 Chen's single processor. Of course it would  
3 be more expensive. But if I were looking at  
4 competing architectures to give the same  
5 performance improvement, Chen's solution  
6 would be attractive in terms of cost because  
7 it uses off the shelf components.

8 Q. In your declaration, you did not  
9 provide an analysis showing the degree to  
10 which Chen's clustered architecture would be  
11 cheaper, if at all, compared to other  
12 clustered architectures; right?

13 A. I cited to a number of other  
14 clustered architectures, but I did not do a  
15 cost comparison; no.

16 Q. Chen itself is not a speech  
17 recognition art; fair?

18 A. I'm sorry?

19 Q. Chen itself --

20 A. What was the first -- Chen?

21 Q. Yes. Let me rephrase it.

22 Withdrawn.

23 Chen itself is not art in the  
24 field of speech recognition; fair?

25 A. No.

1 Schmandt

2 Q. And by no, you mean that you  
3 agree that Chen is not art in the field of  
4 speech recognition; right?

5 A. No. I disagree with the  
6 statement as you stated it, it was that Chen  
7 is not art. Double negative. You said Chen  
8 is not art. I agree that Chen is not art,  
9 and I said no, I don't agree.

10 Q. No. No. That's not the  
11 question.

12 Does Chen specifically teach  
13 anything about speech recognition?

14 A. Not to my recollection.

15 Q. In your declaration, you do not  
16 contend that Chen is in the field of speech  
17 recognition; fair?

18 A. I don't use the term in the  
19 field that I recall, but I do have a  
20 discussion citing to a number of pieces of  
21 material that parallel computing as a way of  
22 enhancing speech recognition was certainly  
23 part of the field, building speech  
24 recognition architectures and building them  
25 in parallel or clustered processing

1 Schmandt

2 architectures. This was well-known.

3 Q. Jiang's tree search engine 74  
4 performs both the alleged computation and  
5 the actual word recognition; right?

6 A. I'm sorry, which computation?  
7 It's all computation.

8 Q. Jiang's tree search engine 74  
9 performs the search and recognition stages  
10 of speech recognition; right?

11 A. The search stage is a  
12 recognition stage. I'm confused by your  
13 question.

14 Q. Jiang's tree search engine 74  
15 performs the search stage of speech  
16 recognition; right?

17 A. Among other tasks, yes.

18 Q. Jiang's tree search engine 74  
19 performs what you identify as the initial  
20 and final score in your theory as to the  
21 '140 patent; right?

22 A. I'm sorry. You cut out for a  
23 second there. Did you say initial and final  
24 score? I just heard --

25 Q. Jiang's tree search engine 74

1 Schmandt

2 performs what you identify as the initial  
3 and final scores; right?

4 A. What claim number is the initial  
5 and final scores section?

6 Q. It's for claim 1 of the '140  
7 patent.

8 A. Well, okay. I think that's like  
9 around E or F. Initial score.

10 (Witness reviewing document.)

11 A. I don't see the claimed final  
12 score, but the initial score finally is  
13 performed by Jiang.

14 Q. Where in Jiang?

15 (Witness reviewing document.)

16 A. So Jiang teaches -- looking at a  
17 feature vector in acoustic models and  
18 determining the fit of the feature vector to  
19 the set of acoustic models to determine  
20 which phoneme was most likely spoken, but,  
21 of course, it doesn't come up with a single  
22 match, it actually tests all the phonemes  
23 and so it will come up with scores for all  
24 the phonemes. Those scores are then  
25 compared to the set of lexical trees. I

Schmandt

think initial score could be scored as a snapshot at any point in this process, but initial scores could also be the score of the initial 10 millisecond audio sample, and so having taken -- having determined which phonemes are most probable and a measure of their probability or likelihood or distance to the future vector from the model itself, this is then applied to all of the lexical trees. In the case of the very first phoneme, the very first sample, this would be looking at the root nodes of these prefix trees. So each of these root nodes has a phoneme, it's marked or characterized by a phoneme, so we're scoring each of the lexical trees based on the score of the first of the phoneme match on the first sample coming out of the feature extractor.

Q. I think my question may not have been clear enough for you, so let me try to direct you to a part of your declaration and we'll go on that basis.

A. Okay.

Q. Would you please go to paragraph

1 Schmandt

2 87 of your declaration for the '140 patent.

3 And I'm just going to say for the record

4 that unless I refer to the '319 patent

5 declaration, for now we're talking about the

6 '140 patent declaration.

7 A. Understood.

8 I'm sorry. Could you repeat the

9 paragraph number again?

10 Q. Paragraph 87.

11 A. Okay. I have it. Let me look

12 at it.

13 (Witness reviewing document.)

14 A. Okay. I think that paragraph

15 basically says what I was just saying in

16 answer to your question, but go ahead.

17 Q. So my question is with respect

18 to the so-called initial score that you

19 identify in Jiang in paragraph 87 of your

20 declaration, do you see that it is the tree

21 search engine 74 in Jiang that calculates

22 what you identify as the so-called initial

23 score?

24 A. Yes. That's what I just said in

25 answer to your previous question.

1 Schmandt

2 Q. Going back to paragraph 74 of  
3 your declaration.

4 A. Oh, that's a long one. Let me  
5 get situated here.

6 Q. We were looking at this  
7 paragraph earlier, but go ahead.

8 A. We changed the topic three or  
9 four times. Sorry.

10 (Witness reviewing document.)

11 A. Okay.

12 Q. At the bottom of page 58 going  
13 into page 59 in paragraph 74, you refer to  
14 combining the teachings of Jiang and Chen  
15 into, quote, a single improved speech  
16 recognition circuit.

17 Do you see that?

18 A. Yes. While we're here, since  
19 you -- do you mind? I mean, we talked about  
20 it before. We were talking about the  
21 comparison in Jiang to conventional  
22 processors, and actually earlier in the  
23 paragraph I contrast this to very high  
24 performance processors, so basically what I  
25 said before was supported by the

1 Schmandt

2 declaration, that I'm contrasting a circuit  
3 of Chen's which is made with basically off  
4 the shelf parts versus specialized high  
5 performance parts.

6 Q. Jiang doesn't itself say that it  
7 requires high performance parts; right?

8 A. No [sic].

9 Q. And you did not do any of the  
10 specific quantitative cost comparison of how  
11 many so-called high performance parts would  
12 be needed in Jiang without modification  
13 compared to the cost of how many clusters of  
14 processors of any particular design with any  
15 particular memories that would be needed for  
16 the substitution of Chen in place of Jiang;  
17 right?

18 A. No, but previously I described  
19 how one would arrive at those numbers. I  
20 didn't do the work and without specific  
21 numbers, I -- it would be a meaningless  
22 hypothetical.

23 Q. At the bottom of page 58 going  
24 into page 59 of your declaration, you refer  
25 to combining the teachings of Jiang and Chen

1 Schmandt

2 into, quote, a single, improved speech  
3 recognition circuit.

4 Do you see that?

5 A. Yes.

6 Q. What would be the single,  
7 improved speech recognition circuit that  
8 combines the teachings of Jiang and Chen  
9 under your theory for purposes of your '140  
10 patent declaration?

11 A. Sure. That would involve in  
12 Jiang using the existing tree search  
13 engine -- I'm sorry -- existing tree search  
14 engine algorithm, adding processors in the  
15 Chen configuration to perform the tree  
16 search, the lexical search as discussed by  
17 Jiang's software, using that software with  
18 the only modification of that software being  
19 that it had to configure the clusters,  
20 spread the data out amongst the clusters as  
21 opposed to serializing it and gather the  
22 results from the computation performed by  
23 the processors in each of the clusters.

24 Q. You just identified an aspect  
25 of -- withdrawn.

1 Schmandt

2 You just identified some  
3 additional work a person of skill would need  
4 to do in order to make Chen's clustered  
5 processors work with Jiang's tree search  
6 algorithm; fair?

7 MS. CANINO: Objection. Form.

8 A. There's always some programming  
9 that has to be done.

10 Q. Is there any other programming  
11 or work that would need to be done beyond  
12 what you just stated in your last answer?

13 A. Hardware would have to be --  
14 hardware would have to be modified. It's  
15 generally not the domain of the designer or  
16 the system architect because Chen doesn't  
17 have a printed circuit and doesn't disclose  
18 a printed circuit, so somebody would have to  
19 build that.

20 Q. Anything else?

21 A. That's all I can think of at the  
22 moment.

23 Q. On page 69 in paragraph 83, I  
24 have a question for you. Could you let me  
25 know when you're there?

1 Schmandt

2 A. Okay.

3 Q. Do you see that in the second  
4 sentence of paragraph 83, you say, each  
5 processor 102 in the clusters employed as a  
6 tree search engine 74 in the Jiang+Chen  
7 modified speech recognition circuit would  
8 have been configured to compute a  
9 probability using the acoustic model data in  
10 the acoustic model memory?

11 A. Yes.

12 Q. So you're saying that every  
13 single processor in Chen's clusters of  
14 processors would have been used by the POSA  
15 to compute a probability with respect to  
16 Jiang's tree search engine 74?

17 A. Yes.

18 Q. And you say further, a POSA  
19 would have recognized that it would have  
20 been a waste for any particular processor to  
21 not be configured to computer probability;  
22 right?

23 A. Yes.

24 Q. When you say compute a  
25 probability in paragraph 83, what are you

1 Schmandt

2 referring to?

3 A. The -- it's the probability that  
4 the particular speech that's been digitized  
5 and had its features extracted matches any  
6 one of the particular lexical trees at this  
7 point in the search.

8 Q. And in paragraph 87, when you  
9 refer to Jiang's alleged initial score, what  
10 are you referring to there?

11 A. This is a measure of basically  
12 the same thing. So Jiang --

13 Q. Are you saying --

14 A. I gave you a lengthy answer  
15 earlier about how Jiang performs a two-step  
16 process.

17 Q. I understand, but are you saying  
18 that what constitutes computer probability  
19 for your theory is the same thing as what  
20 constitutes initial score for your theory?

21 A. Yes.

22 Q. Is there any difference between  
23 them or no?

24 (Witness reviewing document.)

25 A. So there are two parts, as I

1 Schmandt

2 said, to the probability or to the score.

3 Score is basically equivalent to

4 probability. I do want to be consistent

5 with what I actually said.

6 (Witness reviewing document.)

7 A. And both of those are used in  
8 combination to determine a probability or  
9 score for a particular lexical tree because  
10 Jiang is not stopping at what phoneme might  
11 that have been. Jiang's recognizers are  
12 designed to recognize words, and the word  
13 models are in the lexical tree.

14 Q. Okay.

15 So is there any difference for  
16 purposes of your theory as between what  
17 constitutes computing a probability from  
18 Jiang and what constitutes computing or  
19 determining an initial score from Jiang?

20 A. The way Jiang uses the term,  
21 they're the same.

22 Q. How about the way you use those  
23 concepts for your theory?

24 A. Okay. I'll just say the way I  
25 use them, they're the same. Jiang is

1 Schmandt

2 heavily based in hidden Markov models in the  
3 Viterbi algorithm which is generally couched  
4 in probabilistic terms.

5 Q. With respect to claim 1(d),  
6 which is identified above paragraph 84 on  
7 page 70 of your declaration.

8 A. Can you give me just a minute?  
9 I need to keep these pages in order or we'll  
10 never get anywhere.

11 (Pause in the proceedings.)

12 A. Okay. Yes.

13 Q. Claim 1(d) requires that the  
14 speech recognition circuit is configured to  
15 generate an initial score for an audio  
16 sample.

17 Do you see that?

18 A. Yes.

19 Q. With respect to your theory as  
20 to how claim 1(d) is met, what are you  
21 relying on as the speech recognition circuit  
22 that is purportedly required to generate the  
23 alleged initial score?

24 A. It is the same list of  
25 components that I gave you about 45 minutes

1 Schmandt  
2 ago with the addition that clustered  
3 processors as taught by Chen are also  
4 incorporated into the speech recognition  
5 circuit.

6 Q. So in your declaration, what  
7 aspect of the so-called speech recognition  
8 circuit do you contend would have been  
9 configured to generate an initial score?

10 A. Oh, the whole thing.

11 Q. You say in paragraph 87 of your  
12 declaration that Jiang's tree search engine  
13 74 computes the initial score.

14 Is that fair?

15 A. Which paragraph?

16 Q. 87.

17 (Witness reviewing document.)

18 A. I'm not sure exactly what part  
19 of that paragraph you were quoting. Can you  
20 direct me there?

21 Q. Top of page 74 in paragraph 87,  
22 you say, the sampled audio is provided to a  
23 tree search engine 74 configured to  
24 determine a user's utterance by searching a  
25 lexical tree calculating the most likely

1 Schmandt

2 string of phonemes spoken.

3 A. Yes. It says that. I'm not  
4 sure how this relates to the original  
5 question.

6 Q. Okay.

7 In addition, take a look at your  
8 page 76 where you quote in bold, tree search  
9 engine 74 also preferably computes a score  
10 for each of the other nodes 84 and 86 in  
11 tree 77, as well as the language you quote  
12 earlier about the tree search engine  
13 computing a score.

14 Do you see those references?

15 A. Yes.

16 Q. So are you saying that tree  
17 search engine 74 in Jiang computes the  
18 so-called initial score for your theory?

19 A. But it takes the entire circuit  
20 to do that because we're not computing the  
21 score of something abstract, we're computing  
22 the score for an audio sample according to  
23 the claim, so we've got to get the audio  
24 sample. In order to get the audio sample,  
25 we need a microphone, we need an A/D

1 Schmandt

2 converter, we need a feature extractor, and  
3 then we can feed that into the tree search  
4 engine, and then, of course, the tree search  
5 engine also has associated memory.

6 Q. Understood.

7 Is it your theory that Jiang's  
8 tree search engine 74 is where the so-called  
9 initial score is actually computed?

10 A. Yes.

11 Q. In paragraphs 84 to 87 of your  
12 declaration, you don't explain whether  
13 Chen's clustered processors would be  
14 involved in any way in the so-called initial  
15 score computation; fair?

16 (Witness reviewing document.)

17 A. No, there is no mention  
18 explicitly of Chen in there, but as I  
19 discussed elsewhere, Chen would be used  
20 advantageously to result in an improvement  
21 to the tree search engine. And before you  
22 ask any more question, I need a lunch break.  
23 It's 1:30 here.

24 Q. Can I ask one more question on  
25 this specific item?

1 Schmandt

2 A. No. I'm hungry. You can get  
3 back to it. I have a right to have a break  
4 when I want; right? Am I out of order?

5 Q. I've never had a witness tell me  
6 that he won't answer a single other question  
7 until we take a lunch break, so --

8 A. I have no idea --

9 Q. -- I --

10 A. I have no idea how long your  
11 question is going to be. It's 1:30. I  
12 should have taken a lunch break an hour ago,  
13 but because we had taken a break at 12:30, I  
14 didn't, so I think I have a right to take a  
15 lunch break.

16 Q. I have no problem with you  
17 taking a lunch break, sir. I just, you  
18 know, never had it be a point of contention  
19 is all, so I'm not trying to keep you  
20 hostage here. The reason I wanted to ask  
21 one more question is because the questions  
22 relate to each other, it's a lot, you know,  
23 easier to get through --

24 A. Okay. Ask your question.

25 Q. -- that one question, but we can

1 Schmandt

2 take your break.

3 A. Ask your question.

4 Q. We can take that break if you  
5 want to.

6 A. Ask your question. It's okay.  
7 I will answer it.

8 Q. So in your discussion of claim  
9 1(d) in paragraphs 84 to 87, you don't  
10 provide an explanation as to how Chen's  
11 clustered processors and memory would be  
12 used to generate an initial score in view of  
13 Jiang if they would be so used at all;  
14 right?

15 A. As I have just said, I don't  
16 mention Chen in those paragraphs, but I have  
17 previously discussed how Chen -- how Chen's  
18 teaching suggest an improvement to the  
19 performance of Jiang's tree search engine,  
20 and as we've just discussed, the tree search  
21 engine is the focus of all that I've written  
22 in those paragraphs.

23 Q. We can continue this after the  
24 lunch break if we need to. Let's take a  
25 break. Thank you, sir.

1 Schmandt

2 A. Okay. I'm going to take about  
3 an hour because I have a horrible headache.

4 Q. I understand. That's fine with  
5 me. Thank you.

6 A. The headache is not related to  
7 you. I've had a cluster headache for five  
8 days. It's totally unrelated to you.

9 Q. No, I know, but it's like, look,  
10 you know, this is never the most fun thing  
11 to do with your brain anyway, so I  
12 understand that it's a little strenuous.  
13 Let's meet back in an hour. Thank you.

14 A. Cool.

15 (Time noted: 1:28 p.m.)

16 (Lunch recess taken.)

17 (Time resumed: 2:32 p.m.)

18 CONTINUED BY MR. NOROOZI:

19 Q. Mr. Schmandt, with respect to  
20 your opinions as to claim 1(e) which are set  
21 forth starting at page 77 of your  
22 declaration, beginning with paragraph 88.  
23 Could you please let me know when you're  
24 there?

25 A. Yes.

1 Schmandt

2 Q. Your opinions regarding  
3 claim 1(e) go from paragraph 88 to  
4 paragraph 91; right?

5 A. Yes.

6 Q. With respect to claim 1(e) in  
7 your declaration, you rely on teachings from  
8 Jiang; correct?

9 A. Yes.

10 Q. The teachings from Jiang that  
11 you rely on for purposes of your theory as  
12 to claim 1(e) are performed by Jiang's tree  
13 search engine 74; right?

14 A. Yes.

15 Q. In your paragraphs regarding  
16 claim 1(e), you don't expressly discuss  
17 anything about Chen; correct?

18 A. Yes. I make no mention of Chen.

19 Q. And with respect to claim 1(e),  
20 your declaration doesn't explain how Chen's  
21 clustered processors and memories would be  
22 involved as a part of your theory in meeting  
23 claim 1(e) if they would be involved at all;  
24 right?

25 A. Well, I have previously said

1 Schmandt  
2 that Chen would be applied to Jiang's tree  
3 processors, so they would be intimately  
4 involved because this is the tree search  
5 processor -- tree search processing process.

6 Q. With respect to your paragraphs  
7 regarding claim 1(e), you don't explain  
8 Chen's clustered processors and memories  
9 would be used, if at all, to meet claim 1(e);  
10 right?

11 A. Well, I've already -- I've  
12 previously explained that Chen's processors  
13 would be used to speed up the task performed  
14 by the tree search engine, which is what is  
15 being discussed in -- under claim 1(e), so  
16 by implication, the Chen architecture  
17 applied to Jiang would be being used in a  
18 sped up tree search engine.

19 Q. And I'm asking you whether you  
20 provide a specific explanation as to how  
21 Chen's clustered processors would be used to  
22 achieve claim 1(e) in combination with  
23 Jiang.

24 A. Well, as we've just discussed,  
25 I don't mention Chen specifically here, but

Schmandt

previously when I have discussed Chen, I've discussed how Chen could be utilized to perform the task of the tree search engine of Jiang, and that would include pretty much every aspect of the task, so the tree search engine would be performing all of these steps, so it would be tree search engine in light of Chen would be performing all of these steps in the combination.

Q. Do you understand what I mean when I say how Chen would be used?

A. Is this a trick question?

Q. Well, let me ask it differently. Do you have some kind of understanding in your mind of what you think I mean when I say how Chen would be used; fair?

A. Okay.

Q. What is your understanding of what I mean when I say how would Chen be used?

A. Gee, well, without looking up how in the dictionary, generally how means by what means, by what measure, by what route, something like that.

1 Schmandt

2 Q. No, but I'm not asking about a  
3 dictionary, you know, sort of analysis of  
4 all the potential meanings of how. I'm just  
5 saying, I want to make sure you and I are  
6 talking about the same thing is what I'm  
7 getting at, so let me specify further.  
8 Okay?

9 Chen itself doesn't specifically  
10 teach how to implement Jiang's methods or  
11 system; right?

12 A. Correct.

13 Q. Jiang does not expressly teach  
14 how to implement Chen's processor to memory  
15 architecture with Jiang's methods or  
16 systems; right?

17 A. Of course not.

18 Q. In paragraphs 88 through 91 of  
19 your declaration, you don't specifically  
20 explain at an implementation level how  
21 Chen's clustered processors and memories  
22 could or would be used to implement the  
23 aspects of Jiang that are relevant to your  
24 theory for limitation 1(e); right?

25 A. As we've just agreed, there is

1 Schmandt

2 no mention of Chen in the discussion under  
3 1(e), but there is discussion of how Jiang's  
4 tree search engine works, and I have  
5 previously indicated how Jiang's tree search  
6 engine would work and be improved under  
7 Chen's clustered processor architecture.

8 Q. Can you show me in your  
9 declaration where you explain how Chen's  
10 clustered processors and memories would be  
11 used to implement the relevant aspect of  
12 Jiang. And by how, I mean at some sort of  
13 an implementation level such that there is  
14 an explanation of how the clustered  
15 processors and memories are running and  
16 working to actually perform the relevant  
17 teachings of Jiang.

18 A. There is no need to modify the  
19 algorithm of Jiang. Jiang's algorithm runs.  
20 The only issue which we have to address is  
21 parallelism, and parallelism in distributing  
22 tasks among multiple processors was well  
23 within the skill of a POSITA.

24 Q. Okay.

25 So can you --

1 Schmandt

2 A. I can go through that with you  
3 if you'd like.

4 Q. No, I don't want you to go  
5 through that for the first time in your  
6 deposition. What I want you to do is show  
7 me, if you can, where in your declaration  
8 you provided an explanation, for instance,  
9 of how parallelism would be achieved with  
10 Jiang's teachings in combination with Chen's  
11 processor and memory architecture.

12 (Witness reviewing document.)

13 A. Well, I have multiple pages  
14 describing the Jiang algorithm and the Jiang  
15 tree search. For example, beginning at page  
16 62.

17 Q. So let me just pause you for one  
18 second and then you can continue if you'd  
19 like, but to remind you, my question was  
20 about where, if anywhere, you explain how to  
21 implement Jiang in Chen's parallel  
22 processing clustered processor memory  
23 architecture.

24 A. Oh, yes, I appreciate the  
25 question and I was working on that because

1 Schmandt  
2 the base of understanding is -- the base of  
3 any understanding is what is it that Jiang  
4 is doing, so. . .

5 Q. Okay. So I assume that you have  
6 provided an explanation of what Jiang is  
7 doing and I know where it is in your  
8 declaration and I don't want to confuse that  
9 issue with the question of how do you make  
10 Jiang work in architecture, and I'm asking  
11 you if you can show me where that is in your  
12 declaration if you provide that explanation.

13 A. Okay. What I am saying, to  
14 continue, is that we know what Jiang does,  
15 we are replacing or augmenting one of the  
16 processors of Jiang with multiple  
17 processors, so the task that was described  
18 for Jiang is now being performed by multiple  
19 processors.

20 Q. Could you refer me to a  
21 paragraph in your declaration? I just want  
22 to make sure what you're telling me from  
23 here on out is from your declaration. I  
24 don't want additional explanation from you  
25 today that's not in your declaration unless

1 Schmandt

2 I ask for it.

3 A. I'm sorry, I'm allowed to  
4 support what I'm saying by what I said in my  
5 declaration.

6 Q. Yes, but --

7 A. I don't think you have a right  
8 to shut that off.

9 Q. I think --

10 A. I am trying to answer your  
11 question. Would you like me to answer your  
12 question or would you like to ask a  
13 different question?

14 Q. My question is about paragraphs  
15 in your declaration, so can you please  
16 identify paragraphs.

17 A. Okay. I just identified page  
18 numbers. I can tell you paragraphs.

19 Q. Your voice cut off for a second.  
20 Can you tell me which page numbers?

21 A. I don't remember. I said it.  
22 But I'll find it again. Okay.

23 Starting at paragraph 77,  
24 starting at page 62, this is a discussion of  
25 the speech recognition algorithm that is

1 Schmandt

2 being performed by Jiang alone or Jiang in  
3 combination. I have not said that that  
4 algorithm is changed in the combination.

5 Q. Could I ask you a question about  
6 your paragraph 77 and we'll start there and  
7 we'll just work through?

8 A. Sure.

9 Q. Your paragraph 77 says, Jiang --  
10 Jiang's circuitry effectively would be  
11 modified so that the speech recognition  
12 process in Jiang would reside in the cluster  
13 shared memories 104a-d of each cluster of  
14 Chen.

15 Is that accurate?

16 A. That sounds right. I don't  
17 actually see that.

18 Q. Okay. Because I was  
19 paraphrasing. So let me just read it  
20 verbatim. Withdrawn.

21 A. Your paraphrase is fine, I can  
22 go with that, as long as it's not a quote.

23 Q. Okay. Well, let's just read it  
24 verbatim.

25 Your paragraph 77 begins by

1 Schmandt

2 saying Jiang teaches a speech recognition  
3 process in which circuitry is configured in  
4 a few probabilities using HMM acoustic model  
5 data in its acoustic model memory 72  
6 modified to reside in the cluster shared  
7 memories 104a-d of each cluster of Chen.

8 Do you see that?

9 A. Yes.

10 Q. Now, Jiang certainly doesn't  
11 teach modifying anything to reside in Chen;  
12 right?

13 A. Of course not.

14 Q. So you're not saying that Jiang  
15 actually teaches modifying any aspect of  
16 itself to be used in combination with Chen;  
17 correct?

18 A. Right. It probably should say  
19 Jiang+Chen, but Chen -- but the modification  
20 is, of course, the combination that I'm  
21 proposing.

22 Q. And --

23 A. Chen doesn't reference Jiang and  
24 Jiang doesn't reference Chen.

25 Q. Understood.

1 Schmandt

2 And in this first sentence of  
3 paragraph 77 of your declaration, you don't  
4 explain how Jiang's speech recognition  
5 process would be modified to reside in the  
6 cluster shared memories of Chen; fair?

7 A. What I am specifically saying  
8 here is that the information that's stored  
9 in the acoustic model memory would reside in  
10 the shared memories of Chen, so that part  
11 of -- that's explaining the modification  
12 that's going on to the Jiang algorithm, that  
13 memory. We're not talking about processing  
14 here, but that will fall out -- that memory  
15 is distributed among the clustered processors  
16 of Chen.

17 Q. Okay.

18 And then in terms of how Chen's  
19 clustered processors are actually supposed  
20 to run Jiang's speech recognition process in  
21 a parallel architecture across however many  
22 clusters and memories there are, do you  
23 provide a detailed explanation of that in  
24 your declaration?

25 A. Well, as we said multiple times,

1 Schmandt

2 I am discussing here how the Jiang algorithm  
3 work, I have said here there is no need to  
4 modify the Jiang algorithm. The key part is  
5 that the acoustic data is spread across the  
6 multiple memories which makes them  
7 accessible to the multiple processors, and  
8 because of that, each of those processors is  
9 independently capable of executing the  
10 algorithm that I'm describing in Jiang.

11 Q. So do you explain in your  
12 declaration how the multiple clustered  
13 processors would be used in Chen to actually  
14 implement Jiang's speech recognition system  
15 or its speech recognition algorithm?

16 A. Well, we would be -- as I said,  
17 we would be dividing -- we're dividing up  
18 Jiang's models, some of them are running in  
19 one processor and some of them are running  
20 in another processor, so Jiang's algorithm  
21 would run on one set of models or one model  
22 on one processor and a different set of  
23 models in another processor.

24 Q. You explain that in your  
25 declaration?

1 Schmandt

2 A. I believe it's clear.

3 Q. From what? What part of your  
4 declaration makes that clear?

5 A. From the fact that the  
6 information is split among multiple  
7 processors, and I don't think I have to  
8 teach you or the board what parallel  
9 processing means.

10 Q. You don't think you have to  
11 teach me or the board how the parallel  
12 processing architecture of Chen would  
13 actually be used to implement the teachings  
14 you take from Jiang?

15 A. No. That's not what I said.

16 Q. Well --

17 A. What I said was --

18 Q. Well, you --

19 A. May I finish, please.

20 What I said was Jiang's task is  
21 dependent on analyzing acoustic information  
22 in memory. I've said that that acoustic  
23 information is distributed across the  
24 memories of the computers in the cluster, in  
25 Chen's cluster. That means that each of

1 Schmandt

2 them can perform Jiang's algorithm, but each  
3 of them is performing it on different data,  
4 different models, because those models have  
5 been distributed across multiple processors.  
6 I don't think for the sake of a declaration  
7 I need to further explain what parallel  
8 processing means. It means -- you know, I  
9 think everybody knows it means they're done  
10 at the same time.

11 Q. I'm not asking you what parallel  
12 processing means.

13 Can you show me one or more  
14 paragraphs in your declaration by paragraph  
15 number where you explain how Chen's parallel  
16 processors and memories in its clusters  
17 would be used to implement Jiang aside from  
18 the fact that you say in paragraph 77 that  
19 Jiang's speech recognition process would be  
20 modified to reside in the cluster shared  
21 memories of each cluster of Chen?

22 A. I think that's all that's  
23 necessary, the memory is the data.

24 Q. Okay.

25 So aside from whether you think

1 Schmandt

2 that's all that is necessary, do you have  
3 any further explanation responsive to my  
4 question by paragraph number anywhere else  
5 in your declaration?

6 A. Certainly I'll take a look.

7 (Witness reviewing document.)

8 A. Okay. In paragraph 74 and  
9 possibly elsewhere, I refer to how parallel  
10 processing allows the adjustment of the  
11 pruning threshold, and the pruning threshold  
12 is a step that is executed after the Jiang's  
13 trees have been traversed, so I'm saying the  
14 extra processing of Chen's influences -- it  
15 influences the ability to set the pruning  
16 threshold higher or lower and get better  
17 recognition, so that's part of the answer.

18 Q. Well, just to be clear, I don't  
19 understand how that's part of the answer,  
20 and maybe this will be helpful to both of us  
21 in understanding each other because my  
22 question is about how Jiang's relevant  
23 algorithms or other teachings would be  
24 implemented using the parallel processor and  
25 memory clustered architecture of Chen;

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right? And I'm not asking, you know, would you move up or down the pruning threshold a little bit and things like this, I'm asking how the teachings you're relying on from Jiang would be run using the clustered pillow processors and memories of Chen as discussed in your declaration to the extent it's in there.

Do you follow me?

A. I think this is part of the answer because it's the advantages -- I think we're gaining -- it's the advantages, we have the ability to specify a lower pruning threshold, that means we are able to perform the task that leads to pruning more efficiently so we can have a lower threshold which is faster because processing is happening faster. By implication, that's because Chen is performing the rate limiting step in Jiang and the rate limiting step in Jiang is how many of these trees can I traverse in unit time, and these trees are in the memory of Jiang's processor. So by putting those trees into the memory of the

1 Schmandt

2 cluster processors and otherwise not  
3 changing Jiang's algorithm, it seems to me  
4 that it's pretty clear that each of the  
5 clustered processors is performing the  
6 algorithm which is described here for  
7 Jiang's tree search engine.

8 Q. Okay. I understand that you're  
9 saying that. I understand that part. I  
10 understand that your declaration says to use  
11 each of the processors in Chen to run  
12 certain aspects of Jiang's algorithm and  
13 specifically to do the tree search engine  
14 process.

15 Fair enough?

16 A. Yes.

17 Q. What I'm asking is, does your  
18 declaration explain how do that using Chen's  
19 parallel processor clustered memory  
20 architecture?

21 A. Yes. It says that the data to  
22 be analyzed is spread across the memories.  
23 If the data to be analyzed -- so parallelism  
24 basically means multiple processors running  
25 the same software effectively, running the

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same algorithm. I think that's well-known.

Okay? The algorithm in Chen as it's

discussed -- as we've just been discussing

is the tree search algorithm. But in order

to gain parallelism, the different

processors running the tree search algorithm

need to be operating on different parts of

the data. The lexical trees represent

portions of vocabularies to be tested for

recognition. If every processor in parallel

started at the same place like we start with

all words that begin with A in the

dictionary, then nothing is gained, but we

spread that information out, one of the

processors starts with A, one of them starts

with F, one of them starts with H, that's

what's in Jiang's memory. So because of

that, they're each only doing a quarter of

the alphabet, if you will, a quarter of the

dictionary or an eighth of the dictionary

depending on how many of them there are, but

they're still each doing the same thing and

they're doing the same thing that Jiang's

single processor was performing because I

1 Schmandt

2 haven't said we're modifying the algorithm  
3 in any other way.

4 Q. Okay.

5 So do you have an explanation in  
6 your declaration of what happens next in  
7 Chen's processors after they've split up the  
8 tasks so that each processor is doing a part  
9 of the A through Z sort of analysis?

10 A. I don't explicitly say that the  
11 results are then merged, but if we're going  
12 to be doing pruning based on thresholds,  
13 then we have to know the scores that we got  
14 on each of the trees, so I think that's a  
15 safe assumption, that that's in there. So  
16 when each of the processors has performed  
17 its task on its set of trees, it can produce  
18 a set of numbers, and looking at the numbers  
19 across all of the processors, across all of  
20 the results, we can choose a pruning  
21 threshold just like Jiang chooses a pruning  
22 threshold after it performs all these  
23 operations in serial as opposed to parallel.

24 Q. In your declaration, where do  
25 you say the pruning threshold determination

1 Schmandt

2 would occur in your theory? Where would it  
3 happen in terms of hardware based on your  
4 declaration?

5 A. Well, it's described as  
6 happening in Jiang's processor and Jiang's  
7 processor has been replaced by multiple Chen  
8 processors running in parallel, but at that  
9 point in the operation, we no longer need  
10 the acoustic memory because we're done, so  
11 it could be any of those processors. Let's  
12 say processor zero.

13 Q. You don't explain that in your  
14 declaration; right?

15 A. No. I don't think it's  
16 necessary.

17 Q. Let's take a look at --  
18 withdrawn.

19 Just so I'm clear, your  
20 testimony now at your deposition is that the  
21 result would be compiling or scored in one  
22 processor within one cluster in Jiang -- in  
23 Chen -- excuse me -- for instance; is that  
24 fair?

25 A. Yes. At that point we have

1 Schmandt

2 finished our parallel operation and we're  
3 back to serial operations.

4 Q. And the parallel operations in  
5 your theory happened across multiple  
6 clusters of Chen's processors; right?

7 A. Yes.

8 Q. And multiple acoustic memories?

9 A. Yes.

10 Q. And specifically the ones  
11 104a-d; right?

12 A. Yes. And the other ones in that  
13 figure.

14 Q. Well, the ones in the figure I  
15 think are 104a-d; no?

16 A. Oh, you're right. I'm sorry.  
17 One sec.

18 Where does that line go?

19 Yes, you're right. I'm sorry.

20 Q. Let's take a look at Hon, it's  
21 Exhibit 1006, and specifically --

22 A. Just a minute. I'm not there  
23 yet. I have to put away this deck because  
24 if I let it fall to this floor, it will take  
25 us 15 minutes -- take me 15 minutes to

1 Schmandt

2 reorganize it.

3 Q. That's fine. I was just going  
4 to give you a page number.

5 A. Okay. I have Hon in my hand.

6 Q. Okay.

7 So on page 24 of the exhibit  
8 based on the numbering at the bottom of the  
9 pages.

10 A. I'm sorry. This version has  
11 page numbers clipped, I think the Bates  
12 numbers are low. Can you just tell me like  
13 the first sentence on the page?

14 Q. The page --

15 A. At the top so I can find it?

16 Q. Yeah, it's the page that starts  
17 with having 4.4 MARS.

18 A. Cool.

19 Okay. I'm on that page.

20 Q. Do you see that the third  
21 paragraph says that the use of pipeline in  
22 MARS is similar to SRI-Berkeley's search  
23 machine?

24 A. Yes.

25 Q. Do you see the next sentence

1 Schmandt

2 says, however, the '140 patent is  
3 programmable in MARS?

4 A. Yes.

5 Q. And then it says this gives MARS  
6 some flexibility?

7 A. Yes.

8 Q. You understand that those  
9 sentences are comparing the pipeline in MARS  
10 to the pipeline in Berkeley -- in Berkeley  
11 SRI search machine?

12 A. Yes.

13 Q. And you see that those sentences  
14 are saying that the pipeline in MARS is  
15 advantageous compared to SRI Berkeley's  
16 search machine because the '140 patent in  
17 MARS is programmable?

18 A. Yes.

19 Q. Do you see that the last  
20 sentence says in contrast to SRI Berkeley's  
21 search machine, MARS is searchable because  
22 it can be expanded by adding more clusters?

23 A. Okay. Yes.

24 Q. Do you understand that that's  
25 comparing the ability in MARS to add

1 Schmandt

2 processing power compared to the ability to  
3 do so in SRI Berkeley?

4 A. Yes.

5 Q. Let's move to the '319 patent.

6 If you could pull up your declaration for  
7 that and let me know when you have it.

8 A. Okay. I'm holding it in my  
9 hand.

10 Q. Can you confirm that the  
11 experience that you summarize in paragraphs  
12 4 and 6 of your '319 patent declaration is  
13 substantively identical to what you set  
14 forth in paragraphs 4 and 6 of your '140  
15 patent declaration?

16 A. It should be. I believe it's  
17 cut and paste.

18 Q. And your testimony with respect  
19 to your experience in paragraphs 4 and 6 of  
20 the '319 declaration would be the same as  
21 what you stated with respect to the '140  
22 declaration; right?

23 A. Yes.

24 Q. Let's turn to paragraph 68 of  
25 your '319 patent declaration. I will note

1 Schmandt

2 going forward, unless I say otherwise, I'm  
3 referring to your '319 patent declaration.

4 (Witness reviewing document.)

5 Q. Are you at paragraph 68?

6 A. I am looking at it.

7 Q. With respect to the claims  
8 requirement of a speech recognition circuit,  
9 what is the speech recognition circuit of  
10 your theory?

11 A. The -- since I am showing  
12 Figures 1 and 3, microphone, A/D converter,  
13 PCs with processors. Not explicitly --  
14 well, memories because we show memories  
15 here. These are all pieces of circuitry.

16 Q. Well, okay, I understand that  
17 those are all pieces of circuitry. I just  
18 want to make sure you're understanding what  
19 I'm asking.

20 There are lots of speech  
21 recognition circuits out there in the world;  
22 right?

23 A. Yes.

24 Q. What is the speech recognition  
25 circuit of your theory for purposes of your

Schmandt

declaration in IPR2023-00033 as to the '319 patent?

A. Well, it's all those parts that I just described, all those pieces of the system because Thelen is describing a system and that system comprises a circuit, and that system has various parts, some of them are discreet from others, but combined they're a circuit.

Q. Other than what's listed in paragraph 68, are there any other components or details to the speech recognition circuit of your theory as to the '319 patent proceeding?

A. Well, I added memory which was not stated explicitly and there's some storage in Thelen that wasn't stated explicitly, but these are parts that basically are included in PCs and associated with processors.

Q. So would you be able to tell me, please, with specificity what teachings and components you are relying on as part of your theory to meet the required speech

1 Schmandt  
2 recognition circuit of claim 46 and the  
3 other challenged claims of the '319 patent.

4 A. Okay. So you want to be  
5 specific. I am picking up Thelen, and I can  
6 recite some of those.

7 Q. No, sorry, my question was  
8 unclear. Let me just clarify, please.  
9 Sorry.

10 I'd like to focus specifically  
11 only on your declaration for now.

12 A. Okay.

13 Q. And the question is, based on  
14 what you have stated in your declaration,  
15 can you identify for me with specificity as  
16 part of your entire theory what is the  
17 speech recognition circuit of your theory,  
18 meaning what does it consist of in terms  
19 that are relevant to your theory?

20 A. I'm sorry, I don't understand  
21 the question. I'm not sure exactly what  
22 you're asking. You said specificity, so I  
23 was going to refer to numbers in Thelen.  
24 Now, maybe you're asking a more general  
25 question of what constitutes a circuit?

1 Schmandt

2 Q. No, I'm really not. So I think  
3 I'm having a hard time conveying myself to  
4 you and I'd like to rectify that.

5 I am not asking what constitutes  
6 a circuit in general.

7 Okay?

8 A. Okay.

9 Q. I'm not asking all the different  
10 possibilities of what a circuit could be.

11 Fair enough?

12 A. Yes.

13 Q. I'm asking you, what is your  
14 theory as set forth in your declaration for  
15 what is the speech recognition circuit that  
16 you rely upon to meet the challenged claims  
17 of the '319 patent.

18 Do you understand that question?

19 A. Yes, I thought I answered it  
20 from the declaration. Computer implemented  
21 structures and hardware components including  
22 a microphone, A/D converter, PCs comprising  
23 one or more processors and program modules.

24 Q. And would all of the components  
25 of your speech recognition circuit for your

1 Schmandt

2 theory be the ones that are disclosed in  
3 Thelen?

4 A. Yes.

5 Q. Claim 46(b) as set forth on  
6 page 63 of your declaration requires a  
7 plurality of lexical memories containing in  
8 combination complete lexical data for word  
9 recognition, each lexical memory  
10 containing part of said complete lexical  
11 data.

12 Do you see that?

13 A. I'm still going there. Yes.  
14 That's the -- I believe you just read 46(b),  
15 and I concur, that is 46(b).

16 Q. And so in your declaration with  
17 respect to claim 46(b), you don't contend  
18 that Thelen itself teaches multiple lexical  
19 memories that in combination contain  
20 complete lexical data for word recognition  
21 and such that each lexical memory contains  
22 only a part of the complete lexical data;  
23 fair?

24 A. My analysis is that it would be  
25 obvious that Thelen would hold those

1 Schmandt

2 memories, would have those memories because  
3 each recognizer has its own processing  
4 resources, so each recognizer could be  
5 implemented with -- would be implemented  
6 with separate memory to store the language  
7 model it's supposed to recognize since each  
8 processor gets a different language model,  
9 but I have -- what should we say --  
10 augmented that obviousness argument with a  
11 more explicit argument in terms of  
12 combination with Bailey.

13 Q. Right. I think though that  
14 maybe you misunderstood an aspect of my  
15 question, so let me try to clarify.

16 Take a look at paragraph 77 of  
17 your declaration and let me know when you're  
18 there.

19 A. That was the one I was just  
20 looking at.

21 Q. Okay.

22 So are you there?

23 A. I'm there.

24 Q. Do you see that you state that  
25 Thelen's storage 340 stores the complete

1 Schmandt

2 lexical data?

3 A. It says the models are loaded  
4 from storage memory 340. Is that what you  
5 mean? The last sentence? The last line on  
6 the bottom of page 66? Or are you referring  
7 to something else?

8 Q. The first sentence of paragraph  
9 77 as well as the second sentence.

10 A. Okay. Yes. Yes. Okay.

11 Q. Do you see that your declaration  
12 says that Thelen has a storage 340 that  
13 stores the complete lexical data?

14 A. Yes.

15 Q. Do you see that in paragraph 77,  
16 you don't say that the complete lexical data  
17 is stored across multiple memories in Thelen  
18 such that the entire lexical data is on  
19 those multiple memories and each memory has  
20 only a part of the lexical data?

21 A. No, I don't say that in that  
22 paragraph; no.

23 Q. You don't contend that Thelen  
24 teaches that design; right?

25 A. That's a different question.

1 Schmandt

2 Q. That was my original question as  
3 I intended it.

4 A. I guess I'm having a lot of  
5 trouble understanding your questions. I'm  
6 sorry. Maybe I'm a little slow today.

7 (Witness reviewing document.)

8 A. So Thelen says that each  
9 recognizer has a model which is targeted to  
10 a specific part of the huge vocabulary.  
11 Okay? So the vocabulary or language models,  
12 to be more precise, are divided among  
13 multiple recognizers and presumably stored  
14 in their memories, and although Thelen does  
15 not say it explicitly, I think it would be  
16 obvious that spread across all of those  
17 vocabularies -- all those models would be  
18 the sum total of all the model or -- model  
19 vocabulary lexical data because there  
20 wouldn't be any point in having a model if  
21 you weren't going to use it. So if you have  
22 models for different parts of the language,  
23 then different parts of the language which  
24 you are supposed to recognize. Mind you,  
25 Thelen is not a dictionary. Some of our

1 Schmandt

2 other art says it could be a dictionary, but  
3 Thelen doesn't say it is a dictionary. So  
4 Thelen has models built to recognize certain  
5 subsets of a language, of English probably  
6 because it's written in English; right? And  
7 it's my belief that it's obvious that each  
8 entry in that memory which is storage 340  
9 would be sent to at least one of the  
10 recognizers. Otherwise, there wouldn't be  
11 any point in having it.

12 Q. Do you see that Thelen says the  
13 models are preferably loaded from a storage  
14 340 as you yourself quote in your paragraph  
15 77?

16 A. Yes.

17 Q. And it's your reasoning that  
18 when Thelen says loaded from a storage 340,  
19 you take that to mean that the models are  
20 sort of locally stored in each recognizer in  
21 some kind of unstated memory?

22 A. Yes.

23 Q. The entire model?

24 A. The model for that recognizer;  
25 yes.

1 Schmandt

2 Q. Why can't it mean that the  
3 information from each model that's necessary  
4 is passed on to the recognizer as it's  
5 recognizing?

6 A. Because recognizers typically  
7 don't work that way. You would typically  
8 load a language model into the recognizer  
9 before you would perform any recognition  
10 because language models can be utilized at  
11 various stages in the recognition and you're  
12 also trying to get real time performance out  
13 of the system, so it would be -- it's  
14 possible and I've actually built some  
15 models -- I've built some software where  
16 depending on the state of the application,  
17 that could change the vocabulary in the  
18 recognizer, but typically what you do is you  
19 load a vocabulary in before somebody starts  
20 speaking.

21 Q. Taking a look at your paragraph  
22 78, please. Let me know when you're there.

23 A. Okay.

24 Q. And you can see that on page 68  
25 near the end of paragraph 78, you say each

1 Schmandt

2 PR engine 525a through 25c, referring to  
3 Bailey, interface with its own private  
4 memory 615a-615c containing its own library  
5 of prototype patterns.

6 A. Yes.

7 Q. You don't specifically say that  
8 the collection of the information stored in  
9 Bailey's memory 615a-615c constitutes the  
10 entire complete lexical data; fair?

11 A. This is a description of Bailey  
12 separate from the combination?

13 Q. Yes. In terms of the --

14 A. Only in the next -- so that  
15 paragraph doesn't tell us at all what's in  
16 that -- what's in those memories, but Bailey  
17 is directed towards recognizing speech and  
18 handwriting I believe within mark-up models,  
19 so it would probably be speech and  
20 handwriting data, but at this point in the  
21 narrative, we haven't said what's in those  
22 memories.

23 Q. Okay.

24 And do you ever contend that  
25 Bailey itself teaches using its multiple

1 Schmandt

2 memories such that each one contains a  
3 portion of lexical data and that all of the  
4 memories together contain all of the lexical  
5 data?

6 A. Bailey may well practice that.  
7 I haven't -- I haven't relied on it, so I  
8 haven't said it.

9 Q. So you don't offer that opinion;  
10 right? In your declaration.

11 A. I'm reading the declaration.  
12 (Witness reviewing document.)

13 A. No, I don't.  
14 Perhaps while you're thinking,  
15 this is a good time for a break since we've  
16 been going -- well, we've only been going  
17 for about an hour. I can keep going for a  
18 while.

19 Q. Let me --

20 A. I'm fine.

21 Q. Let me ask one more question and  
22 then we can take a break, although, you  
23 know, if it becomes --

24 A. That's okay. I was misreading  
25 the clock. I can go for a while longer.

1 Schmandt

2 Q. It's okay.

3 A. I have an inch of tea in my mug.

4 Q. It's fine to take a break in a

5 second. Let me just ask you this one

6 question if you're okay with it.

7 A. Sure.

8 Q. With respect to claim 46(d),

9 which requires groups of processors with

10 each group connected to a lexical memory,

11 you don't contend that Bailey teaches that;

12 correct?

13 A. That's correct.

14 Q. Let's take a break. Five

15 minutes?

16 A. No. I gotta make a cup of tea.

17 Give me ten. It takes five just to get the

18 water to boil.

19 Q. Sure.

20 A. And five to steep.

21 Q. I see that. Bye.

22 (Whereupon, a brief recess was

23 taken.)

24 CONTINUED BY MR. NOROOZI:

25 Q. So, Mr. Schmandt, in your

1 Schmandt

2 declaration, you don't contend that Bailey  
3 teaches an architecture of multiple  
4 processors to one sort of dedicated group  
5 processor memory; fair?

6 Let me withdraw the question and  
7 try to make this easier.

8 In your declaration at  
9 paragraph 82, you rely on Chen for the  
10 requirement of groups of processors, each  
11 group being connected to a lexical memory;  
12 right?

13 A. Yes, that is correct.

14 Q. You don't contend that either  
15 Bailey or Thelen already teach groups of  
16 processors with each group being connected  
17 to a lexical memory; fair?

18 A. Correct.

19 Q. Chen doesn't teach anything  
20 about speech recognition; fair?

21 A. Yes. Speech is about parallel  
22 processing architecture, not speech  
23 recognition per se. Though, of course,  
24 parallel processing was known as a way of  
25 doing speech recognition, but Chen doesn't

1 Schmandt

2 specifically talk about it; no.

3 Q. According to your earlier  
4 testimony, it's your opinion that Thelen  
5 teaches a processor to memory architecture  
6 where there is a processor and a memory for  
7 each recognizer and the processor for  
8 recognizer gets what it needs from the one  
9 memory associated with that processor for  
10 that recognizer; fair?

11 A. I'm sorry, you said the  
12 recognizer gets what it needs? I'm not sure  
13 what you meant by that. The recognizer  
14 needs a vocabulary or language model which  
15 is loaded from that store that has all of  
16 the vocabularies and language models, but  
17 then once it's in operation to do speech  
18 recognition, the recognizer can rely on the  
19 memory that's local to it.

20 Q. Am I understanding you correctly  
21 that you're saying that in Thelen, when a  
22 recognizer is performing speech recognition,  
23 it has one processor that's associated with  
24 one local memory, the processor is getting  
25 the lexical data that it needs from the one

1 Schmandt

2 local memory associated with it?

3 A. Yes. That memory has already  
4 been loaded before it did recognition.

5 Q. Understood.

6 Let's take a look at  
7 paragraph 84 of your declaration, please.

8 Are you there, sir?

9 A. Yes, I am. I'm just looking at  
10 it.

11 (Witness reviewing document.)

12 A. Okay.

13 Q. At the beginning of paragraph 84  
14 of your declaration, you refer to reducing  
15 the duplication of lexical data.

16 Do you see that?

17 A. Yes.

18 Q. You don't explain how the  
19 duplication of lexical data would be reduced  
20 by your proposed modification; right?

21 A. I think I did.

22 On page 75, a POSITA, in my  
23 opinion, would then have found it obvious  
24 and been motivated to group the plurality  
25 of processors in Thelen such that particular

Schmandt

contexts (e.g., all sports contexts) are clustered together in a particular group for efficient word recognition and storage of Lexical data using less memory.

Q. Isn't that what Thelen already does?

A. No.

Q. How so?

A. Thelen had a set of recognizers and each recognizer has its own memory and each of the context which are the colored boxes in Figure 4 is farmed off to a particular recognizer. There is some duplication in vocabulary between them. They're not completely disjointed, but each of those has some separate vocabulary. So Thelen is not an optimally efficient processor.

Q. So I don't follow you yet, and that might be my fault. I just want to make sure I get you.

So in paragraph 84, you reduce -- you refer to reducing the duplication of lexical data. How would the

1 Schmandt

2 so-called duplication of lexical data as you  
3 describe it be reduced as part of your  
4 combination compared to what Thelen  
5 otherwise does in unmodified form?

6 A. Because each of the Bailey PREs,  
7 which are equivalent to the Thelen  
8 recognizers, each of the Bailey PREs in a  
9 cluster -- I'm sorry -- each of the -- well,  
10 Bailey PREs in the cluster per Chen has  
11 shared memory, so there is some shared  
12 vocabulary amongst these different contexts.  
13 So Thelen talks about a context for sports  
14 and also a context for baseball and a  
15 context for football. Right? And each of  
16 those is likely to share some words or  
17 language model, but also have its own words.  
18 Football doesn't have homeruns, baseball  
19 doesn't have touchdowns, but the part that  
20 is common would be duplicated in the  
21 memories of Thelen because each of those  
22 contexts would be running on a different  
23 recognizer and each recognizer would have  
24 its own memory. In using Chen's multiple  
25 processors in a cluster, each of those

1 Schmandt

2 contexts that are related, and as you can  
3 see from Figure 4, it's a hierarchical  
4 relationship, so each of the clusters in one  
5 of those trees could share some parts of the  
6 memory because some of the words are common  
7 to each of those contexts in that cluster.

8 Q. So are you saying that you  
9 understand Thelen to mean that even within  
10 the context of sports as a whole, as a topic  
11 category, there are additional individual  
12 memories, in your opinion, that store  
13 language models just related to football and  
14 then another memory that stores lexical  
15 models for baseball and so forth?

16 A. Yes.

17 Q. That's how you understand  
18 Thelen?

19 A. Yes.

20 Q. And so what you're really just  
21 proposing is to take the collection of all  
22 sports-related language models, for  
23 instance, and keep them in one memory;  
24 right?

25 A. They're in one memory, and each

1 Schmandt  
2 of the processors connected to that memory  
3 is looking at the particular subset of  
4 vocabulary in that memory that's germane to  
5 its context; yes.

6 Q. But you also think that Thelen  
7 is teaching that there is a dedicated  
8 individual distinct processor for sports and  
9 a dedicated individual distinct processor --  
10 sorry. Withdrawn.

11 Do you think Thelen is teaching  
12 that there is a dedicated processor for  
13 football and then another dedicated  
14 processor for baseball and another dedicated  
15 processor for golf or whatever within the  
16 category of sports?

17 A. Yes.

18 Q. Where do you see that in Thelen?  
19 So we can pull up Thelen, it's Exhibit 1030.  
20 Or you can look at something in your  
21 declaration if you find it there.

22 A. Well, we have, quoting Thelen at  
23 8:54, I'm reading from the dec, recognition  
24 models are hierarchically arranged from  
25 models with a more generic context to models

1 Schmandt

2 with a specific context, and the models are  
3 what the speech recognizers use. A speech  
4 recognizer gets a model.

5 Q. I understand, but where does it  
6 say that as you get more specific into sub  
7 sort of context, that you keep adding  
8 processors per sub-context?

9 A. I'm sorry, it says recognition  
10 models are hierarchically arranged from  
11 models with a more generic context to models  
12 with a specific context. So some of those  
13 models are a specific context, like in this  
14 case baseball, football. Some of those  
15 models are higher up like sports.

16 Q. I understand. Are you equating  
17 recognition model to individual processor?

18 A. Yes.

19 Q. In every instance? So no matter  
20 how fine grained a recognition model might  
21 be for a sub-context, you think it gets its  
22 own processor in Thelen?

23 A. Yes.

24 Q. Where does Thelen say that? How  
25 do you get to that conclusion?

1 Schmandt

2 A. Well, because Thelen's  
3 recognizers -- I'm trying to see if I have  
4 it in the dec because it will be faster.

5 (Witness reviewing document.)

6 A. So Thelen says that each of  
7 those contexts, and contexts are those  
8 little boxes, baseball, football, they're  
9 all contexts, each of those contexts will  
10 normally overlap in vocabulary. The general  
11 words of the language. That implies to me  
12 that the context, and it goes on, it says  
13 the context will differ in specifics of  
14 those common words as well as the jargon  
15 specific to those contexts. I don't see  
16 anything that says, given that those are  
17 what is described as contexts, I don't see  
18 anything that says one recognizer may have  
19 multiple contexts. In fact, that's the  
20 whole point of Thelen, is to divide it up.

21 Q. Okay.

22 So --

23 A. But I'm happy to look at Thelen  
24 if you'd like.

25 Q. Well, let me ask you this.

1 Schmandt

2 Would your combination -- withdrawn.

3 Would your modification of  
4 Thelen in view of Chen require any more  
5 processors than what you think Thelen itself  
6 would have already required?

7 MS. CANINO: Objection. Scope.

8 MR. NOROOZI: Excuse me. State  
9 the objection in more detail. What's  
10 the objection about scope?

11 MS. CANINO: Just that it's not  
12 rooted in his declaration.

13 MR. NOROOZI: Why is that? I'm  
14 asking about his theory about Thelen  
15 and Chen and what his modification  
16 requires.

17 MS. CANINO: Okay. I'm just  
18 objecting for the record.

19 Q. Well, sir, you understand that  
20 you should take no meaning from your  
21 counsel's objection unless she expressly  
22 instructs you not to answer a question?

23 A. Understood.

24 MS. CANINO: And I'd like to  
25 clarify I'm not directing him not to

1 Schmandt

2 answer the question. I'm just making  
3 an objection for the record. You can  
4 continue.

5 A. I'm just doing a little  
6 bookkeeping here.

7 Q. Let me restate the question  
8 again here so it's clear for the record.

9 Mr. Schmandt, would your  
10 modification theory with respect to Thelen  
11 and Chen require any more processors than  
12 what you believe Thelen would already  
13 require in unmodified form?

14 A. No, I don't think so. I note  
15 that Thelen offers multiple variations in  
16 the architecture. In one case, there are  
17 fewer recognizers than models or contexts,  
18 and in other cases there's a one to one  
19 mapping between recognizers in context, and  
20 it is the second one that I am referring to  
21 here or relying on.

22 Q. Okay.

23 So according to your theory,  
24 Thelen in unmodified form would already have  
25 the same number of processors as Thelen in

1 Schmandt

2 modified form would have after being  
3 modified in view of Chen?

4 A. Yes.

5 Q. Taking a look at paragraph 84 of  
6 your declaration, in the first sentence, you  
7 refer to a desire to increase the processing  
8 power of the speech recognition circuit.

9 Do you see that?

10 A. Yes.

11 Q. You don't explain how the  
12 processing power would be increased given  
13 that Thelen already has the same number of  
14 processors as would exist after the  
15 modification in view of Chen; right?

16 A. Yes. For the -- yes, you're  
17 right.

18 Q. And you see in paragraph 84 you  
19 refer to speeding the responsiveness of the  
20 system? Do you see that?

21 (Witness reviewing document.)

22 A. Yes.

23 Q. You don't explain in your  
24 declaration how the system would be sped up  
25 in its responsiveness given that according

1 Schmandt  
2 to you Thelen would have the same number of  
3 processors before and after the  
4 modification; right?

5 A. Let me back up.

6 Thelen discusses multiple  
7 recognizers, but I don't think that Thelen  
8 tells us how those recognizers are  
9 distributed in terms of hardware. So those  
10 recognizers in Thelen could be multiple  
11 threads on the same processor in that case  
12 distributing among multiple processors would  
13 be an increase in performance and speed. So  
14 recognizer -- say Thelen says there's a one  
15 to one mapping from recognizer to model, but  
16 Thelen doesn't actually discuss the hardware  
17 that those recognizers run on.

18 Q. So --

19 A. And it's reasonable that each --  
20 it's reasonable that each of those  
21 recognizers would be operating separately on  
22 its own language model because that's how  
23 recognizers are built, and this could be  
24 something that happens serially or in  
25 parallel, and I don't think Thelen is

1 Schmandt

2 specific in that regards.

3 Q. Okay.

4 So I believe earlier in your  
5 testimony just a few minutes ago, you said  
6 it's your opinion that Thelen teaches using  
7 one processor per context or even  
8 sub-context.

9 Am I correct in my recollection  
10 or are you --

11 A. Right now I'm saying that if I  
12 said that, I was mistaken.

13 Q. Okay.

14 So you're changing your earlier  
15 testimony now?

16 A. Yes.

17 Q. So now your testimony is that  
18 Thelen doesn't tell you what hardware to use  
19 for a given recognizer?

20 A. Yes. Thelen is mostly a  
21 software architecture.

22 Q. Would you please take a look at  
23 paragraph 83 of your declaration and let me  
24 know when you're there.

25 A. Yes.

1 Schmandt

2 Q. Do you see that you say at the  
3 beginning of the paragraph that in Thelen,  
4 each recognizer already has a processor per  
5 Thelen?

6 A. Yes.

7 Q. Are you changing that opinion  
8 now in your testimony?

9 A. No.

10 Q. So does each recognizer have a  
11 processor or does it not have a processor?

12 A. Each processor -- each  
13 recognizer has a processor, but that doesn't  
14 mean that each processor has one and only  
15 one recognizer. A processor may be running  
16 multiple recognizers in threads.

17 Q. So when you say each recognizer  
18 has a processor, do you mean that a  
19 recognizer has some processing ability that  
20 will do what needs to be done somewhere in  
21 some processor, not a dedicated processor?

22 A. Yes. I don't believe that  
23 Thelen discloses dedicated processors. I'm  
24 happy to look at Thelen if you would like.

25 Q. Well, I mean, you've provided

1 Schmandt

2 opinions in this case in the declaration and  
3 you've had lots of times to look at Thelen,  
4 so I'm asking what your opinion is.

5 A. Well, my opinion was in that  
6 sentence you just read, that each recognizer  
7 has a processor. I didn't say each  
8 recognizer has its own dedicated processor.  
9 I said each recognizer has to run on a  
10 processor, it's software.

11 Q. Okay.

12 So now going back to my question  
13 from a moment ago, would your modification  
14 of Thelen in view of Chen require adding any  
15 processors compared to what Thelen already  
16 had?

17 A. It might depending on whether --  
18 so I believe that Thelen as disclosed  
19 doesn't say one to one between processor and  
20 recognizer. Therefore -- and what I'm  
21 proposing is a one to one processor per  
22 recognizer. So if Thelen's recognizers are  
23 shared among multiple -- if Thelen has  
24 multiple recognizers shared among a  
25 processor, I'm splitting them apart. That's

1 Schmandt

2 how we achieve parallelism.

3 Q. So maybe your theory requires  
4 adding processes to Thelen and maybe it  
5 doesn't; fair?

6 A. Correct.

7 Q. Thelen doesn't explain how to  
8 run its approach on groups of processors in  
9 a clustered architecture like the one in  
10 Jiang and Chen; right?

11 A. Right. Thelen is devoted to  
12 discussing mostly a software architecture.  
13 The processors are logically separate. Each  
14 of them has its own model, but it's not  
15 discussed -- it is not discussed in terms of  
16 an architecture of clustered processors.

17 Q. Your declaration doesn't explain  
18 how a person of skill in the art would  
19 actually achieve running Thelen within  
20 Chen's clustered processor and cluster  
21 memory architecture; right?

22 A. Well, I think it does.

23 Q. Well, point me to a paragraph,  
24 please.

25 (Witness reviewing document.)

1 Schmandt

2 A. Okay. Well, certainly up at the  
3 top of page 74, there is discussion of  
4 partitioning the cluster memory by contexts  
5 so that the lexical memory is accessible to  
6 the processors in that cluster -- in that  
7 cluster. Sorry, cluster is also used with  
8 respect to the language models. So grouping  
9 Thelen's recognizers and clusters of  
10 recognizers and connecting each group of  
11 recognizers and associated processor to a  
12 memory is taught by Chen. So each of the  
13 Thelen's recognizers clearly works on some  
14 processor, whether it's owned or shared, and  
15 that software would run on one of the  
16 processors in the cluster of Chen, but I  
17 said the key is dividing up the context of  
18 the language models appropriately among the  
19 clusters which is discussed on page 76 --  
20 sorry -- 75 into 76.

21 Q. Are you saying that page 75 into  
22 76 actually discusses how a person of skill  
23 would manage the parallel operation of the  
24 different recognition models working at the  
25 same time within Chen's clusters?

1 Schmandt

2 A. Well, that's trivial. We  
3 already have recognizers that are  
4 independent. That's why they're called  
5 separate recognizers. Whether they're  
6 running on the same processor or another  
7 process -- or a single processor, that's  
8 irrelevant, because they're in a threaded  
9 system, the threads don't really pay  
10 attention to each other, threaded,  
11 multi-processor system, whatever, each of  
12 those processors -- each of those  
13 recognizers just thinks it's running alone  
14 and it has the full -- access to the full  
15 resources available to it as moderated by  
16 the OS, so that recognizer could run on one  
17 of the generic processors in Chen simply by  
18 copying it in, importing it in. Now, it  
19 probably has to be recompiled or something  
20 because maybe the Chen processor uses a  
21 different processor or something like that,  
22 but presumably it was written in some high  
23 level code and it could be recompiled, and  
24 then it's irrelevant.

25 Q. So you're saying --

1 Schmandt

2 A. The only key or only problem --  
3 let me say the only problem or issue is to  
4 make sure that each of those recognizers has  
5 access to the proper language model because  
6 that's the core of what Thelen is about.

7 Q. You don't think there would be  
8 any other challenge that would be more than  
9 trivial?

10 A. There's always -- you know,  
11 there's always -- there's always challenges,  
12 but I think that it would be within -- to do  
13 this would be within the scope of knowledge  
14 and experience that a POSITA would have.

15 Q. Does your declaration discuss  
16 the challenges that a POSITA might face in  
17 making your proposed combination?

18 A. I don't think there are any  
19 challenges. I just said recompile. Okay?  
20 I didn't say -- I didn't say possibly  
21 recompile for a different architecture or  
22 operating system. I didn't say that in the  
23 declaration. But I think that's pretty  
24 simple and obvious and a POSITA has worked  
25 on multiple operating systems and

1 Schmandt

2 architectures and knows how to run a  
3 compiler.

4 Q. Let's go one thing at a time.

5 Does your declaration identify  
6 any challenges that you believe a POSITA  
7 would face in making your combination?

8 A. Well, as I said, the key  
9 difference is -- the key difference between  
10 raw Thelen and Thelen as implemented on Chen  
11 is to be aware of the mapping of contexts to  
12 recognizers in order that when you load the  
13 contexts from the big store, the huge  
14 vocabulary store, they go to the right  
15 cluster, but by the time you've gotten  
16 through Thelen, you already have your  
17 language models divided up by clusters, and  
18 so that's been done. Right? You've already  
19 got this hierarchical model because that's  
20 been disclosed in Figure 4, so given that  
21 you already have the recognition contexts  
22 with the associated language model and you  
23 have this hierarchical tree structure,  
24 that's simply a matter of going down the  
25 tree and putting associated contexts in the

1 Schmandt

2 memory of the cluster. Now, you do have to  
3 add something to say that each of the  
4 cluster recognizers is only looking at a  
5 portion of this vocabulary because before  
6 you put it into the Chen architecture, each  
7 recognizer would have only -- the context  
8 and only the context, and now that's all  
9 that's in its memory, and now multiple  
10 contexts are in its memory, but that's  
11 simply a matter of dividing the memory into  
12 portions and passing each recognizer a  
13 different pointer into a part of memory, and  
14 that is a simple matter of programming.

15 Q. Are there -- withdrawn.

16 Were the things that you just  
17 discussed set forth in your declaration?

18 A. No, because they're fairly  
19 simple obvious things, they are things  
20 within the knowledge of a POSITA, given our  
21 agreed upon level of knowledge that a POSITA  
22 possesses.

23 Q. Does your declaration identify  
24 any challenges a POSITA would face in making  
25 your proposed combination?

1 Schmandt

2 A. Not that I recall.

3 Q. Would a POSITA in your opinion  
4 face any challenges in making your proposed  
5 combination?

6 A. I just discussed what I thought  
7 those challenges would be, but -- and that I  
8 didn't think they would be particularly  
9 difficult.

10 Q. So you think that there would be  
11 some challenges, but you don't think it  
12 would be necessarily difficult; is that  
13 right?

14 A. It would be within the skill of  
15 a POSITA as we've defined it; yes. Maybe  
16 I'm concerned about your word challenge.  
17 You know? If challenge means something  
18 difficult -- sometimes challenge means  
19 something difficult and hard, and if that's  
20 how you're using the word challenge, then  
21 there are no challenges. There are things  
22 that have to be done, but I wouldn't call  
23 those challenges.

24 Q. Okay.

25 A. There are tasks that have to be

1 Schmandt

2 performed.

3 Q. Does your declaration discuss  
4 the tasks that would have to be performed  
5 for a POSITA to achieve your combination and  
6 whether or not those tasks would be  
7 difficult for a POSITA to achieve?

8 A. I discussed the major issues,  
9 the major issues, which is the memory  
10 organization for the models. That's all.

11 Q. Does your declaration discuss  
12 any other tasks other than memory  
13 organization in the manner that you've  
14 identified it, that a POSITA would need to  
15 accomplish to achieve your combination?

16 A. I don't think it does.

17 Q. And, therefore, your declaration  
18 also does not address whether or not any  
19 other tasks that would be required of the  
20 POSITA towards making your combination would  
21 be difficult or beyond the POSA's capability  
22 or not with particularity; right?

23 A. My opinion is that it would be  
24 well within the capabilities of the POSITA  
25 as we have defined them, as we have defined

1 Schmandt

2 those credentials.

3 Q. I know that you give the  
4 conclusion that they would be within the  
5 capability. I'm asking whether you give the  
6 detailed explanation that goes through the  
7 tasks and what they would require and  
8 whether each of those would be within the  
9 capability.

10 A. No, because those tasks would  
11 be -- you know, it would be a long list.  
12 Copy, copy source file to disk, move source  
13 file to other architecture, compile under  
14 other architecture, link under other  
15 architecture. I mean, this is sort of like  
16 a series of things that one would do on a  
17 routine basis, so no, I do not.

18 Q. Do you --

19 A. And I don't think that's  
20 necessary.

21 Q. Okay.

22 Did you make a list of the tasks  
23 that would be required for yourself before  
24 you reached your conclusion that there would  
25 be nothing beyond the level of skill for the

1 Schmandt

2 person of ordinary skill?

3 A. No. I thought about it from the  
4 point of view of I have supervised many  
5 people who have the qualifications of a  
6 POSITA as we've defined it because I taught  
7 for 40 years, and I looked at it from the  
8 perspective of would they be able to  
9 solve -- would they be able to solve this  
10 problem. Now, they may need to come to me,  
11 and they may come to me and say, hey, I  
12 don't have a C compiler for this  
13 architecture in which I would say, oh,  
14 here's where you can get one. Right?  
15 Hopefully they would be good enough to just  
16 go out and get it, but I wouldn't expect to  
17 have to micromanage them and to do task by  
18 task management of what they did. I didn't  
19 work with them that way.

20 Q. Have you ever supervised someone  
21 who had to map a speech recognition model to  
22 a clustered processor and memory  
23 architecture like Chen's?

24 A. No.

25 Q. So let's take a look at

1 Schmandt

2 paragraph 85 and 86.

3 Withdrawn.

4 Let's take a look at

5 paragraph 87.

6 Do you see that in paragraph

7 87 --

8 A. I'm not even there yet. Hold  
9 on.

10 Q. All right.

11 A. I am putting these pages back in  
12 order so that they can be retrieved if we go  
13 back there.

14 Now, I'm at 87, but I'm going to  
15 read it before we talk about it.

16 (Witness reviewing document.)

17 A. Okay.

18 Q. You say in paragraph 87 that you  
19 are relying on Bailey's CPU 510 to realize  
20 the control processor of Thelen, which you  
21 identify as controller 350 + model selector  
22 360; right?

23 A. Yes.

24 Q. As a starting point, Bailey's  
25 CPU 510 -- withdrawn.

1 Schmandt

2 Do you see in paragraph 86, you  
3 say at the top that Bailey's CPU 510 sends  
4 patterns of speech to each PR engine for  
5 comparison against the library of patterns  
6 stored in their lexical memories 615a-c?

7 A. Yes.

8 Q. And so that is an embodiment in  
9 which -- withdrawn.

10 If you go back to page 71 of  
11 your declaration, do you see that you have  
12 a --

13 A. Wait. Hold on. Hold on.

14 Okay. I'm on page 71.

15 Q. Do you see that you have a  
16 figure on page 71 of your declaration from  
17 Bailey that identifies the memory 615a-c?

18 A. I do.

19 Q. And this is the embodiment that  
20 you're relying on with respect to Bailey's  
21 CPU 510 for your opinion in paragraphs 85  
22 through 87; right?

23 A. Yes.

24 Q. And in this embodiment, Bailey's  
25 CPU 510 is involved in getting the

1 Schmandt

2 information from a dedicated memory to a  
3 dedicated processor; right?

4 A. Are you referring to RAM 512?  
5 You said dedicated memory.

6 Q. I am referring to the memory  
7 615a-c and the fact that there is a one  
8 memory to one processor architecture in the  
9 embodiment of Bailey that we're talking  
10 about.

11 A. I'm not sure whether the CPU  
12 writes directly into that memory or not or  
13 whether it has to send commands to the PRE  
14 which writes to the memory. I'm just not  
15 sure about that. I think that's what your  
16 question was directed at.

17 Q. Yeah.

18 Regardless of which way it  
19 goes -- withdrawn.

20 Do you see that in the  
21 embodiment of Figure 3A from Bailey as shown  
22 on page 71 of your declaration, CPU 510 is  
23 controlling a single processor that isn't a  
24 one processor to one memory relationship?

25 A. Yes. The PREs are one to one

1 Schmandt

2 with memory.

3 Q. With respect to Thelen's  
4 controller 350 plus model selector 360 --  
5 withdrawn.

6 If you -- excuse me. Withdrawn.

7 Can you pull up Thelen and go to  
8 column 7 starting at line 50 --

9 A. There's no point in giving me  
10 columns and line numbers until I have it in  
11 front of me.

12 Q. Okay.

13 A. Because I'm not listening  
14 because I'm putting away my '319 and digging  
15 out Thelen.

16 Okay. I now have Thelen if you  
17 would like to direct me.

18 Q. Okay. Column 7, line 50.

19 A. Okay.

20 (Witness reviewing document.)

21 Q. Do you see that Thelen refers to  
22 a controller 350 that makes a final  
23 selection of a recognized word sequence?

24 A. Yes.

25 Q. With respect to the controller

1 Schmandt

2 350, Thelen doesn't say anything about the  
3 controller 350 controlling any particular  
4 processor or collection of processors;  
5 right?

6 A. Controller 350 is also  
7 responsible for directing the speech input  
8 to the recognizers. This directing may be  
9 fixed if the number of active recognizers is  
10 constant.

11 Q. Can I just be clear that the  
12 court reporter technically needs to write  
13 down everything you say? So if you're just  
14 reading phrases from the art, it can be  
15 confusing on the record. Are you reading  
16 something that is in response to my question  
17 or are you just reading aloud to yourself?

18 A. No. That was in response to  
19 your question. I said the controller 350 is  
20 also responsible for directing the speech  
21 input to the recognizers. The recognizers  
22 are the processors. And I think the  
23 question was about communication between  
24 controller 350 and the processors. Is that  
25 wrong? Am I answering the wrong question?

1 Schmandt

2 Q. Okay.

3 So you're saying that the role  
4 of the controller 350 with respect to the  
5 recognizers in Thelen is to direct speech  
6 input to the recognizers; is that right?

7 A. That's part of it; yes. That's  
8 one of the functions. It also gathers the  
9 results and chooses the high score. The  
10 model selector has an important role, too,  
11 because the model selector figures out  
12 what -- what recognition model each of the  
13 recognizers is supposed to use. Does the  
14 model -- I have said that the controllers  
15 350 plus 360 in Figure 3, the model selector  
16 is shown as communicating directly to the  
17 recognizers. So that is part of the  
18 functionality of the control processor which  
19 is why I have mapped the control processor  
20 to 350 and 360 in Thelen.

21 Q. You said earlier today that the  
22 recognizers in Thelen are not processors;  
23 right?

24 A. A recognizer runs on a  
25 processor. Thelen is describing a software

1 Schmandt

2 architecture. It's not clear from Thelen  
3 whether each recognizer is its own processor  
4 not. Each recognizer has to run on a  
5 processor. We've been through this before.

6 Q. Multiple recognizers according  
7 to you could run on one processor; right?

8 A. Yes, they could.

9 Q. So controlling Thelen's  
10 recognizers does not necessarily mean  
11 controlling Thelen's processors; right?

12 A. Well, the recognizer is running  
13 on a processor, so you are sending a message  
14 to that processor. In order to control, you  
15 are doing some communication. That  
16 communication ultimately involves some  
17 signals being sent on a hardware bus, some  
18 commands or something like that, it's being  
19 sent on a hardware bus at the lower level,  
20 and then that's read by the processor and  
21 then that can be fed into particular pieces  
22 of software which may be interrupt ribbon or  
23 looking at a status buffer or command buffer  
24 or something like that.

25 Q. Thelen does not expressly teach

1 Schmandt

2 that its controller 350 or its model  
3 selector 360 or the combination of the two  
4 controls processors that are arranged in  
5 groups with a dedicated memory per group;  
6 fair?

7 A. Well, each -- each recognizer is  
8 running on a processor. The memory is  
9 probably partitioned so that each processor,  
10 let's assume it's -- each processor is a  
11 process. Processor generally in the  
12 operating system prevents one processor from  
13 writing into another processor's memory.  
14 That's sort of the core tenets of  
15 multi-tasking OS, so each processor -- each  
16 recognizer has a -- each processor clearly has  
17 memory, each recognizer running on that  
18 processor has a logical hunk of memory that  
19 is its memory that is partitioned per the  
20 operating system.

21 MS. NOROOZI: Could the reporter  
22 please read back my question.

23 (Whereupon, the requested  
24 portion of the record was read back  
25 by the reporter.)

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2 A. I would use the term cluster  
3 instead of group, but if that's the aspect  
4 that you're getting at, no, there is no --  
5 there is no grouping of those particular  
6 recognizers. Sorry I didn't answer your  
7 question exactly.

8 Q. Thelen does not express any  
9 doubt or concern about being able to achieve  
10 real time recognition; right?

11 (Witness reviewing document.)

12 A. So Thelen, the task most  
13 described in Thelen is dictation, but I  
14 think it is in no way limited, I'm reading  
15 column 6, line 40, it will be understood  
16 that the recognition outcome need not be  
17 used for dictation purposes. It may equally  
18 well be used as input for other systems such  
19 as dialogue systems wherein depending on the  
20 recognized speech -- wherein depending on  
21 the recognized speech information -- oh,  
22 depending on the recognized speech -- should  
23 be a comma -- information is retrieved from  
24 a database or an operation that's affected  
25 like ordering a book or reserving a journey.

1 Schmandt

2 So there are some real time requirements for  
3 that. You know, imagine using a dictation  
4 system where I say a word and it doesn't  
5 appear for five seconds. Usability would be  
6 pretty low.

7 Q. Well, let me be clear. I agree  
8 that Thelen expresses a desire for real time  
9 recognition.

10 A. Oh, I'm sorry. I thought you  
11 asked -- that was the question you asked,  
12 whether it did.

13 Q. No. My question was, does  
14 Thelen express any doubt or concern about  
15 being able to achieve that in light of its  
16 own hardware teachings?

17 A. I didn't see such.

18 Q. Speech recognition has a lot of  
19 different subsidiary tasks that can be  
20 identified; right?

21 A. That's fair.

22 Q. Should we have a processor for  
23 every single task in speech recognition  
24 dedicated?

25 A. No, but we know that the

1 Schmandt

2 search -- the word search task is the most  
3 time consuming and difficult and resource  
4 intensive.

5 Q. So when should we have a  
6 dedicated processor as of the invention date  
7 of the '319 patent and when should we not  
8 have a dedicated processor in your opinion?

9 A. Well, the sweet spot is for --  
10 part of the algorithm is doing the word  
11 search, typically through lexical trees, but  
12 it could be through any number of language  
13 representations, language models.

14 Q. So within the word recognition  
15 task of speech recognition, we should have a  
16 word processor for every task?

17 A. No. The word recognition task  
18 is a task and that can be optimized by  
19 parallelism. We're back to the example of  
20 taking the dictionary and breaking it into  
21 pieces and giving each processor a section  
22 of the dictionary and saying does the  
23 evidence that we have suggest that this word  
24 is in your chunk of the dictionary, and, if  
25 so, which word or words and what's the

1 Schmandt

2 score.

3 Q. So sometimes after the word  
4 recognition process, there's a need for  
5 potential modifications to the results;  
6 right?

7 A. Yes.

8 Q. Should that task be done on its  
9 own processor?

10 A. Well, that is typically -- that  
11 would typically be -- that is something that  
12 happens after you get the putative  
13 recognition results.

14 Excuse me one second.

15 (Pause in the proceedings.)

16 A. So that task -- that task would  
17 be done after we had done at least the first  
18 pass of the word search.

19 Q. Would you like to continue?

20 A. Can you hear me?

21 Q. Yes. Would you like to continue  
22 your answer?

23 A. No. I think I answered the  
24 question.

25 Q. Okay. The question was whether

1 Schmandt

2 that task of potential modifications to the  
3 word recognition result should have a  
4 dedicated processor or not.

5 A. I can go either way.

6 Q. What does it depend on?

7 A. It depends on exactly what the  
8 algorithm is that we're talking about.

9 Sometimes you go back and do a full re-pars  
10 of the acoustic data, other times you look  
11 at combinations of the words that were  
12 recognized in context, and say even though  
13 processor 1 told me this word was good  
14 with a higher score than that word from  
15 processor 2, my language model suggests that  
16 the word from processor 2 is much more  
17 likely in this lexical context, so I'll go  
18 with that. That's not something that needs  
19 to be done in parallel, but I haven't really  
20 thought about it.

21 Q. Well, I'm actually not really  
22 asking about parallelism just to be clear.  
23 I'm asking --

24 A. You were asking about multiple  
25 processors.

1 Schmandt

2 Q. Yeah, but multiple processors  
3 don't always have to be used in parallel, do  
4 they?

5 A. In the combinations that we've  
6 been talking about all day, they are, but  
7 no, of course not.

8 Q. So, for example, if you have a  
9 processor -- withdrawn. I mean, it's also a  
10 little bit about how you're using the  
11 concept of parallel. So with respect to a  
12 given frame of speech, you could have  
13 multiple processors working on the same  
14 frame at the same time or you could have  
15 multiple processors working on a given frame  
16 at one time such that no two processors are  
17 working on the same frame at the same time.  
18 Do you see what I'm saying?

19 A. I -- I suppose you could do  
20 that.

21 Q. So let me elucidate my question  
22 of what I actually care about. Okay?

23 A. Okay.

24 Q. If I understood you, you said  
25 whether or not there should be a dedicated

1 Schmandt

2 processor for potential modifications of  
3 word recognition results depends. Did I  
4 understand you correctly?

5 A. Okay. I think I said it depends  
6 on the algorithm that's being used or how  
7 the word modification is happening. It's  
8 too vague a question to have a simple  
9 answer.

10 Q. What are some examples of  
11 scenarios in which it would not make sense  
12 or be desirable to have a dedicated  
13 processor for that task?

14 MS. CANINO: Objection. Scope.

15 A. I'm sorry. The question is when  
16 would it. I'm just trying to understand the  
17 polarity of your question. When would it be  
18 not desirable to have a single processor?

19 Q. No.

20 A. When it would be desirable to  
21 have a single processor.

22 Q. Well, just to be clear, we're  
23 talking about a dedicated processor for  
24 modifications to word recognition results.

25 Do you follow me so far?

1 Schmandt

2 A. Okay. I'm not sure we've talked  
3 about a dedicated processor, but okay, for  
4 that task. Maybe we have. Is this related  
5 to one of the claims?

6 Q. It's related to this proceeding  
7 and I'm asking you -- withdrawn.

8 So one benefit to adding  
9 processors to a speech recognition system  
10 potentially is to give a processing  
11 advantage or improvement; right?

12 A. Yes.

13 Q. And yet there are reasons not to  
14 add processors to speech recognition  
15 systems, too; right?

16 A. There's always design tradeoffs;  
17 yes.

18 Q. What are reasons not to add  
19 additional processors to a speech  
20 recognition system?

21 A. If a system can perform  
22 adequately given the speed of the processor  
23 that it's running on, then the complexity of  
24 the recognition task, if it can perform  
25 adequately in real time, then you wouldn't

1 Schmandt

2 have any need.

3 Q. And how do you define  
4 adequately?

5 A. Well, that would be up to a user  
6 experience person to talk about. Adequately  
7 would be taking into effect the accuracy,  
8 which has two parts. One is recognition,  
9 the probability or the percentage of times  
10 that you hear a word you're supposed to  
11 recognize and you do successfully recognize  
12 it, and the flip side would be rejection,  
13 percentage of the time that you hear a word  
14 that you shouldn't recognize or a noise and  
15 you properly reject it, so I think that's a  
16 measure of performance, and you would have  
17 to cross that with speed in terms of delay  
18 with respect to the time that the utterance  
19 is spoken.

20 Q. So can you articulate for me the  
21 reasons that it would not be desirable to  
22 add another processor to a speech  
23 recognition system as it's understood in the  
24 field of art?

25 A. I'm sorry. Could you repeat the

1 Schmandt  
2 beginning of that question?

3 Q. Yes.

4 Could you enumerate for me  
5 reasons why it's not desirable to add  
6 another processor to an existing speech  
7 recognition system as that consideration is  
8 commonly understood in the field of art?

9 A. Well, it's always not desirable  
10 to complicate hardware or software when an  
11 existing hardware or software can perform  
12 adequately. So if I have a small vocabulary  
13 recognizer and I find that I get adequate  
14 recognition, let's say a voice dialer, I  
15 pick up my phone and I say call so and so,  
16 probably my address book is fairly small,  
17 maybe yours is bigger, I try to trim mine  
18 down, but let's say that's the task, so  
19 actually probably in part to answer this I'd  
20 have to like, you know, find 50 people and  
21 see how big their address books is --  
22 address books are, if I were some companies,  
23 I would just spy on their data, and so my  
24 task would be recognizing -- recognizing one  
25 of N words where N was sort of the mean

1 Schmandt

2 number of context, in the context lists of  
3 my users I would probably have a requirement  
4 to run this in near real time, I could  
5 probably tolerate a second delay, probably  
6 not much more than a second, so like the  
7 most maybe two, and if I could perform that  
8 on a single processor and get adequate  
9 results, I wouldn't need -- there would be  
10 no reason to add another processor. It's  
11 just going to make things messier. There's  
12 no reason. If I instead were like a system  
13 that would direct -- do directory name look  
14 up like an automated Yellow Pages where I  
15 was going to recognize 50,000 names out of a  
16 telephone directory, that's a case where I  
17 probably would need multiple processors to  
18 get real time performance because there's a  
19 heck of a lot of names that I'd have to  
20 search for to compare against the acoustic  
21 data when the user said a name, so it all  
22 has to be contextualized.

23 Q. Why don't we take a short break,  
24 five, ten minutes?

25 A. Okay.

1 Schmandt

2 Q. Thank you.

3 (Whereupon, a brief recess was  
4 taken.)

5 Q. Thank you, Mr. Schmandt. No  
6 further questions at this time.

7 THE WITNESS: Christina, any  
8 redirect?

9 MS. CANINO: No redirect.

10 (Time noted: 5:25 p.m.)

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## A C K N O W L E D G E M E N T

I, CHRISTOPHER SCHMANDT, hereby  
certify that I have read the transcript  
of my testimony taken under oath in my  
deposition of September 6, 2023; that  
the transcript is a true, complete and  
correct record of what was asked,  
answered and said during this  
deposition, and that the answers on the  
record as given by me are true and  
correct.

\_\_\_\_\_  
CHRISTOPHER SCHMANDT

Subscribed and sworn to  
before me this \_\_\_\_ day  
of \_\_\_\_\_, 20\_\_.

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## PREVIOUSLY MARKED EXHIBITS:

- Apple Exhibit 1003 for patent '140
- Apple Exhibit 1003 for patent '319
- Apple Exhibit 1006
- Apple Exhibit 1030

C E R T I F I C A T E

STATE OF NEW YORK )  
 ) ss.:  
 COUNTY OF NASSAU )

I, ROBIN LaFEMINA, a Registered  
 Professional Reporter, Certified LiveNote  
 Reporter and Notary Public, do hereby  
 certify:

That CHRISTOPHER SCHMANDT, the  
 witness whose deposition is hereinbefore set  
 forth, was duly sworn by a Notary Public and  
 that such deposition is a true record of the  
 testimony given by such witness.

I further certify that I am not  
 related to any of the parties to this action  
 by blood or marriage; and that I am in no  
 way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have  
 hereunto set my hand this     day of     ,  
 2023.

ROBIN LaFEMINA

1 \*\*\* ERRATA SHEET \*\*\*

2 CASE: Apple Inc. v. Zentian Ltd

3 DATE: September 6, 2023

4 WITNESS: Christopher Schmandt

5 JOB NO.: 7862

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22 Christopher Schmandt

23 Subscribed and sworn to before me

24 this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

25 \_\_\_\_\_.

Notary Public

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| 137:21                     |                            |  |  |  |
| <b>76</b> 78:8 137:19,20   |                            |  |  |  |
| 137:22                     |                            |  |  |  |
| <b>77</b> 78:11 82:21      |                            |  |  |  |