If 90% of a new OOP software program consists of proven, existing components made from preexisting reusable objects, then only the remaining 10% of the new software project has to be written and tested from scratch. Since 90% already came from an inventory of extensively tested reusable objects, the potential domain from which an error could originate is 10% of the program. As a result, OOP enables software developers to build objects out of other, previously built, objects.

This process closely resembles complex machinery being built out of assemblies and sub-assemblies. OOP technology, therefore, makes software engineering more like hardware engineering in that software is built from existing components, which are available to the developer as objects. All this adds up to an improved quality of the software as well as an increased speed of its development.

Programming languages are beginning to fully support the OOP principles, such as encapsulation, inheritance, polymorphism, and composition-relationship. With the advent of the C++ language, many commercial software developers have embraced OOP. C++ is an OOP language that offers a fast, machine-executable code. Furthermore, C++ is suitable for both commercial-application and systems-programming projects. For now, C++ appears to be the most popular choice among many OOP programmers, but there is a host of other OOP languages, such as Smalltalk, common lisp object system (CLOS), and Eiffel. Additionally, OOP capabilities are being added to more traditional popular computer programming languages such as Pascal.

The benefits of object classes can be summarized, as follows:

- Objects and their corresponding classes break down complex programming problems into many smaller, simpler problems.
- Encapsulation enforces data abstraction through the organization of data into small, independent objects that can communicate with each other. Encapsulation protects the data in an object from accidental damage, but allows other objects to interact with that data by calling the object's member functions and structures.
- Subclassing and inheritance make it possible to extend and modify objects through deriving new kinds of objects from the standard classes available in the system. Thus, new capabilities are created without having to start from scratch.
- Polymorphism and multiple inheritance make it possible for different programmers to mix and match characteristics of many different classes and create specialized objects that can still work with related objects in predictable ways.
- Class hierarchies and containment hierarchies provide a flexible mechanism for modeling real-world objects and the relationships among them.
- Libraries of reusable classes are useful in many situations, but they also have some limitations. For example:
  - Complexity. In a complex system, the class hierarchies for related classes can become extremely confusing, with many dozens or even hundreds of classes.
  - Flow of control. A program written with the aid of class libraries is still responsible for the flow of control (i.e., it must control the interactions among all the objects created from a particular library). The programmer has to decide which functions to call at what times for which kinds of objects.
  - Duplication of effort. Although class libraries allow programmers to use and reuse many small pieces of code, each programmer puts those pieces together in a different way. Two different programmers can use the same set of class libraries to write two programs that do exactly the same thing but whose internal structure (i.e., design) may be quite different, depending on hundreds of small decisions each programmer makes along the way. Inevitably, similar pieces of code end up doing similar things in slightly different ways and do not work as well together as they should.

Class libraries are very flexible. As programs grow more complex, more programmers are forced to reinvent basic solutions to basic problems over and over again. A relatively new extension of the class library concept is to have a framework of class libraries. This framework is more complex and consists of significant collections of collaborating classes that capture both the small scale patterns and major mechanisms that implement the common requirements and design in a specific application domain. They were first developed to free application programmers from the chores involved in displaying menus, windows, dialog boxes, and other standard user interface elements for personal computers.

Frameworks also represent a change in the way programmers think about the interaction between the code they write and code written by others. In the early days of procedural programming, the programmer called libraries provided by the operating system to perform certain tasks, but basically the program executed down the page from start to finish, and the programmer was solely responsible for the flow of control. This was appropriate for printing out paychecks, calculating a mathematical table, or solving other problems with a program that executed in just one way.

The development of graphical user interfaces began to turn this procedural programming arrangement inside out. These interfaces allow the user, rather than program logic, to drive the program and decide when certain actions should be performed. Today, most personal computer software accomplishes this by means of an event loop which monitors the mouse, keyboard, and other sources of external events and calls the appropriate parts of the programmer's code according to actions that the user performs. The programmer no longer determines the order in which events occur. Instead, a program is divided into separate pieces that are called at unpredictable times and in an unpredictable order. By relinquishing control in this way to users, the developer creates a program that is much easier to use. Nevertheless, individual pieces of the program written by the developer still call libraries provided by the operating system to accomplish certain tasks, and the programmer must still determine the flow of control within each piece after being called by the event loop. Application code still "sits on top of" the system.

Even event loop programs require programmers to write a lot of code that should not need to be written separately for every application. The concept of an application framework carries the event loop concept further. Instead of dealing with all the nuts and bolts of constructing basic menus, windows, and dialog boxes and then making these things all work together, programmers using application frameworks start with working application code and basic user interface elements in place. Subsequently, they build from there by replacing some of the generic capabilities of the framework with the specific capabilities of the intended application.

Application frameworks reduce the total amount of code that a programmer has to write from scratch. However, because the framework is really a generic application that displays windows, supports copy and paste, and so on, the

programmer can also relinquish control to a greater degree than event loop programs permit. The framework code takes care of almost all event handling and flow of control, and the programmer's code is called only when the framework needs it (e.g., to create or manipulate a proprietary data structure).

A programmer writing a framework program not only relinquishes control to the user (as is also true for event loop programs), but also relinquishes the detailed flow of control within the program to the framework. This approach allows the creation of more complex systems that work together in interesting ways, as opposed to isolated programs, having custom code, being created over and over again for similar problems.

Thus, as is explained above, a framework basically is a collection of cooperating classes that make up a reusable design solution for a given problem domain. It typically includes objects that provide default behavior (e.g., for menus and windows), and programmers use it by inheriting some of that default behavior and overriding other behavior so that the framework calls application code at the appropriate times.

There are three main differences between frameworks and class libraries:

- Behavior versus protocol. Class libraries are essentially collections of behaviors that you can call when you want those individual behaviors in your program. A framework, on the other hand, provides not only behavior but also the protocol or set of rules that govern the ways in which behaviors can be combined, including rules for what a programmer is supposed to provide versus what the framework provides.
- Call versus override. With a class library, the code the programmer instantiates objects and calls their member functions. It's possible to instantiate and call objects in the same way with a framework (i.e., to treat the framework as a class library), but to take full advantage of a framework's reusable design, a programmer typically writes code that overrides and is called by the framework. The framework manages the flow of control among its objects. Writing a program involves dividing responsibilities among the various pieces of software that are called by the framework rather than specifying how the different pieces should work together.
- Implementation versus design. With class libraries, programmers reuse only implementations, whereas with frameworks, they reuse design. A framework embodies the way a family of related programs or pieces of software work. It represents a generic design solution that can be adapted to a variety of specific problems in a given domain. For example, a single framework can embody the way a user interface works, even though two different user interfaces created with the same framework might solve quite different interface problems.

Thus, through the development of frameworks for solutions to various problems and programming tasks, significant reductions in the design and development effort for software can be achieved. A preferred embodiment of the invention utilizes HyperText Markup Language (HTML) to implement documents on the Internet together with a general-purpose secure communication protocol for a transport medium between the client and the Newco. HTTP or other protocols could be readily substituted for HTML without undue experimentation. Information on these products is available in T. Berners-Lee, D. Connoly, "RFC 1866: Hypertext Markup Language—2.0" (Nov. 1995); and R. Fielding, H, Frystyk, T. Berners-Lee, J. Gettys and J. C. Mogul, "Hypertext Transfer Protocol—HTTP/1.1: HTTP Working Group Internet Draft" (May 2, 1996). HTML is a simple data format used to create hypertext documents that are portable from one platform to another. HTML documents are SGML documents with generic semantics that are appropriate for representing information from a wide range of domains. HTML has been in use by the World-Wide Web global information initiative since 1990. HTML is an application of ISO Standard 8879:1986 Information Processing Text and Office Systems; Standard Generalized Markup Language (SGML).

To date, Web development tools have been limited in their ability to create dynamic Web applications which span from client to server and interoperate with existing computing resources. Until recently, HTML has been the dominant technology used in development of Web-based solutions. However, HTML has proven to be inadequate in the following areas:

- Poor performance;
- Restricted user interface capabilities;
- Can only produce static Web pages;
- Lack of interoperability with existing applications and data; and
- Inability to scale.

Sun Microsystem's Java language solves many of the client-side problems by:

- Improving performance on the client side;
- Enabling the creation of dynamic, real-time Web applications; and
- Providing the ability to create a wide variety of user interface components.

With Java, developers can create robust User Interface (UI) components. Custom "widgets" (e.g. real-time stock tickers, animated icons, etc.) can be created, and client-side performance is improved. Unlike HTML, Java supports the notion of client-side validation, offloading appropriate processing onto the client for improved performance. Dynamic, real-time Web pages can be created. Using the above-mentioned custom UI components, dynamic Web pages can also be created.

Sun's Java language has emerged as an industry-recognized language for "programming the Internet." Sun defines Java as: "a simple, object-oriented, distributed, interpreted, robust, secure, architecture-neutral, portable, high-performance, multithreaded, dynamic, buzzword-compliant, general-purpose programming language. Java supports programming for the Internet in the form of platform-independent Java applets." Java applets are small, specialized applications that comply with Sun's Java Application Programming Interface (API) allowing developers to add "interactive content" to Web documents (e.g. simple animations, page adornments, basic games, etc.). Applets execute within a Java-compatible browser (e.g. Netscape Navigator) by copying code from the server to client. From a language standpoint, Java's core feature set is based on C++. Sun's Java literature states that Java is basically "C++, with extensions from Objective C for more dynamic method resolution".

Another technology that provides similar function to JAVA is provided by Microsoft and ActiveX Technologies, to give developers and Web designers wherewithal to build dynamic content for the Internet and personal computers. ActiveX includes tools for developing animation, 3-D virtual reality, video and other multimedia content. The tools

use Internet standards, work on multiple platforms, and are being supported by over 100 companies. The group's building blocks are called ActiveX Controls, small, fast components that enable developers to embed parts of software in hypertext markup language (HTML) pages. ActiveX Controls work with a variety of programming languages including Microsoft Visual C++, Borland Delphi, Microsoft Visual Basic programming system and, in the future, Microsoft's development tool for Java, code named "Jakarta." ActiveX Technologies also includes ActiveX Server Framework, allowing developers to create server applications. One of ordinary skill in the art readily recognizes that ActiveX could be substituted for JAVA without undue experimentation to practice the invention.

In accordance with a preferred embodiment, BackgroundFinder (BF) is implemented as an agent responsible for preparing an individual for an upcoming meeting by helping him/her retrieve relevant information about the meeting from various sources. BF receives input text in character form indicative of the target meeting. The input text is generated in accordance with a preferred embodiment by a calendar program that includes the time of the meeting. As the time of the meeting approaches, the calendar program is queried to obtain the text of the target event and that information is utilized as input to the agent. Then, the agent parses the input meeting text to extract its various components such as title, body, participants, location, time etc. The system also performs pattern matching to identify particular meeting fields in a meeting text. This information is utilized to query various sources of information on the web and obtain relevant stories about the current meeting to send back to the calendaring system. For example, if an individual has a meeting with Netscape and Microsoft to talk about their disputes, and would obtain this initial information from the calendaring system. It will then parse out the text to realize that the companies in the meeting are "Netscape" and "Microsoft" and the topic is "disputes." Then, the system queries the web for relevant information concerning the topic. Thus, in accordance with an objective of the invention, the system updates the calendaring system and eventually the user with the best information it can gather to prepare the user for the target meeting. In accordance with a preferred embodiment, the information is stored in a file that is obtained via selection from a link imbedded in the calendar system.

PROGRAM ORGANIZATION

A computer program in accordance with a preferred embodiment is organized in five distinct modules: BF.Main, BF.Parse, Background Finder.Error, BF.PatternMatching and BF.Search. There is also a frmMain which provides a user interface used only for debugging purposes. The executable programs in accordance with a preferred embodiment never execute with the user interface and should only return to the calendaring system through Microsoft's Winsock control. A preferred embodiment of the system executes in two different modes which can be specified under the command line sent to it by the calendaring system. When the system runs in simple mode, it executes a keyword query to submit to external search engines. When executed in complex mode, the system performs pattern matching before it forms a query to be sent to a search engine.

DATA STRUCTURES

The system in accordance with a preferred embodiment utilizes three user defined structures:

1. TMeetingRecord;
2. TPatternElement; and
3. TPatternRecord.

The user-defined structure, tMeetingRecord, is used to store all the pertinent information concerning a single meeting. This info includes userID, an original description of the meeting, the extracted list of keywords from the title and body of meeting etc. It is important to note that only one meeting record is created per instance of the system in accordance with a preferred embodiment. This is because each time the system is spawned to service an upcoming meeting, it is assigned a task to retrieve information for only one meeting. Therefore, the meeting record created corresponds to the current meeting examined. ParseMeetingText populates this meeting record and it is then passed around to provide information about the meeting to other functions. If GoPatternMatch can bind any values to a particular meeting field, the corresponding entries in the meeting record is also updated. The structure of tMeetingRecord with each field described in parentheses is provided below in accordance with a preferred embodiment.

A.1.1.1.1.1	Public Type tMeetingRecord
sUserID As String	(user id given by Munin)
sTitleOrig As String	(original non stop listed title we need to keep around to send back to Munin)
sTitleKW As String	(stoplisted title with only keywords)
sBodyKW As String	(stoplisted body with only keywords)
sCompany( ) As String	(companys identified in title or body through pattern matching)
sTopic( ) As String	(topics identified in title or body through pattern matching)
sPeople( ) As String	(people identified in title or body through pattern matching)
sWhen( ) As String	(time identified in title or body through pattern matching)
sWhere( ) As String	(location identified in title or body through pattern matching)
sLocation As String	(location as passed in by Munin)
sTime As String	(time as passed in by Munin)
sParticipants ( ) As String	(all participants engaged as passed in by Munin)
sMeetingText As String	(the original meeting text w/o userid)
End Type	

There are two other structures which are created to hold each individual pattern utilized in pattern matching. The record tAPatternRecord is an array containing all the components/elements of a pattern. The type tAPatternElement is an array of strings which represent an element in a pattern. Because there may be many "substitutes" for each element, we need an array of strings to keep track of what all the substitutes are. The structures of tAPattemElement and tAPatterrRecord are presented below in accordance with a preferred embodiment.

```
Public Type tAPatternElement
elementarray( ) As String
End Type
Public Type tAPatternRecord
patternArray( ) As tAPatternElement
End Type
```

COMMON USER DEFINED CONSTANTS

Many constants are defined in each declaration section of the program which may need to be updated periodically as part of the process of maintaining the system in accordance with a preferred embodiment. The constants are accessible to allow dynamic configuration of the system to occur as updates for maintaining the code.

Included in the following tables are lists of constants from each module which I thought are most likely to be modified from time to time. However, there are also other constants used in the code not included in the following list. It does not mean that these non-included constants will never be changed. It means that they will change much less frequently.

For the Main Module (BF.Main):

CONSTANT	PRESET VALUE	USE
MSGTOMUNIN_TYPE	6	Define the message number used to identify messages between BF and Munin
IP_ADDRESS_MUNIN	"10.2.100.48"	Define the IP address of the machine in which Munin and BF are running on so they can transfer data through UDP.
PORT_MUNIN	7777	Define the remote port in which we are operating on.
TIMEOUT_AV	60	Define constants for setting time out in inet controls
TIMEOUT_NP	60	Define constants for setting time out in inet controls
CMD_SEPARATOR	"\"	Define delimiter to tell which part of Munin's command represents the beginning of our input meeting text
OUTPARAM_ SEPARATOR	"::"	Define delimiter for separating out different portions of the output. The separator is for delimiting the msg type, the user id, the meeting title, and the beginning of the actual stories retrieved.

For the Search Module (BF.Search):

CONSTANT	CURRENT VALUE	USE
PAST_NDAYS	5	Define number of days you want to look back for Alta Vista articles. Doesn't really matter now because we aren't really doing a news search in alta vista. We want all info.
CONNECTOR_AV_URL	"+AND+"	Define how to connect keywords. We want all our keywords in the string so for now use AND. If you want to do an OR or something, just change connector.
CONNECTOR_NP_URL	"+AND+"	Define how to connect keywords. We want all our keywords in the string so for now use AND. If you want to do an OR or something, just change connector.
NUM_NP_STORIES	3	Define the number of stories to return back to Munin from NewsPage.
NUM_AV_STORIES	3	Define the number of stories to return back to Munin from AltaVista.

For the Parse Module (BF.Parse):

CONSTANT	CURRENT VALUE	USE
PORTION_SEPARATOR	"::"	Define the separator between different portions of the meeting text sent in by Munin. For example in "09::Meet with Chad::about life::Chad | Denise::::::" "::" is the separator between different parts of the meeting text.
PARTICIPANT_ SEPARATOR	"|"	Define the separator between each participant in the participant list portion of the original meeting text. Refer to example above.

For Pattern Matching Module (BFPatternMatch): There are no constants in this module which require frequent updates.

General Process Flow

The best way to depict the process flow and the coordination of functions between each other is with the five flowcharts illustrated in FIGS. **2** to **6**. FIG. **2** depicts the overall process flow in accordance with a preferred embodiment. Processing commences at the top of the chart at function block **200** which launches when the program starts. Once the application is started, the command line is parsed to remove the appropriate meeting text to initiate the target of the background find operation in accordance with a preferred embodiment as shown in function block **210**. A global stop list is generated after the target is determined as shown in function block **220**. Then, all the patterns that are utilized for matching operations are generated as illustrated in function block **230**. Then, by tracing through the chart, function block **200** invokes GoBF **240** which is responsible for logical processing associated with wrapping the correct search query information for the particular target search engine. For example, function block **240** flows to function block **250** and it then calls GoPatternMatch as shown in function block **260**. To see the process flow of GoPatternMatch, we swap to the diagram titled "Process Flow for BF's Pattern Matching Unit."

One key thing to notice is that functions depicted at the same level of the chart are called by in sequential order from left to right (or top to bottom) by their common parent function. For example, Main **200** calls ProcessCommandLine **210**, then CreateStopListist **220**, then CreatePatterns **230**, then GoBackgroundFinder **240**. FIGS. **3** to **6** detail the logic for the entire program, the parsing unit, the pattern matching unit and the search unit respectively. FIG. **6** details the logic determinative of data flow of key information through BackgroundFinder, and shows the functions that are responsible for creating or processing such information.

DETAILED SEARCH ARCHITECTURE UNDER THE SIMPLE QUERY MODE

SEARCH ALTA VISTA

(Function block **270** of FIG. **2**)

The Alta Vista search engine utilizes the identifies and returns general information about topics related to the cur-

rent meeting as shown in function block **270** of FIG. **2**. The system in accordance with a preferred embodiment takes all the keywords from the title portion of the original meeting text and constructs an advanced query to send to Alta Vista. The keywords are logically combined together in the query. The results are also ranked based on the same set of keywords. One of ordinary skill in the art will readily comprehend that a date restriction or publisher criteria could be facilitated on the articles we want to retrieve. A set of top ranking stories are returned to the calendaring system in accordance with a preferred embodiment.

NEWS PAGE

(Function block **275** of FIG. **2**)

The NewsPage search system is responsible for giving us the latest news topics related to a target meeting. The system takes all of the keywords from the title portion of the original meeting text and constructs a query to send to the NewsPage search engine. The keywords are logically combined together in the query. Only articles published recently are retrieved. The Newspage search system provides a date restriction criteria that is settable by a user according to the user's preference. The top ranking stories are returned to the calendaring system.

FIG. **3** is a user profile data model in accordance with a preferred embodiment. Processing commences at function block **300** which is responsible for invoking the program from the main module. Then, at function block **310**, a wrapper function is invoked to prepare for the keyword extraction processing in function block **320**. After the keywords are extracted, then processing flows to function block **330** to determine if the delimiters are properly positioned. Then, at function block **340**, the number of words in a particular string is calculated and the delimiters for the particular field are and a particular field from the meeting text is retrieved at function block **350**. Then, at function block **380**, the delimiters of the string are again checked to assure they are placed appropriately. Finally, at function block **360**, the extraction of each word from the title and body of the message is performed a word at a time utilizing the logic in function block **362** which finds the next closest word delimiter in the input phrase, function block **364** which strips unnecessary materials from a word and function block **366** which determines if a word is on the stop list and returns an error if the word is on the stop list.

PATTERN MATCHING IN ACCORDANCE WITH A PREFERRED EMBODIMENT

The limitations associated with a simple searching method include the following:

1. Because it relies on a stoplist of unwanted words in order to extract from the meeting text a set of keywords, it is limited by how comprehensive the stoplist is. Instead of trying to figure out what parts of the meeting text we should throw away, we should focus on what parts of the meeting text we want.
2. A simple search method in accordance with a preferred embodiment only uses the keywords from a meeting title to form queries to send to Alta Vista and NewsPage. This ignores an alternative source of information for the query, the body of the meeting notice. We cannot include the keywords from the meeting body to form our queries because this often results in queries which are too long and so complex that we often obtain no meaningful results.
3. There is no way for us to tell what each keyword represents. For example, we may extract "Andy" and "Grove" as two keywords. However, a simplistic search has no way knowing that "Andy Grove" is in fact a person's name. Imagine the possibilities if we could somehow intelligently guess that "Andy Grove" is a person's name. We can find out if he is an Andersen person and if so what kind of projects he's been on before etc. etc.
4. In summary, by relying solely on a stoplist to parse out unnecessary words, we suffer from "information overload".

PATTERN MATCHING OVERCOMES THESE LIMITATIONS IN ACCORDANCE WITH A PREFERRED EMBODIMENT

Here's how the pattern matching system can address each of the corresponding issues above in accordance with a preferred embodiment.

1. By doing pattern matching, we match up only parts of the meeting text that we want and extract those parts.
2. By performing pattern matching on the meeting body and extracting only the parts from the meeting body that we want. Our meeting body will not go to complete waste then.
3. Pattern matching is based on a set of templates that we specify, allowing us to identify people names, company names etc from a meeting text.
4. In summary, with pattern matching, we no longer suffer from information overload.

Of course, the big problem is how well our pattern matching works. If we rely exclusively on artificial intelligence processing, we do not have a 100% hit rate. We are able to identify about 20% of all company names presented to us.

PATTERNS

A pattern in the context of a preferred embodiment is a template specifying the structure of a phrase we are looking for in a meeting text. The patterns supported by a preferred embodiment are selected because they are templates of phrases which have a high probability of appearing in someone's meeting text. For example, when entering a meeting in a calendar, many would write something such as "Meet with Bob Dutton from Stanford University next Tuesday." A common pattern would then be something like the word "with" followed by a person's name (in this example it is Bob Dutton) followed by the word "from" and ending with an organization's name (in this case, it is Stanford University).

PATTERN MATCHING TERMINOLOGY

The common terminology associated with pattern matching is provided below.

Pattern: a pattern is a template specifying the structure of a phrase we want to bind the meeting text to. It contains sub units.

Element: a pattern can contain many sub-units. These subunits are called elements. For example, in the pattern "with $PEOPLE$ from $COMPANY$", "with" "$PEOPLE$" "from" "$COMPANY$" are all elements.

Placeholder: a placeholder is a special kind of element in which we want to bind a value to.Using the above example, "$PEOPLE$" is a placeholder.

Indicator: an indicator is another kind of element which we want to find in a meeting text but no value needs to bind to it. There may be often more than one indicator we are looking for in a certain pattern. That is why an indicator is not an "atomic" type.

Substitute: substitutes are a set of indicators which are all synonyms of each other. Finding any one of them in the input is good.

There are five fields which are identified for each meeting:

+Company ($COMPANY$)

People ($PEOPLE$)

Location ($LOCATION$)

Time ($TIME$)

Topic ($TOPIC_UPPER$) or ($TOPIC_ALL$)

In parentheses are the placeholders I used in my code as representation of the corresponding meeting fields.

Each placeholder has the following meaning:

$COMPANY$: binds a string of capitalized words (e.g. Meet with Joe Carter of <Andersen Consulting>)

$PEOPLE$: binds series of string of two capitalized words potentially connected by "," "and" or "&" (e.g. Meet with <Joe Carter> of Andersen Consulting, Meet with <Joe Carter and Luke Hughes> of Andersen Consulting)

$LOCATION$: binds a string of capitalized words (e.g. Meet Susan at <Palo Alto Square>)

$TIME$: binds a string containing the format #:## (e.g. Dinner at <6:30 pm>)

$TOPIC_UPPER$: binds a string of capitalized words for our topic (e.g. <Stanford Engineering Recruiting> Meeting to talk about new hires).

$TOPIC_ALL$: binds a string of words without really caring if it's capitalized or not. (e.g. Meet to talk about <ubiquitous computing>)

Here is a table representing all the patterns supported by BF. Each pattern belongs to a pattern group. All patterns within a pattern group share a similar format and they only differ from each other in terms of what indicators are used as substitutes. Note that the patterns which are grayed out are also commented in the code. BF has the capability to support these patterns but we decided that matching these patterns is not essential at this point.

PAT GRP	PAT #	PATTERN	EXAMPLE
1	a	$PEOPLE$ of $COMPANY$	Paul Maritz of Microsoft
	b	$PEOPLE$ from $COMPANY$	Bill Gates, Paul Allen and Paul Maritz from Microsoft
2	a	$TOPIC_UPPER$ meeting	Push Technology Meeting
	b	$TOPIC_UPPER$ mtg	Push Technology Mtg
	c	$TOPIC_UPPER$ demo	Push Technology demo
	d	$TOPIC_UPPER$ interview	Push Technology interview
	e	$TOPIC_UPPER$ presentation	Push Technology presentation
	f	$TOPIC_UPPER$ visit	Push Technology visit
	g	$TOPIC_UPPER$ briefing	Push Technology briefing
	h	$TOPIC_UPPER$ discussion	Push Technology discussion
	i	$TOPIC_UPPER$ workshop	Push Technology workshop
	j	$TOPIC_UPPER$ prep	Push Technology prep
	k	$TOPIC_UPPER$ review	Push Technology review
	l	$TOPIC_UPPER$ lunch	Push Technology lunch
	m	$TOPIC_UPPER$ project	Push Technology project
	n	$TOPIC_UPPER$ projects	Push Technology projects
3	a	$COMPANY$ corporation	Intel Corporation
	b	$COMPANY$ corp.	IBM Corp.
	c	$COMPANY$ systems	Cisco Systems
	d	$COMPANY$ limited	IBM limited
	e	$COMPANY$ ltd	IBM ltd
4	a	about $TOPIC_ALL$	About intelligent agents technology
	b	discuss $TOPIC ALL$	Discuss intelligent agents technology
	c	show $TOPIC_ALL$	Show the client our intelligent agents technology
	d	re: $TOPIC_ALL$	re: intelligent agents technology
	e	review $TOPIC_ALL$	Review intelligent agents technology
	f	agenda	The agenda is as follows: --clean up --clean up --clean up
	g	agenda: $TOPIC_ALL$	Agenda: --demo client intelligent agents technology. --demo ecommerce.
5	a	w/$PEOPLE$ of $COMPANY$	Meet w/Joe Carter of Andersen Consulting
	b	w/$PEOPLE$ from $COMPANY$	Meet w/Joe Carter from Andersen Consulting
6	a	w/$COMPANY$ per $PEOPLE$	Talk w/Intel per Jason Poster
7	a	At $TIMES$	at 3:00 pm
	b	Around $TIME$	Around 3:00 pm
8	a	At $LOCATION$	At LuLu's resturant
	b	in $LOCATION$	in Santa Clara
9	a	Per $PEOPLE$	per Susan Butler
10	a	call w/$PEOPLE$	Conf call w/John Smith
	B	call with $PEOPLE$	Conf call with John Smith
11	A	prep for $TOPIC_ALL$	Prep for London meeting
	B	preparation for $TOPIC_ALL$	Preparation for London meeting

FIG. **4** is a detailed flowchart of pattern matching in accordance with a preferred embodiment. Processing commences at function block **400** where the main program invokes the pattern matching application and passes control to function block **410** to commence the pattern match processing. Then, at function block **420**, the wrapper function loops through to process each pattern which includes determining if a part of the text string can be bound to a pattern as shown in function block **430**. Then, at function block **440**, various placeholders are bound to values if they exist, and in function block **441**, a list of names separated by punctuation are bound, and at function block **442** a full name is processed by finding two capitalized words as a full name and grabbing the next letter after a space after a word to determine if it is capitalized. Then, at function block **443**, time is parsed out of the string in an appropriate manner and the next word after a blank space in function block **444**. Then, at function block **445**, the continuous phrases of capitalized words such as company, topic or location are bound and in function block **446**, the next word after the blank is obtained for further processing in accordance with a preferred embodiment. Following the match meeting field processing, function block **450** is utilized to locate an indicator which is the head of a pattern, the next word after the blank is obtained as shown in function block **452** and the word is checked to determine if the word is an indicator as shown in function block **454**. Then, at function block **460**,

the string is parsed to locate an indicator which is not at the end of the pattern and the next word after unnecessary white space such as that following a line feed or a carriage return is processed as shown in function block **462** and the word is analyzed to determine if it is an indicator as shown in function block **464**. Then, in function block **470**, the temporary record is reset to the null set to prepare it for processing the next string and at function block **480**, the meeting record is updated and at function block **482** a check is performed to determine if an entry is already made to the meeting record before parsing the meeting record again.

USING THE IDENTIFIED MEETING FIELDS

Now that we have identified fields within the meeting text which we consider important, there are quite a few things we can do with it. One of the most important applications of pattern matching is of course to improve the query we construct which eventually gets submitted to Alta Vista and News Page. There are also a lot of other options and enhancements which exploit the results of pattern matching that we can add to BF. These other options will be described in the next section. The goal of this section is to give the reader a good sense of how the results obtained from pattern matching can be used to help us obtain better search results.

FIG. **5** is a flowchart of the detailed processing for preparing a query and obtaining information from the Internet in accordance with a preferred embodiment. Processing commences at function block **500** and immediately flows to function block **510** to process the wrapper functionality to prepare for an Internet search utilizing a web search engine. If the search is to utilize the Alta Vista search engine, then at function block **530**, the system takes information from the meeting record and forms a query in function blocks **540** to **560** for submittal to the search engine. If the search is to utilize the NewsPage search engine, then at function block **520**, the system takes information from the meeting record and forms a query in function blocks **521** to **528**.

Alta Vista Search Engine

The strength of the Alta Vista search engine is that it provides enhanced flexibility. Using its advance query method, one can construct all sorts of Boolean queries and rank the search however you want. However, one of the biggest drawbacks with Alta Vista is that it is not very good at handling a large query and is likely to give back irrelevant results. If we can identify the topic and the company within a meeting text, we can form a pretty short but comprehensive query which will hopefully yield better results. We also want to focus on the topics found. It may not be of much merit to the user to find out info about a company especially if the user already knows the company well and has had numerous meetings with them. It's the topics they want to research on.

News Page Search Engine

The strength of the News Page search engine is that it does a great job searching for the most recent news if you are able to give it a valid company name. Therefore when we submit a query to the news page web site, we send whatever company name we can identify and only if we cannot find one do we use the topics found to form a query. If neither one is found, then no search is performed. The algorithmn utilized to form the query to submit to Alta Vista is illustrated in FIG. **7**. The algorithmn that we will use to form the query to submit to News Page is illustrated in FIG. **8**.

The following table describes in detail each function in accordance with a preferred embodiment. The order in which functions appear mimics the process flow as closely as possible. When there are situations in which a function is called several times, this function will be listed after the first function which calls it and its description is not duplicated after every subsequent function which calls it.

Procedure Name	Type	Called By	Description
Main (BF.Main)	Public Sub	None	This is the main function where the program first launches. It initializes BF with the appropriate parameters(e.g. Internet time-out, stoplist . . .) and calls GoBF to launch the main part of the program.
ProcessCommandLine (BF.Main)	Private Sub	Main	This function parses the command line. It assumes that the delimiter indicating the beginning of input from Munin is stored in the constant CMD_SEPARATOR.
CreateStopList (BF.Main)	Private Function	Main	This function sets up a stop list for future use to parse out unwanted words from the meeting text. There are commas on each side of each word to enable straight checking.
CreatePatterns (BF.PatternMatch)	Public Sub	Main	This procedure is called once when BF is first initialized to create all the potential patterns that portions of the meeting text can bind to. A pattern can contain however many elements as needed. There are two types of elements. The first type of elements are indicators. These are real words which delimit the potential of a meeting field (eg company) to follow. Most of these indicators are stop words as expected because stop words are words usually common to all meeting text so it makes sense they form patterns. The second type of elements are special strings which represent placeholders. A place holder is always in the form of $*$ where * can be either PEOPLE, COMPANY, TOPIC_UPPER, TIME, LOCATION or TOPIC_ALL. A pattern can begin with either one of the two types of elements and can be however long, involving however any number/type of elements. This procedure dynamically creates a new pattern record for each pattern in the table

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Procedure Name	Type	Called By	Description
			and it also dynamically creates new tAPatternElements for each element within a pattern. In addition, there is the concept of being able to substitute indicators within a pattern. For example, the pattern $PEOPLE$ of $COMPANY$ is similar to the pattern $PEOPLE$ from $COMPANY$. "from" is a substitute for "of". Our structure should be able to express such a need for substitution.
GoBF, (BF.Main)	Public Sub	Main	This is a wrapper procedurer that calls both the parsing and the searching subroutines of the BF. It is also responsible for sending data back to Munin.
ParseMeetingText (BF.Parse)	Public Function	GoBackGround Finder	This function takes the initial meeting text and identifies the userID of the record as well as other parts of the meeting text including the title, body, participant list, location and time. In addition, we call a helper function ProcessStopList to eliminate all the unwanted words from original meeting title and meeting body so that only keywords are left. The information parsed out is stored in the MeetingRecord structure. Note that this function does no error checking and for the most time assumes that the meeting text string is correctly formatted by Munin. The important variable is this Meeting Record is the temp holder for all info regarding current meeting. It's eventually returned to caller.
FormatDelimitation (BF.Parse)	Private	ParseMeeting Text, DetermineNum Words, GetAWord FromString	There are 4 ways in which the delimiters can be placed. We take care of all these cases by reducing them down to Case 4 in which there are no delimiters around but only between fields in a string(e.g. A::B::C)
DetermineNumWords (BF.Parse)	Public Function	ParseMeeting Text, ProcessStop List	This functions, determines how many words there are in a string (stInEvalString) The function assumes that each word is separated by a designated separator as specified in stSeparator. The return type is an integer that indicates how many words have been found assuming each word in the string is separated by stSeparator. This function is always used along with GetAWordFromString and should be called before calling GetAWordFrom String.
GetAWordFromString (BF.Parse)	Public Function	ParsseMeeting Text, ProcessStop List	This function extracts the ith word of the string(stInEvalString) assuming that each word in the string is separated by a designated separator contained in the variable stSeparator. In most cases, use this function with DetermineNumWords. The function returns the wanted word. This function checks to make sure that iInWordNum is within bounds so that i is not greater than the total number of words in string or less than/equal to zero. If it is out of bounds, we return empty string to indicate we can't get anything. We try to make sure this doesn't happen by calling DetermineNumWords first.
ParseAndCleanPhrase (BF.Parse)	Private Function	ParseMeeting Text	This function first grabs the word and send it to CleanWord in order strip the stuff that nobody wants. There are things in parseWord that will kill the word, so we will need a method of looping through the body and rejecting words without killing the whole function i guess keep CleanWord and check a return value ok, now I have a word so I need to send it down the parse chain. This chain goes ParseCleanPhrase -> CleanWord -> EvaluateWord. If the word gets through the entire chain without being killed,it will be added at the end to our keyword string. first would be the function that checks for "/" as a delimiter and extracts the parts of that. This I will call "StitchFace" (Denise is more normal and calls it GetAwordFromString) if this finds words, then each of these will be sent, in turn, down the chain. If these get

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Procedure Name	Type	Called By	Description
			through the entire chain without being added or killed then they will be added rather than tossed.
FindMin (BF.Parse)	Private Function	ParseAndClean Phrase	This function takes in 6 input values and evaluates to see what the minimum non zero value is. It first creates an array as a holder so that we can sort the five input values in ascending order. Thus the minimum, value will be the first non zero value element of the array. If we go through entire array without finding a non zero value, we know that there is an error and we exit the function.
CleanWord (BF.Parse)	Private Function	ParseAndClean Phrase	This function tries to clean up a word in a meeting text. It first of all determines if the string is of a valid length. It then passes it through a series of tests to see it is clean and when needed, it will edit the word and strip unnecessary characters off of it. Such test includes getting rid of file extensions, non chars, numbers etc.
EvaluatedWord (BF.Parse)	Private Function	Parse and CleanPhrase	This function tests to see if this word is in the stop list so it can determine whether to eliminate the word from the original meeting text. If a word is not in the stoplist, it should stay around as a keyword and this function exits beautifully with no errors. However, if the words is a stopword, an error must be returned. We must properly delimit the input test string so we don't accidentally retrieve sub strings.
GoPatternMatch (BF.Pattern Match)	Public Sub	GoBF	This procedure is called when our QueryMethod is set to complex query meaning we do want to do all the pattern matching stuff. It's a simple wrapper function which initialized some arrays and then invokes pattern matching on the title and the body.
MatchPatterns (BF.Pattern Match)	Public Sub	GoPattern Match	This procedure loops through every pattern in the pattern table and tries to identify different fields within a meeting text specified by sInEvalString. For debugging purposes it also tries to tabulate how many times a certain pattern was triggered and stores it in gTabulateMatches to see whichp pattern fired the most. gTabulateMatches is stored as a global because we want to be able to run a batch file of 40 or 50 test strings and still be able to know how often a pattern was triggered.
MatchAPattern (BF.Pattern Match)	Private Function	MatchPatterns	This function goes through each element in the current pattern. It first evaluates to determing whether element is a placeholder or an indicator. If it is a placeholder, then it will try to bind the placeholder with some value. If it is an indicator, then we try to locate it. There is a trick however. Depending on whether we are at current element is the head of the pattern or not we want to take different actions. If we are at the head, we want to look for the indicator or the placeholder. If we can't find it, then we know that the current pattern doesn't exist and we quit. However, if it is not the head, then we continue looking, because there may still be a head somewhere. We retry in this case.
etingField (BF.Pattern) Match)	Private Function	MatchAPattern	This function uses a big switch statement to first determing what kind of placeholder we are talking about and depending on what type of placeholder, we have specific requirements and different binding criteria as specified in the subsequent functions called such as BindNames, BindTime etc. If binding is successful we add it to our guessing record.
BindNames (BF.Pattern Match)	Private Function	MatchMeeting Field	In this function, we try to match names to the corresponding placeholder $PEOPLE$. Names are defined as any consecutive two words which are capitalized. We also what to retrieve a series of names which are connected by and, or & so we look until we don't see any of these 3 separators anymore. Note that we don't want to bind single word names because it is probably too general anyway so we don't want to produce broad but irrelevant results. This functions calls BindAFullName which binds one name so in a since BindNames collects all the results from BindAFullName
BindAFullName	Private Function	BindNames	This function tries to bind a full name. If the

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Procedure Name	Type	Called By	Description
(BF.Pattern Match)			$PEOPLE$ placeholder is not the head of the pattern, we know that it has to come right at the beginning of the test string because we've been deleting stuff off the head of the string all along. If it is the head, we search until we find something that looks like a full name. If we can't find it, then there's no such pattern in the text entirely and we quit entirely from this pattern. This should eventually return us to the next pattern in MatchPatterns.
GetNextWordAfterWhiteSpace (BF.Pattern Match)	Private Function	BindAFullName, BindTime, BindCompanyTopicLoc	This function grabs the next word in a test string. It looks for the next word after white spaces, @ or /. The word is defined to end when we encounter another one of these white spaces or separators.
BindTime (BF.Pattern Match)	Private Function	MatchMeetingField	Get the immediate next word and see if it looks like a time pattern. If so we've found a time and so we want to add it to the record. We probably should add more time patterns. But people don't seem to like to enter the time in their titles these days especially since we now have tools like OutLook.
BindCompanyTopicLoc (BF.Pattern Match)	Private Function	MatchMeetingField	This function finds a continuous capitalized string and binds it to stMatch which is passed by reference from MatchMeetingField. A continuous capitalized string is a sequence of capitalized words which are not interrupted by things like, etc. There's probably more stuff we can add to the list of interruptions.
LocatePatternHead (BF.Pattern Match)	Private Function	MatchAPattern	This function tries to locate an element which is an indicator. Note that this indicator SHOULD BE AT THE HEAD of the pattern otherwise it would have gone to the function LocateIndicator instead. Therefore, we keep on grabbing the next word until either there's no word for us to grab (quit) or if we find one of the indicators we are looking for.
ContainInArray (BF.Pattern Match)	Private Function	LocatePatternHead, LocateIndicator	'This function is really simple. It loops through all the elements in the array 'to find a matching string.
LocateIndicator (BF.Pattern Match)	Private Function	MatchAPattern	This function tries to locate an element which is an indicator. Note that this indicator is NOT at the head of the pattern otherwise it would have gone to LocatePatternHead instead. Because of this, if our pattern is to be satisfied, the next word we grab HAS to be the indicator or else we would have failed. Thus we only grab one word, test to see if it is a valid indicator and then return result.
InitializeGuessesRecord (BF.Pattern Match)	Private Sub	MatchAPattern	This function reinitializes our temporary test structure because we have already transfered the info to the permanent structure, we can reinitialize it so they each have one element
AddToMeetingRecord (BF.Pattern Match)	Private Sub	MatchAPattern	This function is only called when we know that the information stored in tInCurrGuesses is valid meaning that it represents legitimate guesses of meeting fields ready to be stored in the permanent record, tInMeetingRecord. We check to make sure that we do not store duplicates and we also what to clean up what we want to store so that there's no cluttered crap such as punctuations, etc. The reason why we don't clean up until now is to save time. We don't waste resources calling ParstAndCleanPhrase until we know for sure that we are going to add it permanently.
NoDuplicateEntry (BF.Pattern Match)	Private Function	AddToMeetingRecord	This function loops through each element in the array to make sure that the test string aString is not the same as any of the strings already stored int the array. Slightly different from ContainInArray.
SearchAltaVista (BF.Search)	Public Function	GoBackGroundFinder	This function prepares a query to be submitted to AltaVista Search engine. It submits it and then parses the returning result in the appropriate format containing the title, URL and body/summary of each story retrieved. The number of stories retrieved is specified by the constant NUM_AV_STORIES. Important variables include stURLAltaVista used to store query to submit stResultHTML used to store html from page specified by stURLAltaVista.
ConstructAltaVistaURL (BF.Search)	Private Function	SearchAltaVista	This function constructs the URL string fro the alta vista search engine using the advanced query search mode. It includes the keywords to be used, the language and how we want

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Procedure Name	Type	Called By	Description
			to rank the search. Depending on whether we want to use the results of our pattern matching unit, we construct our query differently.
ConstructSimpleKeyWord (BF.Search)	Private Function	ConstructAltaVistaURl, ConstructNewsPageURL	This function marches down the list of keywords stored in the stTitleKW or stBodyKW fields of the input meeting record and links them up into one string with each keyword separated by connector as determined by the input variable stInConnector. Returns this newly constructed string.
ConstructComplexAVKeyWord (BF.Search)	Pivate Function	ConstructAltaVistaURL	This function constructs the keywords to be send to the AltaVista site. Unlike ConstructSimpleKeyWord which simply takes all the keywords from the title to form the query, this function will look at the result of BF's pattern matching process and see it we are able to identify any specific company names or topics for constructing the queries. Query will include company and topic identified and default to simple query if we cannot identify either company or topic.
JoinWithConnectors (BF.Search)	Private Function	Construct ComplexAV KeyWord, Construct ComplexNP KeyWord, RefineWith Rank	This function simply replaces the spaces between the words within the string with a connector which is specified by the input.
RefineWithDate (NOT CALLED AT THE MOMENT) (BF.Search)	Private Function	ConstructAltaVistaURL	This function constructs the date portion of the alta vista query and returns this portion of the URL as a string. It makes sure that alta vista searches for articles within the past PAST_NDAYS.
RefindWithRank (BF.Search)	Private Function	ConstructAltaVistaURL	This function constructs the string needed to passes to Altavista in order to rank an advanced query search. If we are constructing the simple query we will take in all the keywords from the title. For the complex query, we will take in words from company and topic, much the same way we formed the query in ConstructComplexAVKeyWord.
IdentifyBlock (BF.Parse)	Public Function	SearchAltaVista, SearchNewsPage	This function extracts the block within a string marked by the beginning and the ending tag given as inputs starting at a certain location(iStart). The block retrieved does not include the tags themselves. If the block cannot be identified with the specified delimiters, we return unsuccessful through the parameter iReturnSuccess passed to use by reference. The return type is the block retrieved.
IsOpenUrlError (BF.Error)	Public Function	SearchAltaVista, SearchNewsPage	This function determines whether the error encountered is that of a timeout error. It restores the mouse to default arrow and then returns true if it is a time out or false otherwise.
SearchNewsPage (BF.Search)	Public Function	GoBackGroundFinder	This function prepares a query to be submited to NewsPage Search engine. It submits it and then parses the returning result in the appropriate format containing the title, URL and body/summary of each story retrieved. The number of stories retrieved is specified by the constant UM_NP_STORIES
ConstructNewsPageURL (BF.Search)	Private Function	SearchNewsPage	This function constructs the URL to send to the NewsPage site. It uses the information contained in the input meeting record to determine what keywords to use. Also depending whether we want simple or complex query, we call different functions to form strings.
ConstructComplexNPKeyWord (BF.Search)	Private Function	ConstructNewsPageURL	This function constructs the keywords to be send to the NewsPage site. UnlikeConstructKeyWord String which simply takes all the keywords from the title to form the query, this function will look at the results of BF's pattern matching process and see if we are able to identify any specific company names or topics for constructing the queries. Since newspage works best when we have a company name, we'll use only the company name and only if there is no company will we use topic.
ConstructOverallResult (BF.Main)	Private Function	GoBackGroundFinder	This function takes in as input an array of strings (stInStories) and a MeetingRecord which stores the information for the current meeting. Each element in the array stores the stories retrieved from each information source. The function simply constructs the appropriate output to send to Munin including a return message type to let Munin know that it is the BF responding and

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Procedure Name	Type	Called By	Description
			also the original user_id and meeting title so Munin knows which meeting BF is talking about.
ConnectAnd TransferTo Munin (BF.Main)	Public Sub	GoBackGround Finder	This function allows Background Finder to connect to Munin and eventually transport information to Munin. We will be using the UDP protocol instead of the TCP protocol so we have to set up the remote host and port correctly. We use a global string to store gResult Overall because although it is unecessary with UDP, it is needed with TCP and if we ever switch back don't want to change code.
DisconnectFr omMuninAn d Quit (BF.Main)	Public Sub		

FIG. **6** is a flowchart of the actual code utilized to prepare and submit searches to the Alta Vista and Newspage search engines in accordance with a preferred embodiment.

Processing commences at function block **610** where a command line is utilized to update a calendar entry with specific calendar information. The message is next posted in accordance with function block **620** and a meeting record is created to store the current meeting information in accordance with function block **630**. Then, in function block **640** the query is submitted to the Alta Vista search engine and in function block **650**, the query is submitted to the Newspage search engine. When a message is returned from the search engine, it is stored in a results data structure as shown in function block **660** and the information is processed and stored in summary form in a file for use in preparation for the meeting as detailed in function block **670**.

FIG. **7** provides more detail on creating the query in accordance with a preferred embodiment. Processing commences at function block **710** where the meeting record is parsed to obtain potential companies, people, topics, location and a time. Then, in function block **720**, at least one topic is identified and in function block **720**, at least one company name is identified and finally in function block **740**, a decision is made on what material to transmit to the file for ultimate consumption by the user.

FIG. **8** is a variation on the query theme presented in FIG. **7**. A meeting record is parsed in function block **800**, a company is identified in function block **820**, a topic is identified in function block **830** and finally in function block **840** the topic and or the company is utilized in formulating the query.

Alternative embodiments for adding various specific features for specific user requirements are discussed below.

Enhance Target Rate for Pattern Matching

To increase BF's performance, more patterns/pattern groups are added to the procedure "CreatePatterns." The existing code for declaring patterns can be used as a template for future patterns. Because everything is stored as dynamic arrays, it is convenient to reuse code by cutting and pasting. The functions BindName, BindTime, BindCompanyLocTopic which are responsible for associating a value with a placeholder can be enhanced. The enhancement is realized by increasing the set of criteria for binding a certain meeting field in order to increase the number of binding values. For example, BindTime currently accepts and binds all values in the form of ##:## or #:##. To increase the times we can bind, we may want BindTime to also accept the numbers 1 to 12 followed by the more aesthetic time terminology "o'clock." Vocabulary based recognition algorithms and assigning an accuracy rate to each guess BF makes allowing only guesses which meet a certain threshold to be valid.

Depending on what location the system identifies through pattern matching or alternatively depending on what location the user indicates as the meeting place, a system in accordance with a preferred embodiment suggests a plurality of fine restaurants whenever it detects the words lunch/dinner/breakfast. We can also use a site like company finder to confirm what we got is indeed a company name or if there is no company name that pattern matching can identify, we can use a company finder web site as a "dictionary" for us to determine whether certain capitalized words represent a company name. We can even display stock prices and breaking news for a company that we have identified.

Wireless Bargain Identification in Accordance With A Preferred Embodiment

FIG. **9** is a flow diagram that depicts the hardware and logical flow of control for a device and a software system designed to allow Web-based comparison shopping in conventional, physical, non-Web retail environments. A wireless phone or similar hand-held wireless device **920** with Internet Protocol capability is combined with a miniature barcode reader **910** (installed either inside the phone or on a short cable) and used to scan the Universal Product Code (UPC) bar code on a book or other product **900**. The wireless device **920** transmits the bar code via an antennae **930** to the Pocket BargainFinder Service Module (running on a Web server) **940**, which converts it to (in the case of books) its International Standard Book Number or (in the case of other products) whatever identifier is appropriate. The Service Module then contacts the appropriate third-party Web site(s) to find price, shipping and availability information on the product from various Web suppliers **950**. This information is formatted and displayed on the hand-held device's screen. The IP wireless phone or other hand held device **920** utilizes a wireless modem such as a Ricochet SE Wireless Modem from Metricom. Utilizing this device, a user can hang out in a coffee shop with a portable computer perched on a rickety little table, with a latte sloshing dangerously close to the keyboard, and access the Internet at speeds rivaling direct connect via a telephone line.

The 8-ounce Ricochet SE Wireless Modem is about as large as a pack of cigarettes and setup is extremely simple, simply attach the modem to the back of your portable's screen with the included piece of Velcro, plug the cable into the serial port, flip up the stubby antenna, and transmit. Software setup is equally easy: a straightforward installer adds the Ricochet modem drivers and places the connection icon on your desktop. The functional aspects of the modem are identical to that of a traditional telephone modem.

Of course, wireless performance isn't nearly as reliable as a traditional dial-up phone connection. We were able to get strong connections in several San Francisco locations as

long as we stayed near the windows. But inside CNET's all-brick headquarters, the Ricochet couldn't connect at all. When you do get online, performance of up to 28.8 kbps is available with graceful degradation to slower speeds. But even the slower speeds didn't disappoint. Compared to the alternative—connecting via a cellular modem—the Ricochet is much faster, more reliable, and less expensive to use. Naturally, the SE Wireless is battery powered. The modem has continuous battery life of up to 12 hours. And in accordance with a preferred embodiment, we ran down our portable computer's dual cells before the Ricochet started to fade.

Thus, utilizing the wireless modem, a user may utilize the web server software **940** to identify the right product **950** and then use an appropriate device's key(s) to select a supplier and place an order in accordance with a preferred embodiment. The BargainFinder Service Module then consummates the order with the appropriate third-party Web supplier **960**.

mySite! Personal Web Site & Intentions Value Network Prototype

mySite! is a high-impact, Internet-based application in accordance with a preferred embodiment that is focused on the theme of delivering services and providing a personalized experience for each customer via a personal web site in a buyer-centric world. The services are intuitively organized around satisfying customer intentions—fundamental life needs or objectives that require extensive planning decisions, and coordination across several dimensions, such as financial planning, healthcare, personal and professional development, family life, and other concerns. Each member owns and maintains his own profile, enabling him to create and browse content in the system targeted specifically at him. From the time a demand for products or services is entered, to the completion of payment, intelligent agents are utilized to conduct research, execute transactions and provide advice. By using advanced profiling and filtering, the intelligent agents learn about the user, improving the services they deliver. Customer intentions include Managing Daily Logistics (e.g., email, calendar, contacts, to-do list, bill payment, shopping, and travel planning); and Moving to a New Community (e.g., finding a place to live, moving household possessions, getting travel and shipping insurance coverage, notifying business and personal contacts, learning about the new community). From a consumer standpoint, mySite! provides a central location where a user can access relevant products and services and accomplish daily tasks with ultimate ease and convenience.

From a business standpoint, mySite! represents a value-added and innovative way to effectively attract, service, and retain customers. Intention value networks allow a user to enter through a personalized site and, and with the assistance of a learning, intelligent agent, seamlessly interact with network participants. An intention value network in accordance with a preferred embodiment provides superior value. It provides twenty four hour a day, seven days a week access to customized information, advice and products. The information is personalized so that each member views content that is highly customized to assure relevance to the required target user.

Egocentric Interface

An Egocentric Interface is a user interface crafted to satisfy a particular user's needs, preferences and current context. It utilizes the user's personal information that is stored in a central profile database to customize the interface. The user can set security permissions on and preferences for interface elements and content. The content integrated into the Egocentric Interface is customized with related information about the user. When displaying content, the Egocentric Interface will include the relationship between that content and the user in a way that demonstrates how the content relates to the user. For instance, when displaying information about an upcoming ski trip the user has signed up for, the interface will include information about events from the user's personal calendar and contact list, such as other people who will be in the area during the ski trip. This serves to put the new piece of information into a context familiar to the individual user.

FIG. **10**A describes the Intention Value Network Architecture implementation for the World Wide Web. For simplification purposes, this diagram ignores the complexity pertaining to security, scalability and privacy. The customer can access the Intention Value Network with any Internet web browser **1010**, such as Netscape Navigator or Microsoft Internet Explorer, running on a personal computer connected to the Internet or a Personal Digital Assistant with wireless capability. See FIG. **17** for a more detailed description of the multiple methods for accessing an Intention Value Network. The customer accesses the Intention Value Network through the unique name or IP address associated with the Integrator's Web Server **1020**. The Integrator creates the Intention Value Network using a combination of resources, such as the Intention Database **1030**, the Content Database **1040**, the Supplier Profile Database **1050**, and the Customer Profile Database **1060**.

The Intention Database **1030** stores all of the information about the structure of the intention and the types of products and services needed to fulfill the intention. Information in this database includes intention steps, areas of interest, layout templates and personalization templates. The Content Database **1040** stores all of the information related to the intention, such as advice, referral information, personalized content, satisfaction ratings, product ratings and progress reports.

The Supplier Profile Database **1050** contains information about the product and service providers integrated into the intention. The information contained in this database provides a link between the intention framework and the suppliers. It includes product lists, features and descriptions, and addresses of the suppliers' product web sites. The Customer Profile Database **1060** contains personal information about the customers, such as name, address, social security number and credit card information, personal preferences, behavioral information, history, and web site layout preferences. The Supplier's Web Server **1070** provides access to all of the supplier's databases necessary to provide information and transactional support to the customer.

The Product Information Database **1080** stores all product-related information, such as features, availability and pricing. The Product Order Database **1090** stores all customer orders. The interface to this database may be through an Enterprise Resource Planning application offered by SAP, Baan, Oracle or others, or it may be accessible directly through the Supplier's Web Server or application server. The Customer Information Database **1091** stores all of the customer information that the supplier needs to complete a transaction or maintain customer records.

FIG. **10**B is a flowchart providing the logic utilized to create a web page within the Egocentric Interface. The