

**UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD**

FIFTH THIRD BANK, NATIONAL ASSOCIATION
Petitioner,

v.

UNITED STATES AUTOMOBILE ASSOCIATION
Patent Owner

INTER PARTES REVIEW OF U.S. PATENT NO. 12,211,095
Case No. IPR2026-00277

**PETITION FOR *INTER PARTES* REVIEW OF
CLAIMS 1-30 OF U.S. PATENT NO. 12,211,095
UNDER 35 U.S.C §§ 312 AND 37 C.F.R. §§ 42.104**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES	2
	A. Real Party-in-Interest	2
	B. Related Matters.....	2
	C. Lead and Backup Counsel and Service Information.....	3
III.	CERTIFICATION OF GROUNDS FOR STANDING	4
IV.	OVERVIEW OF CHALLENGE AND RELIEF REQUESTED.....	4
	A. Prior Art References.....	4
	B. Grounds for Challenge	6
V.	TECHNOLOGY BACKGROUND.....	7
	A. Checks	7
	B. Electronic Check Processing.....	8
	C. Image-Based Document Processing with Camera Phones	9
	D. Mobile Applications.....	11
VI.	THE ‘095 PATENT.....	12
	A. Brief Description	12
	B. Prosecution History	15
VII.	CLAIM CONSTRUCTION	15
VIII.	PERSON OF ORDINARY SKILL	16
IX.	PRINCIPAL PRIOR ART REFERENCES.....	16
	A. Garcia (EX1003)	16
	B. Luo (EX1004).....	17
	C. Meier (EX1005)	21
	D. Cohen (EX1006).....	22
	E. Yoon (EX1007)	23
	F. Goyal (EX1008)	24
	G. Randle (EX1048).....	24

H.	Attia (EX1043).....	24
X.	SPECIFIC GROUNDS FOR UNPATENTABILITY.....	25
A.	Ground I: Claims 1-4, 6-12, 14-21, 23-30 are Obvious Over Garcia with Luo, Meier, and Cohen.....	25
1.	Garcia/Luo/Meier/Cohen	25
2.	Independent Claims 1, 9, 18, 26	35
3.	Dependent Claims 2-4, 6-8, 10-12, 14-17, 19-21, 23-25, 27-30	56
B.	Ground II: Claims 5/13/22 are Obvious Over Garcia with Luo/Meier/Cohen/Yoon	65
C.	Ground III: Claims 7/24 are Obvious Over Garcia with Luo/Meier/Cohen/Randle.....	68
D.	Ground IV: Claims 11, 16 are Obvious Over Garcia with Luo/Meier/Cohen/Attia.	71
1.	Garcia in view of Luo/Meier/Cohen/Attia.....	71
2.	Claim 11	73
3.	Claim 16.....	73
E.	Ground V: Claims 1-4, 6-12, 14-21, 23-30 are Obvious Over Garcia with Luo/Goyal/Cohen	74
1.	Garcia in view of Luo/Goyal/Cohen.....	74
2.	Claims 1-4, 6-12, 14-21, 23-30.....	79
F.	Grounds VI, VII, & VIII	83
XI.	FEES	84
XII.	CONCLUSION.....	84

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>ACCO Brands Corp. v. Fellowes, Inc.</i> , 813 F.3d 1361 (Fed. Cir. 2016)	34, 72
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	27, 29, 67, 77
<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	16
<i>Uber Techs., Inc. v. X One, Inc.</i> , 957 F.3d 1334 (Fed. Cir. 2020)	30, 62
Statutes	
35 U.S.C. §102.....	5, 6
35 U.S.C. §103.....	4, 6
Regulations	
37 C.F.R. §42.8(b)	2, 3
37 C.F.R. §42.101	4
37 C.F.R. §42.104	4

Fifth Third Bank, National Association (“Petitioner”) respectfully requests *inter partes* review (“IPR”) of claims 1-30 of U.S. Patent No. 12,211,095, owned by United Services Automobile Association (“Patent Owner” or “PO”). This Petition is materially identical to that in instituted IPR2025-01356, to which Petitioner concurrently files a Motion for Joinder.

I. INTRODUCTION

U.S. Patent No. 12,211,095 (the “’095 patent”) claims systems for using mobile devices to capture and submit check images for deposit by a bank. However, mobile remote check deposit was described in a patent application (“Garcia”) published years earlier, and the only features that the claims of the ’095 patent purport to add relate to the use of existing technologies to control a mobile device camera and automatically capture check images. By 2009, these elements would have been simple and obvious to implement in a check deposit system.

Indeed, in prior proceedings involving related patents, the Board found and the Federal Circuit affirmed that automatically capturing an image for mobile check deposit is obvious in view of Luo and Yoon relied on herein. EX1009-571-FWD, 23-72, 73-74. In another proceeding relating to a patent with an even earlier alleged priority chain, the Board found and the Federal Circuit affirmed that implementing Garcia’s system with a downloaded application that accesses a software abstraction layers (*e.g.*, “application programming interfaces” or “APIs”) would have been

obvious. EX1010-598-FWD, 23-31, 69. The '095 patent does not add anything meaningful to claims that were previously invalidated. Petitioner therefore respectfully requests the Board institute *IPR* and hold claims 1-30 of the '095 patent unpatentable.

II. MANDATORY NOTICES

A. Real Party-in-Interest

Pursuant to 37 C.F.R. §42.8(b)(1), Petitioner certifies that Fifth Third Bank, National Association is the real party-in-interest. Fifth Third Bancorp is the indirect parent company of Fifth Third Bank, National Association.

B. Related Matters

Under 37 C.F.R. §42.8(b)(2), Petitioner states that Patent Owner ("PO") has asserted two patents, including the '095 patent and another patent in the '095 patent family (U.S. Patent No. 12,159,310) in *United Services Auto. Ass'n* ("USAA" or "PO") *v. Regions Bank*, Case No. 2:25-cv-00082 (E.D. Tex.).

The '095 patent is the subject of *Regions Bank v. United Services Automobile Association*, IPR2025-01356 (instituted February 10, 2026).

Petitioner is concurrently filing a petition for *inter partes* review of the '310 patent, along with a motion for joinder to the *inter partes* review of that patent, *Regions Bank v. United Services Automobile Association*, IPR2025-01326 (instituted February 10, 2026).

Thirteen prior post-grant proceedings have been filed pertaining to patents in the '095 patent's family by third parties, none of which are pending: 8,699,779 (CBM2019-00005, IPR2019-01083, IPR2020-00976, IPR2021-01070), 8,977,571 (CBM2019-00004, IPR2019-01082, IPR2020-00975, IPR2021-01073), 9,569,756 (IPR2020-00092), 9,818,090 (CBM2019-00002, IPR2019-00815, IPR2020-00882, IPR2022-01593). Among those proceedings, the following reached final written decisions finding all challenged claims unpatentable, which were affirmed by the Federal Circuit:

- (1) IPR2021-01070 (U.S. Patent No. 8,699,779) – challenged claims 1-2, 7-10, and 15-17 unpatentable
- (2) IPR2021-01073 (U.S. Patent No. 8,977,571) – challenged claims 1-6, 9, 10, 12, and 13 unpatentable

C. Lead and Backup Counsel and Service Information

Under 37 C.F.R. §§ 42.8(b)(3)-(4), Petitioner identifies the following lead and backup counsel, to whom all correspondence should be directed.

LEAD COUNSEL	BACKUP COUNSEL
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Phone: 202-434-5000 Fax: 202-434- 5029	Phone: 202-434-5000 Fax: 202-434- 5029
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Petitioner consents to service by email on lead and backup counsel.

III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies under 37 C.F.R. §42.104(a), the '095 patent is available for *IPR* and under 37 C.F.R. §§42.101(a)-(c), Petitioner is not barred or estopped from requesting *IPR* on grounds identified in this Petition.

IV. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Under Rules 42.22(a)(1) and 42.104(b)(1)-(2), Petitioner requests cancellation of claims 1-30 of the '095 patent.

A. Prior Art References

On its face, the '095 patent was filed on March 1, 2024. A Certificate of Correction was issued August 5, 2025 (EX1033-FH095, 646-48) adding a priority claim to Application No. 12/545,127, filed August 21, 2009, now Pat. No. 8,977,571.¹ The following references are pertinent to the grounds of unpatentability presented below:

1. International Patent Application Publication No. WO2005/043857

¹ This Petition applies pre-AIA provisions of 35 U.S.C. §§102-103.

(“Garcia”) (EX1003),² published May 12, 2005, is prior art at least under 35 U.S.C. §§102(a), 102(b). Garcia is of record on the face of the ’095 patent but did not form the basis of a rejection during prosecution.

2. Chinese Patent Application Publication No. CN 1897644A (“Luo”) (EX1004),³ published January 17, 2007, is prior art under 35 U.S.C. §§102(a), 102(b). Luo is of record but did not form the basis of a rejection during prosecution.

3. Reto Meier, Professional Android™ Application Development, Wiley Publishing (June 25, 2008) (“Meier”) (EX1005), is prior art under 35 U.S.C. §§102(a), 102(b). As June Munford’s Declaration details, Meier was publicly available as of June 25, 2008, before the earliest provisional application to which the ’095 patent claims priority. EX1062-Munford. Meier is not of record on the ’095 patent.

4. U.S. Patent Application Publication No. 2007/0194102 (“Cohen”) (EX1006), published August 23, 2007, is prior art under 35 U.S.C.

² Garcia, originally published in Spanish, is provided in EX1003 Exhibit A. Citations to “EX1003” refer to EX1003 Exhibit B, a certified English translation.

³ Luo, originally published in Chinese, is provided in EX1004 Exhibit A. Citations to “EX1004” refer to EX1004 Exhibit B, a certified English translation.

§§102(a), 102(b). Cohen is of record but did not form the basis of a rejection during prosecution.

5. U.S. Patent Application Publication No. 2007/0262148 (“Yoon”) (EX1007), published November 15, 2007, is prior art under 35 U.S.C. §§102(a), 102(b). Yoon is of record but did not form the basis of a rejection during prosecution.

6. Vikram Goyal, Pro Java ME MMAPi: Mobile Media API for Java Micro Edition, Apress (June 14, 2006) (“Goyal”) (EX1008), is prior art under 35 U.S.C. §§102(a), 102(b). As Munford’s Declaration details, Goyal was publicly available as of June 14, 2006, before the earliest provisional application to which the ’095 patent claims priority. EX1062-Munford. Goyal is not of record on the ’095 patent.

7. U.S. Patent Application Publication No. 2006/0106717 (“Randle”) (EX1048), published May 18, 2006, is prior art under 35 U.S.C. §§102(a), 102(b). Randle is of record but did not form the basis of a rejection during prosecution.

8. U.S. Patent No. 7,156,311 (“Attia”) (EX1043), issued January 2, 2007, is prior art under 35 U.S.C. §§102(a), 102(b). Attia is not of record on the ’095 patent.

B. Grounds for Challenge

Petitioner requests cancellation of claims 1-30 of the ’095 patent as unpatentable under 35 U.S.C. §103. The grounds for challenge are:

Ground	References	Basis	Claims Challenged
I	Garcia/Luo/Meier/Cohen	§103	1-4, 6-12, 14-21, 23-30
II	Garcia/Luo/Meier/Cohen/Yoon	§103	5, 13, 22
III	Garcia/Luo/Meier/Cohen/Randle	§103	7, 24
IV	Garcia/Luo/Meier/Cohen/Attia	§103	11, 16
V	Garcia/Luo/Goyal/Cohen	§103	1-4, 6-12, 14-21, 23-30
VI	Garcia/Luo/Goyal/Cohen/Yoon	§103	5, 13, 22
VII	Garcia/Luo/Goyal/Cohen/Randle	§103	7, 24
VIII	Garcia/Luo/Goyal/Cohen/Attia	§103	11, 16

This Petition is supported by the declaration of John Hart, PhD (EX1081), which adopts the declaration of Dr. Daniel Lopresti, EX1002.

V. TECHNOLOGY BACKGROUND

A. Checks

Checks are financial instruments that direct the payor's bank to pay a specified amount to the payee. To deposit a check, the payee's bank collects information from the check, including amount, account number, and account holder identity. *See* EX1003-Garcia, 7:1-14, 10:12-13; EX1006-Cohen, [0008], [0022]. Checks

typically contain a **magnetic-ink character-recognition (“MICR”) line**. See EX1006-Cohen, [0008], [0022]; EX1011-Clarke, 1:22-32, 5:61-65. The **MICR line** includes payor’s bank routing number, customer account number, and check number:

John Smith
2 Jefferson Rd
E. Brunswick, NJ

April 29, 1999

Pay To The
Order Of: COMCS \$ 37 no/00

Thirty-Seven and no/100

John Smith

0210000891: 1234567891 ■ |||0000003700 |||

EX1014-Slater, Fig.11. Checks have “been in use in one form or another for hundreds of years.” EX1012-Richardson, [0005]. EX1002-Decl., ¶¶58-60.

B. Electronic Check Processing

Long ago, check deposit was a manual process. However, “[o]ver time, the process has become gradually more and more automated with the advent of high-speed check processing machines, computer-readable check numbers, and...computer handwriting recognition.” EX1012-Richardson, [0005]; EX1013-FDIC.

By early 2000s, banks had the automated technology necessary to process check deposits using check images without having a physical copy of the check.

EX1012-Richardson, [0007]. For example, banks had “*well known*” optical character recognition (“OCR”) technology that could read information from a check image automatically. EX1006-Cohen, [0007]; EX1003-Garcia, 11:7-15; EX1014-Slater, [0023]. The Federal Reserve adopted a standardized electronic check file format that required compressing check images to a smaller bi-tonal format to facilitate their processing. EX1006-Cohen, [0010]; EX1015-DSTU. In 2004, Congress enacted Check Clearing for the 21st Century Act (“Check 21 Act”), that required banks to accept a digital image of a check in lieu of the original paper check. EX1006-Cohen, [0010]; EX1012-Richardson, [0007]-[0008]; EX1013-FDIC. The creation of a digital image of a check that removes the need for a paper check is a process known as “truncation.” EX1006-Cohen, [0004]; EX1012-Richardson, [0008]. EX1002-Decl., ¶¶61-66.

C. Image-Based Document Processing with Camera Phones

By mid-2000s, **camera phones** had become increasingly ubiquitous with hundreds of millions of devices in circulation globally. The resolution and performance of these devices improved rapidly—surpassing 1 megapixel and becoming capable of capturing images suitable for text recognition and **document** processing. This shift enabled applications for **camera**-based **document** analysis and recognition. Advances in on-device processing and adaptive OCR technologies allowed **mobile devices** to accurately capture and interpret **document** content. Other

techniques like **alignment guides** (shown below)—which help users **align documents** in **camera preview windows** to avoid distortions like warp and skew—had been implemented in commercial products to produce OCR-readable images. EX1004-Luo, 1, 4-6; EX1007-Yoon, [0022]-[0023]; EX1016-MotoRokr-Manual, 95-96. To avoid user error, autocapture features were introduced to automatically capture an image when one or more monitoring criterion—like detecting **document edges** and sufficient brightness—were satisfied. EX1004-Luo, 6; EX1007-Yoon, [0019], [0025]-[0026]; EX1016-MotoRokr-Manual, 95-97.

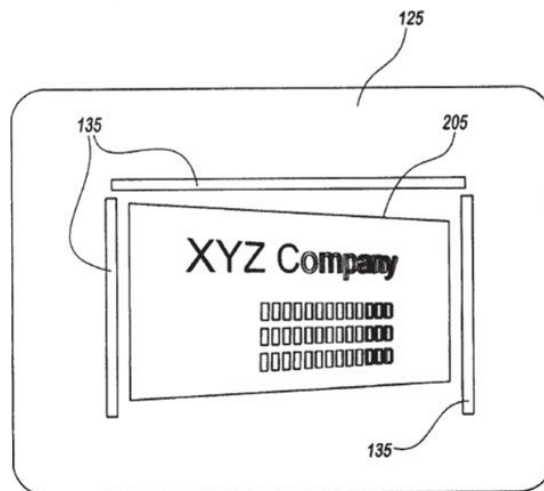


Fig. 5

EX1004-Luo, Fig.5. EX1002-Decl., ¶¶67-70.

It was known by early/mid-2000s that one natural and foreseeable application of this technology was mobile check deposit. EX1003-Garcia, Abstract; EX1017-Acharya, Abstract; EX1018-Burks, 1:31-36, 14:15-31. A 2005 prototype used a

standard **camera phone** to capture and process bank checks. EX1019-Parikh, 80. By late 2000s, two banks had already introduced mobile deposit applications. EX1020-Bruno-Britz; EX1021-Mitek, 37. *See also* EX1022-Bruene. EX1002-Decl., ¶¶71-72.

D. Mobile Applications

Beginning in the 1990s, **mobile devices** like **PDA**s gained popularity for providing useful functionality in a compact formfactor. EX1023-Edwards. By mid-2000s, **PDA**s hit the market with features like handwriting recognition and high-quality **cameras**. EX1024-Rajeswari, 1863; EX1025-Slocombe, 1-4. **Cellphone** capabilities increased significantly, too: the iPhone was released in 2007 with a 2-megapixel **camera** and a nearly-half-a-gigahertz processor. EX1026-Apple; EX1027-EveryiPhone; EX1028-Nokia. EX1002-Decl., ¶¶73-74.

These increased capabilities brought about the ubiquity of downloadable mobile applications. EX1005-Meier, 5; EX1008-Goyal, 66-67. Following this trend, the Apple App Store opened in July 2008 with 500 downloadable applications. EX1029-Graham. **Mobile device** manufacturers also distributed free software development kits (SDKs) with APIs that let an application developer to easily access **device** features like the **camera**, GPS, and/or accelerometer without having to write all the code to make the **camera** operate. EX1005-Meier, 5-6; EX1008-Goyal, 1,

127, 174; EX1030-Aiello, 3, 10; EX1031-Raento, 51, 53, 58. Highly capable **camera**-based applications like business card readers and those that could augment reality by processing live images/frames from the captured video in real time on the **mobile device** began emerging. EX1005-Meier, 320; EX1032-Patrick, 2. EX1002-Decl., ¶¶75-77.

VI. THE '095 PATENT

A. Brief Description

The '095 patent is generally directed to “remote deposit of checks” wherein “the payee may capture a digital image of a check using a [**camera** on a] **mobile device**. The **financial institution** [*i.e.*, **depository**] may then receive from the payee the digital image of the check. The **financial institution** may then use the digital image to credit funds to the payee” via a **clearinghouse**. EX1001-USP095, 1:29-34. EX1002-Decl., ¶78.

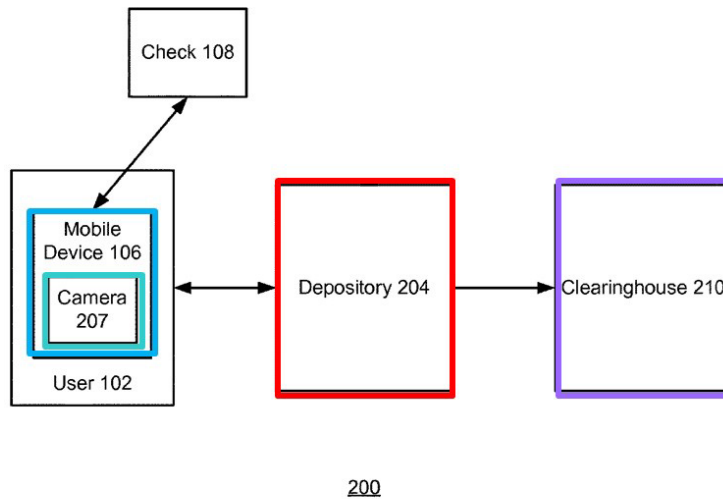


FIG. 2

EX1001-USP095, Fig.2. EX1002-Decl., ¶78.

The '095 patent describes capturing check images by (1) “monitoring” “[a]n image of a check that is in the field of view of a **camera**” of a **mobile device**, (2) providing “feedback” to the “user of the **camera** regarding the image of the check,” and (3) “[w]hen the image of the check in the field of view passes **monitoring criteria**, [taking] an image...by the **camera** and provid[ing] [the image] to a **financial institution**.” EX1001-USP095, Abstract; *see also id.*, 1:45-50, Fig.8.

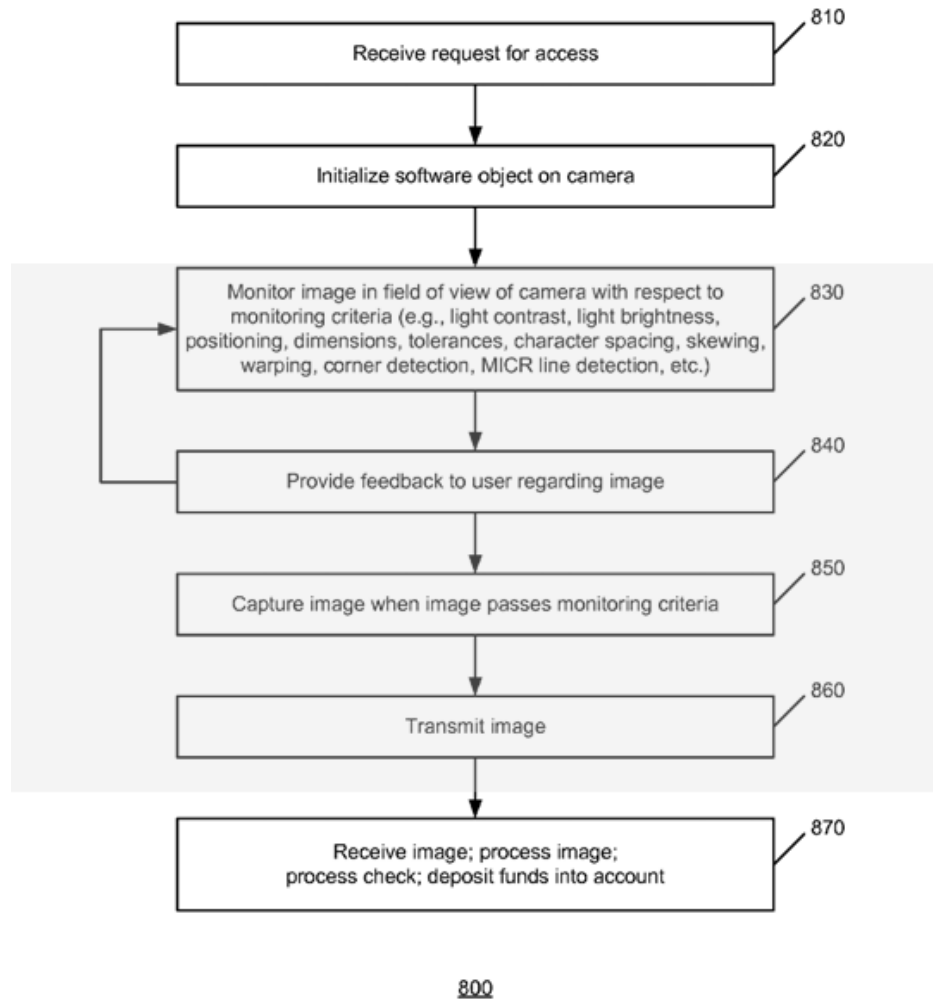


FIG. 8

EX1001-USP095, Fig.8. EX1002-Decl., ¶¶79.

While patent lists potential monitoring criteria (EX1001-USP095, 4:15-19, it does not provide experimental data or actual implementations of how to determine if such criteria are met and instead relies on “known” techniques. *Id.*, 7:17-18 (edge detection); 7:66-67 (same); 8:59-63 (**MICR** detection); 9:10-12 (spacing); 9:47-49 (brightness); 10:17-19 (same). EX1002-Decl., ¶¶80-81.

The '095 patent also discusses implementations with basic software components: the **mobile device camera** can be “operate[d] through a software abstraction layer, such as an application programming interface (API).” EX1001-USP095, 11:26-28. The patent did not invent APIs, instead it relies on known APIs in commercialized mobile operating systems. *Id.*, 11:39-41. EX1002-Decl., ¶82.

B. Prosecution History

Application No. 18/593,854, which issued as the '095 patent, was filed on March 1, 2024, as a “Track One” application. EX1001-USP095, cover; EX1033-FH095, 10-11. The originally-filed application lacked a priority claim, and was therefore rejected over U.S. Patent No. 8,977,571. *Id.*, 84-93. USAA then sought a corrected filing receipt adding a priority claim (*id.*, 96-98), and argued the '571 patent was not prior art (*id.*, 226-27). Though the patent was subsequently allowed, it issued with no priority information. *Id.*, 550-57; EX1001-USP095, cover. PO petitioned for a correction, which subsequently issued on August 5, 2025. EX1033-FH095, 636-48. However, the issued claims would have been obvious in view of prior art cited in this Petition. EX1002-Decl., ¶83.

VII. CLAIM CONSTRUCTION

The Board need only to construe claim terms to the extent necessary to resolve a controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d

1013, 1017 (Fed. Cir. 2017). Petitioner does not believe that any term requires construction for purposes of this Petition.

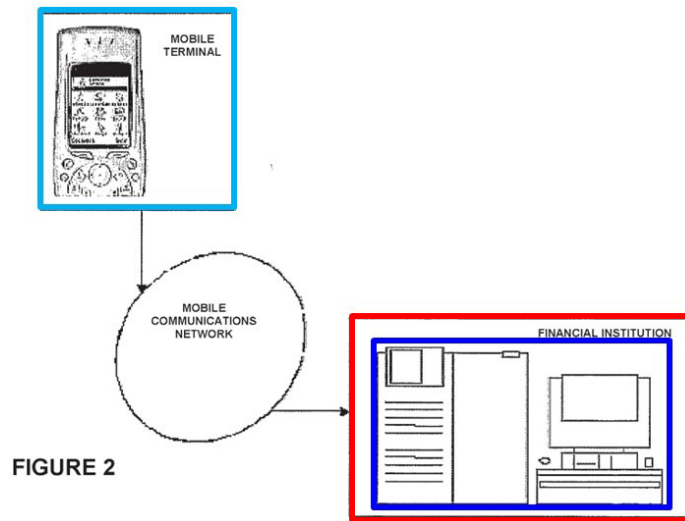
VIII. PERSON OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) as of the claimed priority date of the ‘095 patent would have had a bachelor’s degree in electrical engineering, computer science, computer engineering, or equivalent field, and at least two years of prior experience with (1) image capture/scanning technology, involving transferring and processing of image data to and at a server and (2) software application development. Less work experience may be compensated by a higher level of education and vice versa. EX1002-Decl., ¶¶84-86.

IX. PRINCIPAL PRIOR ART REFERENCES

A. Garcia (EX1003)

Like the ‘095 patent, Garcia teaches a remote check deposit system “for processing and accepting...bank checks...using...a **mobile device** capable of capturing and sending images.” EX1003-Garcia, 1:7-13. Garcia’s Figure 2 illustrates the system that includes a user’s “**mobile device**” and “**computer equipment** at the **financial institution**.” *Id.*, 9:11-18.



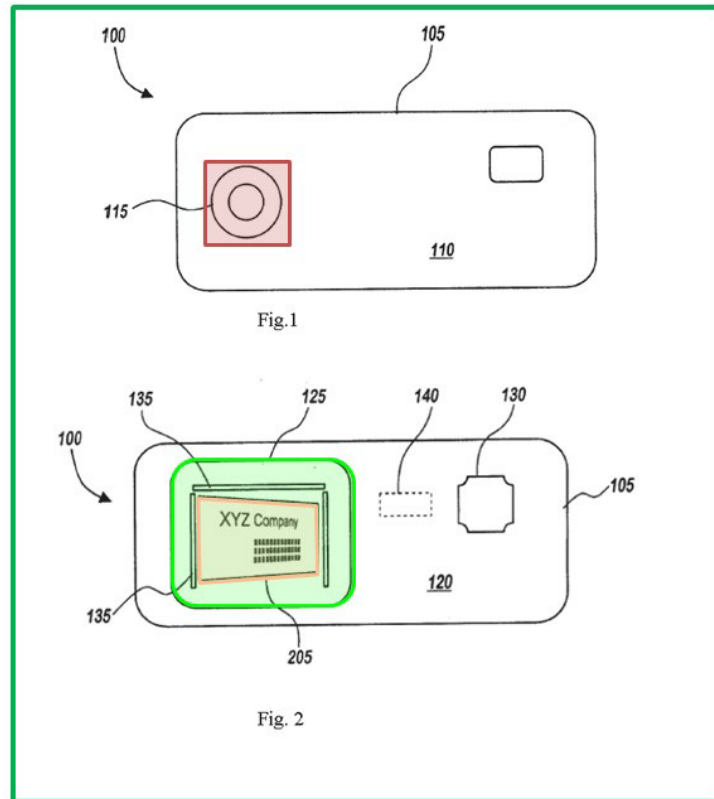
Id., Fig.2. EX1002-Decl., ¶¶89-93.

Like the '095 patent, the **mobile device** captures and sends the check image and other information to a **financial institution**. EX1003-Garcia, 10:10-13, 10:16-18, 11:20-12:3, 12:9-13. The **institution** recognizes, verifies, and processes the image “by the usual means (truncation systems)” to “automatically process the deposit.” *Id.*, 11:7-10, 11:15-19, 12:17-22. Automatic processing uses “**computer equipment**...[with] optical character recognition (OCR).” *Id.*, 11:7-15. *See also id.*, 11:15-19, Fig.1. EX1002-Decl., ¶¶93-95.

B. Luo (EX1004)

Like Garcia and the '095 patent, Luo discloses imaging **documents** with a **mobile device**. EX1004-Luo, 1. **Handheld camera system** 100 includes an “**image sensor** 115 adapted to receive an image” and a “**preview window** 125” that functions

as a “viewfinder” that “display[s] in real time any moving **image**” from” the **image sensor 115.**” *Id.*, 1, 3. EX1002-Decl., ¶¶96-99.



EX1004-Luo, Figs.1-2. EX1002-Decl., ¶99.

Luo improves **handheld devices** image capture to obtain “well-focused and clear **document** images” to “make the [OCR] of any text printed in the **document** effective and reliable.” EX1004-Luo, 4. Luo recognizes that images captured using **handheld devices** may result in “unideal variable factors such as the distance from the lens” to yield images that “may contain defects such as projective distortion” which impair OCR. *Id.*, 1. As illustrated in Figure 3, “projective deformation” occurs

when the “the surface of the object to be imaged” (“object plane 310”) and the “preview image displayed in window 125” (forming “image plane 320”) are not “substantially parallel,” resulting in a distorted image. EX1004-Luo 4.

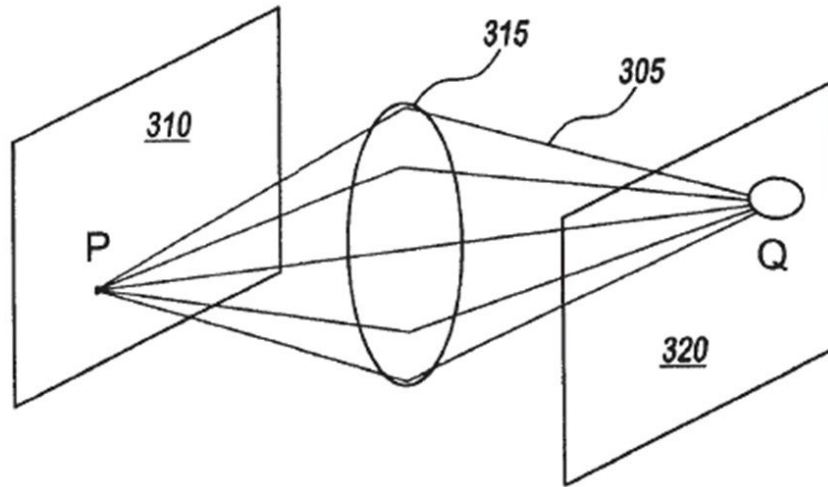


Fig. 3

EX1004-Luo, Fig.3. Projective deformation/distortion causes blur, which can negatively affect OCR. *Id.*, 1, 5.

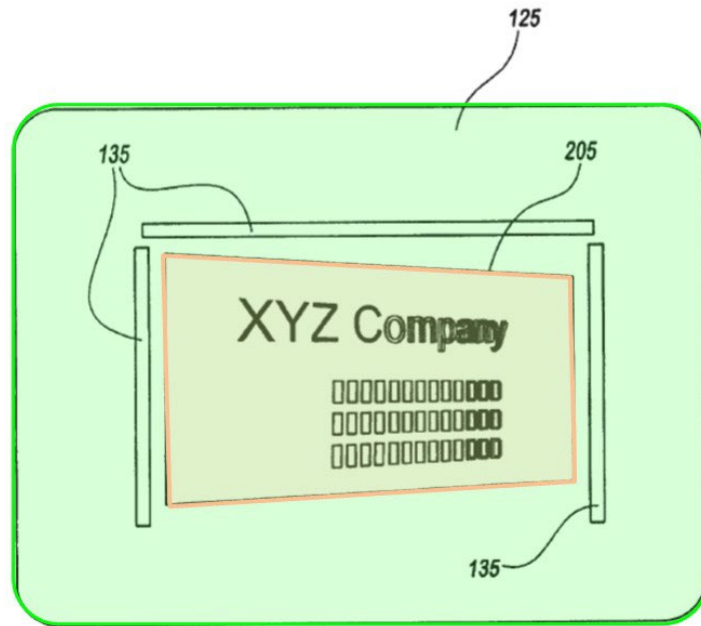


Fig. 5

EX1004-Luo., Fig.5. EX1002-Decl., ¶¶100-105.

Luo addresses these problems using “**reference lines**” that work like the ’095 patent’s “**alignment guide**”:

Luo, FIGURE 5

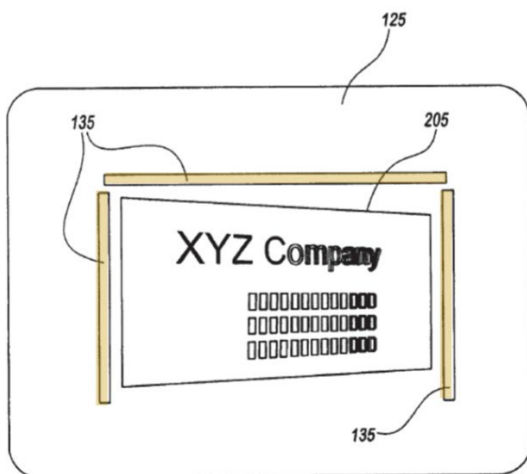


Fig. 5

'095 Patent, FIGURE 3

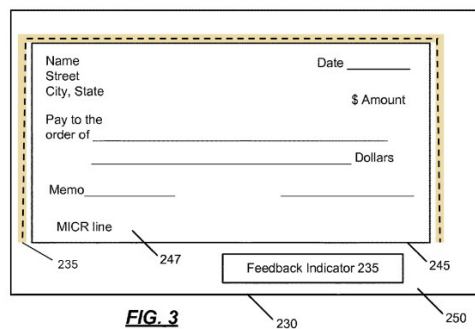


FIG. 3

EX1004-Luo, Fig.5; EX1001-USP095, Fig.3. “[P]rojective distortion in the image is reduced” by monitoring the **document** image 205 relative to **reference lines** 135 capturing the image “only when the **straight edge** 205 shown in the **preview window** 125 is substantially parallel to the corresponding **reference line** 135....” EX1004-Luo, 7. Luo provides instructions and feedback throughout the process (e.g., changing the color of or flickering the **reference line(s)** when an edge of the **document** in the **preview window** is parallel the **reference line(s)**). *Id.*, 3, 6, Fig.6, claim 5. EX1002-Decl., ¶¶106-108.

C. Meier (EX1005)

Meier is a guide for developing mobile applications—specifically for Android-based devices identified by the '095 patent. EX1005-Meier, xvii, 1; EX1001-USP095, 11:37-41. Android provides “APIs” that allow applications to access **mobile device** hardware, like the **camera**. EX1005-Meier, 1, 3, 5-6, 12, 16. Camera APIs “capture images and preview and capture live video” from a mobile application. *Id.*, 315, 319-21. Third-party applications are downloaded from the Android Marketplace. *Id.*, 5. EX1002-Decl., ¶¶109-13.

D. Cohen (EX1006)

Cohen, like Garcia and the '095 patent, discloses depositing a check using its image. EX1006-Cohen, [0008], [0022]. A merchant can deposit checks using “remote computer 108, equipped with scanner 106” and “a software scanning module which allows checks to be scanned front and back....” *Id.*, [0021].

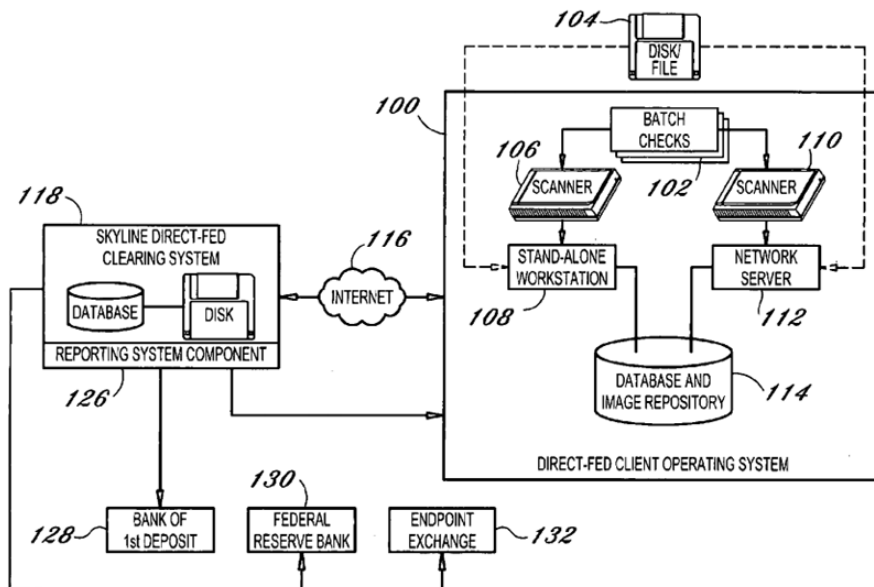


FIG. 1

Id., Fig.1. EX1002-Decl., ¶¶114-17.

The merchant’s system runs an “OCR and parsing processes [that] return[s] value data, including: (1) check amount; (2) bank routing number; (3) bank account number; and (4) check number” as well “values[] representing the confidence level of the accuracy of the OCR results pertaining to each of the respective pieces of data.” EX1006-Cohen, [0022], Fig.2. An operator at “merchant site 100 reviews the

images and data for each check”—including confidence levels—to confirm no errors. *Id.* The images are then transmitted to clearing system 118 for deposit. *Id.*, [0022]-[0023], [0016].

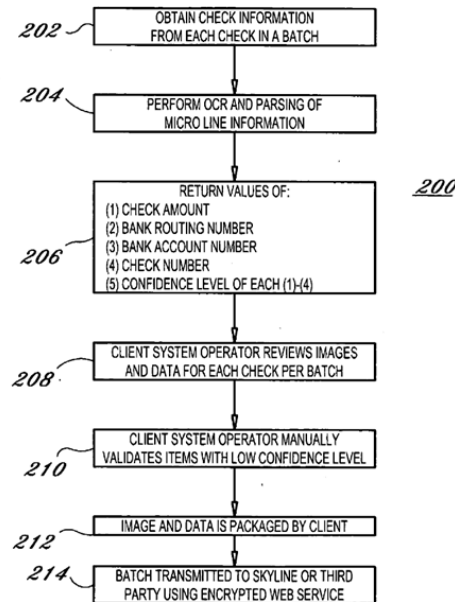


FIG. 2

Id., Fig.2. EX1002-Decl., ¶118.

E. Yoon (EX1007)

Yoon, like Luo and the '095 patent, discloses capturing images of **documents** using a **mobile device** by automatically capturing an image when certain criteria are satisfied. EX1007-Yoon, Abstract, [0019], [0032], claim 1. Yoon teaches using image brightness and **alignment** with a **reference line** as criteria before capture. *Id.*, [0007], [0019], [0022], [0024]-[0030], [0032], Fig.2, claims 2-7, 9, 12-17. EX1002-Decl., ¶¶119-23.

F. Goyal (EX1008)

Goyal is a guide for developing mobile applications—specifically for Java-enabled devices (*e.g.*, Alcatel, Motorola, and Nokia). EX1008-Goyal, 5, 15, back cover. Goyal teaches that “MMAPI [Multi Media API] allows you to create applications”—referred to as “MIDlets”—“for Java-enabled devices that can discover and use the multimedia capabilities of [host] device.” *Id.*, 1, 3, 127. Java-enabled device MMAPIs can “capture snapshots or full videos” from within a mobile application. *Id.*; *see also id.*, 1, 16, 128, 174, 253. Once completed, users download applications “over the air.” *Id.*, 66-67. EX1002-Decl., ¶¶124-27.

G. Randle (EX1048)

Randle, like Garcia and the '095 patent, discloses a check image processing system. EX1048-Randle, [0002], [0006]-[0007]. Randle teaches that the check image is converted from “a high level of quality” to “a less size intensive format” such as to a “bi-tonal (black and white)” image to “increase[] transmission speed and reduce[] storage requirements.” *Id.*, [0043], [0022], [0024], [0026]. EX1002-Decl., ¶¶128-32.

H. Attia (EX1043)

Attia teaches decoding barcodes imaged by **mobile devices**. EX1043-Attia, Abstract, 1:12-16, 3:24-27, 3:45-52, 5:58-63, 11:30-47, claim 1, 3-6, 8-12, 14, Fig.2A-C, 4B, 5A. Attia monitors images of a barcode in real-time and captures the

image when the barcode can be decoded. *Id.*, 4:1-18. Monitoring and decoding can be performed by server. *Id.* EX1002-Decl., ¶¶133-34.

X. SPECIFIC GROUNDS FOR UNPATENTABILITY

A. Ground I: Claims 1-4, 6-12, 14-21, 23-30 are Obvious Over Garcia with Luo, Meier, and Cohen

1. Garcia/Luo/Meier/Cohen

a. Garcia in view of Luo/Meier

First, Garcia/Luo/Meier are analogous art to the Challenged Claims. Garcia/Luo/Meier are in the same field as the Challenged Claims—capturing and processing **document** images. *See, e.g.*, EX1001-USP095, claim 1; EX1003-Garcia, 1:7-13; EX1004-Luo, 6-7 (imaging small rectangular **documents**), 1 (using OCR); EX1005-Meier, 315 (disclosing SDKs to “[a]ccess to the [**mobile**] **device camera**”). EX1002-Decl., ¶¶135-38, 140-43.

Second, a POSITA would have been motivated to combine Garcia’s mobile remote check deposit system with well-known **mobile device** image capture techniques, including Luo’s guidance and autocapture and Meier’s downloaded application and **cameras** APIs. EX1002-Decl., ¶144.

As Section IX.A details, Garcia discloses “**mobile equipment** that performs the initial processes of capturing, digitizing and processing the image consists of a **mobile telephone** equipped...with a **camera** and processing capacity.” EX1003-Garcia, 11:1-6, 1:7-13, 11:7-15, 9:21-10:3 (discussing “computer application”). A

POSITA would have been motivated to apply teachings from Luo/Meier to fill implementation details regarding image capture and the **mobile device** software architecture. EX1002-Decl., ¶145.

Luo provides such teachings for capturing check images on a **mobile device**. Specifically, Luo improves captured **mobile device** images of **documents** for OCR by providing instructions and feedback to the user and helping the user **align** the **document** edge with parallel **reference lines** in a **camera preview window**. EX1004-Luo, Abstract, 5-7, claims 5, 11, 13, Fig.6. Luo also discloses automatically capturing the image when the **document** is properly **aligned** in the **preview window**. *Id.* EX1004-Luo, 6. Such techniques produce “improved method and system for capturing the...image,” are “user friendly and intuitive in use,” ensure the “image is clearer and more accurate,” and reduce projective distortion, which “accelerate[the] image capture process” and “optical character recognition...with high accuracy.” *Id.*, 7. EX1002-Decl., ¶¶146-47.

A POSITA would have been motivated to incorporate Luo’s teachings into Garcia. Luo’s image capture techniques, including **reference lines** and instructions to the user, can produce higher quality images that reduce “projective distortion” and “blur” and improve OCR. EX1004-Luo, 1, 5, 7. A POSITA would have therefore been motivated to use Luo’s **preview window**, instructions, feedback, **document alignment**, and automatic capture techniques to improve captured images for

Garcia’s check deposit system. Luo’s techniques would have predictably increase the likelihood of obtaining check images suitable for Garcia’s “[r]ecognizing, verifying, and electronically treating and processing.” EX1003-Garcia, 6:8-10. EX1002-Decl., ¶147-49.

Implementing Garcia’s mobile check deposit system using Luo’s techniques would have amounted to applying a known technique/method (*e.g.*, Luo’s display, feedback, and capture techniques) to a known device/method (*e.g.*, Garcia’s mobile phone) ready for improvement (*e.g.*, to improve OCR of Garcia’s images) to yield predictable results (*e.g.*, improved check images). *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). EX1002-Decl., ¶150.

Garcia uses “a computer application in the **mobile telephone**” and “features and functions necessary” for image capture. EX1003-Garcia, 9:21-10:1, 11:4. Luo similarly teaches processors running “stored program instructions” and “software...that enables the [**camera**] **preview window**.” EX1004-Luo, 3, 7-8. A POSITA would have been motivated to apply teachings from Meier to fill in implementation details regarding the software architecture and how the software is loaded onto the **mobile device**. EX1002-Decl., ¶151.

Meier fills in those details with well-known then-existing software components. Meier teaches developers how “to get the most out of Android” by using the **device camera**. EX1005-Meier, xvii, 5-6, 12, 315. Meier explains that

mobile applications can be downloaded onto the **device** and “[a]ccess...the **device camera** for taking pictures and previewing video” using “application-neutral APIs.” *Id.*, xviii, 316, 5, 12, 315, 319-21, 325. EX1002-Decl., ¶¶152-53.

A POSITA would have been motivated to implement Garcia/Luo with Meier’s downloadable application and Camera APIs. Mobile (**camera**) applications were becoming increasingly popular. *See* §§V.C-V.D; EX1005-Meier, 315, 319-20. Downloaded applications allow enterprises (*e.g.*, Garcia’s bank), to offer customers customized functionality that is more complex than other solutions like webpages. EX1034-Yuan, 52. Downloaded applications are only installed once, and can provide more security than webpages. *Id.*, 44, 52. Downloaded applications also facilitate access to the **device camera** without requiring the enterprise to write **mobile device** software from the ground up. EX1005-Meier, 1, 3, 5-6, 12, 16, 315, 319-21. Downloaded applications with APIs for controlling image capture were already used for desktop check deposit (EX1036-Westerman; EX1037-EasCorp; EX1038-eServices), so a POSITA would have used the equivalent architecture for **mobile devices**. EX1039-Hariharan. EX1002-Decl., ¶¶154-57.

A POSITA would have been drawn to how-to guides like Meier to implement the teachings of Garcia/Luo on a mobile platform, like Android. In the Garcia/Luo/Meier combination, Meier’s downloadable application and Camera API would include the software required for Garcia/Luo’s teachings. For example, the

downloaded application would facilitate Luo's **preview window** and image capture using the Camera API that privies access to video preview from a **device camera** (e.g., using Android's `setPreviewDisplay`) and the ability to capture a picture from that video feed (e.g., using `takePicture`). EX1004-Luo, Abstract, 5-7, claims 5, 11, 13, Fig.6; EX1005-Meier, xviii, 5, 12, 315, 318-20. Moreover, Meier provides other implementation details, such as how to initialize the **camera** and control additional settings. *See, e.g.*, EX1005-Meier, 319-20. EX1002-Decl., ¶158.

Implementing Garcia/Luo's software using Meier's downloaded application and API would have amounted to applying a known technique/method (e.g., Meier's well-known software architecture) to a known device/method (e.g., Garcia/Luo's mobile check capture and processing software) ready for improvement (e.g., facilitating Garcia/Luo's functionality without requiring repeated downloads and writing **camera** control software) to yield predictable results (e.g., capturing/processing a check image with a **mobile device**). *KSR*, 550 U.S., 416. EX1002-Decl., ¶159.

Third, similarities between the references and the teachings therein would have led a POSITA to reasonably expect success in implementing the combination of Garcia's mobile check deposit system using Luo's capture technique and Meier's architecture. All three are directed to **mobile devices** with **cameras** and image capture software (EX1003-Garcia, 1:7-13, 11:1-6; EX1004-Luo, 3, 6-8; EX1005-

Meier, 315), which suggests the teaching from one would have applied to the others. Moreover, Garcia/Luo teach capturing images of the same subjects—small rectangular **documents** with **straight edges**, which would include Garcia’s “bank checks.” EX1003-Garcia, 12:6; EX1004-Luo, 1, 4, 6. EX1002-Decl., ¶¶160-63.

Regarding the references themselves, Garcia teaches a “computer application” in a **mobile device** that engages in an interactive session with a **financial institution** for a check deposit without expressing difficulties implementing such features. EX1003-Garcia, 9:19-10:18. Thus, Garcia assumes that implementing known details like Luo’s image capture process or Meier’s software architecture would have been within the level of skill of a POSITA, and could have been accomplished using computer code. EX1004-Luo, 1, 3, 7-8; EX1005-Meier, 315, 319-20. Other contemporaneous evidence confirms that controlling a **mobile device camera** using an API was known and “trivial.” EX1040-CodeGuru, 1.⁴ Moreover, Meier is a

⁴ The ’095 patent similarly assumes a POSITA would understand how to implement the claimed image capture process and software architecture, and also lacks implementation details, such as specific APIs, example code, or particular monitoring criterion parameters. EX1001-USP095, 7:54-60, 8:7-19, 24-30, 10:42-51, 11:26-51, 16:19-39, 21:1-27, claims 1-2, 5-6, 8, 9; *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) (specification silence on implementation

handbook directed to “*anyone* interested in creating applications for...**mobile phone[s]**” with only “some experience in software development.” EX1005-Meier, xvii. Accordingly, it would have been obvious for a POSITA to incorporate into Garcia Luo/Meier’s teachings regarding monitoring criteria, automatic capture, feedback to a user, and software architecture to Garcia’s mobile check deposit system. EX1002-Decl., ¶¶164-66.

Finally, the Board and Federal Circuit have already found obvious the combination of a similar mobile check deposit reference like Garcia with Luo’s image capture techniques to be obvious (EX1009-571-FWD, 23-72; EX1060-PNC2, *3-*7), and the combination of Garcia with another prior art disclosure regarding downloaded applications similar to Meier (EX1010-598-FWD, 20-25). Combining Garcia/Luo/Meier would have been obvious for similar reasons.

b. Garcia in view of Cohen

First, like Garcia, Cohen is analogous art to the Challenged Claims. Cohen is in the same field as the Challenged Claims—capturing and processing **document** images. EX1001-USP095, claim 1; EX1006-Cohen, [0002]. EX1002-Decl., ¶¶139, 167.

“suggest[s]” POSITA is “more than capable of selecting between the known methods”).

Second, a POSITA would have been motivated to incorporate Cohen's teachings into Garcia. Garcia discloses "[r]ecognizing, verifying, and electronically treating and processing the information received by [a **financial**] **institution**" and requires that such **institution** has "**computer equipment**...that has an optical character recognition (OCR) system." EX1003-Garcia, 6:8-10; 11:10-15. Cohen fills in implementation details regarding what Garcia's "verifying" and "processing" entails. For example, Cohen discloses techniques for verifying and processing of check images using OCR, reading the **MICR line**, and validating various information items via accuracy confidence levels. EX1006-Cohen, Abstract, [0017], [0019]-[0022], [0042]-[0044], [0059], [0076]-[0088], [0093], Figs.1-2, claims 8, 14. Cohen also discloses that the user can review and confirm the image and information read from the check after processing but before submitting. EX1006-Cohen, [0022], [0032], [0045], [0078], [0091], [0093]-[0094], Fig.2. EX1002-Decl., ¶¶168-72.

A POSITA would have been motivated to combine Garcia's mobile check deposit system with Cohen's check image processing teachings, including OCR, validation, and confirmation techniques, to improve the reliability and automation of remote check deposit. Garcia itself teaches toward the combination. Garcia identifies the need for OCR and data processing/verification (EX1003-Garcia, 1:6-13, 2:7-14, 4:11-18, 5:1-10, 6:8-10, 11:1-19, 12:17-22, claims 1, 4, Fig.1), and Garcia directs a POSITA to the "usual means" of processing checks, such as

“truncation systems” (EX1003-Garcia, 11:15-19; EX1010-598-FWD, 50). This would have led a POSITA to truncation systems like Cohen, which disclose additional check processing steps left by Garcia to the skill and discretion of a POSITA. EX1006-Cohen, [0004]-[0010], [0018], [0025], [0036] (describing check truncation, substitute checks). A POSITA would have been drawn to Cohen in particular, as Cohen is directed to techniques for ensuring that an image captured by a user’s **device**—as opposed to an ATM or other bank system—are of sufficient quality for deposit. These techniques would have been directly applied to Garcia’s mobile check deposit system. EX1002-Decl., ¶173.

Incorporating Cohen’s teachings to allow a user to review a captured check image and information extracted therefrom would have ensured that only higher quality check images are submitted, decreasing the likelihood that the image would later be rejected. EX1006-Cohen, [0022], [0072], [0078], [0092]. EX1002-Decl., ¶174.

In the combination, Garcia teaches performing recognizing, processing, and verifying by a remote bank computer (EX1003-Garcia, 1:6-13, 2:7-14, 4:11-18, 5:1-10, 6:8-10, 11:1-19, 12:17-22, claims 1, 4, Fig.1), whereas Cohen teaches performing at least some of those steps on a user’s **mobile device**. EX1006-Cohen, Abstract, [0017], [0019]-[0022], [0043]-[0044], [0059], [0076]-[0088], [0093], Fig.2, claims 8, 14. When faced with the alternatives of performing such steps on

the **mobile device** or the server, a POSITA would have found design choice obvious. *ACCO Brands Corp. v. Fellowes, Inc.*, 813 F.3d 1361, 1367 (Fed. Cir. 2016). On the one hand, a POSITA would have been motivated to perform check image processing steps on the **mobile device** to save bandwidth and delay by determining readability of deposit information before transmitting the image for deposit over a bandwidth-constrained network. EX1042-PNC, *8-*10; EX1043-Attia, 4:1-7; EX1044-Nepomniachtchi, 10:29-48; EX1048-Randle, [0028], [0021], [0074]. Conversely, a POSITA would have also been motivated to perform such processing at the bank's server where the rest of the verification takes place and to avoid processing burden on the **mobile device**. EX1042-PNC, *10; EX1043-Attia, 4:1-7; EX1044-Nepomniachtchi, 10:29-48. EX1002-Decl., ¶¶175-79.

Third, the similarity between Garcia and Cohen and the teachings therein would have led a POSITA to reasonably expect success. Garcia and Cohen are both directed to depositing checks using images (EX1003-Garcia, 1:7-13; EX1006-Cohen, [0002]), which suggests that Cohen's check image processing steps would have also been applicable to Garcia's images. Moreover, both Garcia and Cohen teach processing and verifying steps, including OCR. EX1003-Garcia, 1:6-13, 2:7-14, 4:11-18, 5:1-10, 6:8-10, 11:7-19, 12:17-22, claims 1, 4, Fig.1; EX1006-Cohen, [0017], [0019]-[0022], [0043]-[0044], [0059], [0076]-[0088], [0093], Fig.2, claims 8, 14. Thus, Garcia's broader disclosure of "[r]ecognizing, verifying, and

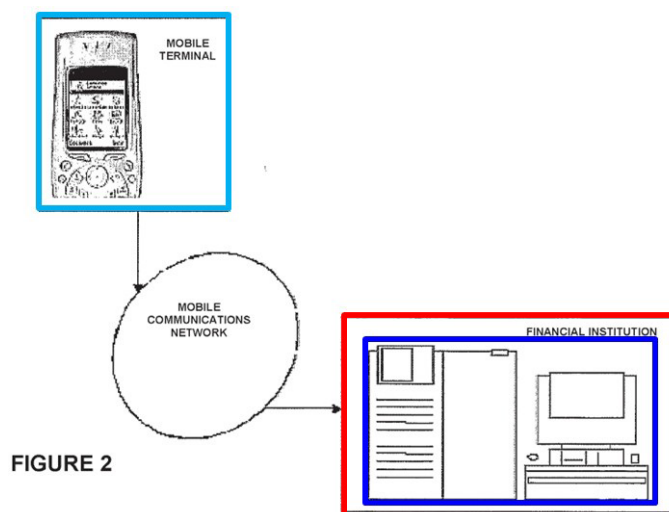
electronically treating and processing” check images encompasses Cohen’s complementary teaching of steps like OCRing the MICR and amount, and obtaining accuracy confidence levels for deposit information. Garcia’s teaching to use the “usual means” like Cohen would have led a POSITA to expect success. EX1003-Garcia, 11:7-19; EX1006-Cohen, [0004]. Accordingly, it would have been obvious for a POSITA to combine the teachings of Garcia with Cohen. EX1002-Decl., ¶¶180-83.

2. Independent Claims 1, 9, 18, 26

a. Claims 1[pre]/9[pre]/18[pre]/26[pre]

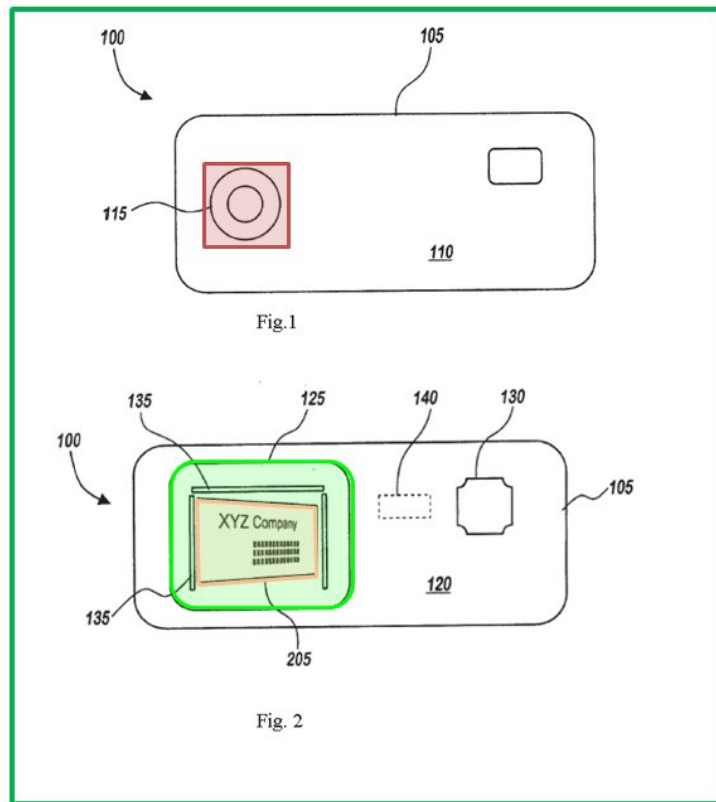
Garcia/Meier/Luo teaches *a system enabling mobile check deposit* (e.g., system for performing remote check deposit (Garcia)) *auto-capture functionality* (e.g., automatically capturing image upon satisfying the alignment guide (Luo)) *via video frame processing* (e.g., live image processing (Luo) via camera capture using an API (Meier)). EX1002-Decl., ¶¶184, 190.

Garcia discloses a system for *mobile check deposit* in which a mobile device captures an image of a check and transmits the image over a communications network to a remote financial institution for processing and deposit. EX1003-Garcia, 1:6-13, 3:13-14, 4:11-18, 9:11-18, Fig.2 (reproduced below).



Id., Fig.2. EX1002-Decl., ¶185.

Luo discloses techniques for automatically capturing an image of a **document** using a **handheld device**. EX1004-Luo, 3, 6, Figs.1-2 (reproduced below).



Id., Figs.1-2. Luo obtains **document** images suitable for OCR by automatically capturing the image when **straight edges** of the **document** in a **preview window** are parallel to one or more **reference lines**. *Id.*, 1, 4-7, Figs.3, 5, claims 3, 10. EX1002-Decl., ¶¶186-87.

Meier discloses software APIs that allows a **mobile device** to display, preview, and process video frames from a **camera**. EX1005-Meier, 315. The Camera Preview API provides “[a]ccess to the **camera’s** streaming video [so] that you can incorporate live video into your applications.” EX1005-Meier, 320. “The **camera** preview can be displayed in real time onto a Surface.” *Id.* “[E]arly Android

applications have used this functionality as the basis for augmenting reality,” demonstrating live image/frame processing from captured video. EX1005-Meier, 320. EX1002-Decl., ¶¶188-89.

b. Claims 1[a]/9[a] (first half)/18[a]/26[a]

Garcia teaches *a mobile device of a user* (e.g., Garcia’s **mobile device** include computer application), *the user’s mobile device including a camera, a processor, and a memory coupled to the processor*. EX1002-Decl., ¶191.

Garcia discloses a **mobile device** with a **camera** that takes a check image and “processing capacity” (*processor*). EX1003-Garcia, 9:19-10:18, 4:11-18. 6:12-20, 11:1-6, 12:4-11. Additionally, Garcia’s **mobile device** submits the image of the check to a bank for deposit. *Id.*, 4:11-18, 7:18-22, 11:1-6, 16:19-20. A POSITA would have understood the “processing capacity” to include a *processor*, and that Garcia’s **mobile device** would have included a *memory* coupled to the *processor* to store software to perform “the features and functions” of Garcia’s system. EX1010-598-FWD, 23. EX1002-Decl., ¶¶192-93.

c. Claims 1[b]/18[b]/26[b]

Garcia/Meier teach *a software abstraction layer [for controlling the camera]* (e.g., Meier’s API), *the software abstraction layer comprising Instructions that, when executed by the processor, control the camera*. EX1002-Decl., ¶194.

As Section X.A.2.b details, Garcia discloses a **mobile device** with a **camera**. *See also* EX1010-598-FWD, 23. Meier discloses a downloadable application that can implement “the features and functions” described in Garcia—*i.e.*, capturing an image of a check from a **mobile device**. EX1005-Meier, 5, 20, 315, 320. Meier further teaches that such applications use APIs (*software abstraction layers*) of the **mobile device** to “access **camera** hardware,” for example to “capture images and preview and capture live video.” *Id.*, 20, 315, 319. Meier’s API and associated software, would be *executed* by the user’s **mobile device** processor, for example, to “adjust **camera** settings, take pictures, and manipulate streaming **camera** previews.” *Id.*, 319. In Garcia/Luo/Cohen, the software would perform additional operations. §§X.A.2.d-X.A.2.1, X.A.1. EX1002-Decl., ¶¶195-99.

d. Claims 1[c]/9[a](second half)/18[c]/26[c]

Garcia/Meier teach *a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera [through the software abstraction layer, the downloaded app comprising Instructions that, when executed*

*by the processor, cause the user's mobile device]*⁵*to perform operations.* EX1002-Decl., ¶200.

As Section X.A.2.c details, Garcia/Meier teaches a downloaded application that accesses an API to control the **camera**, which a POSITA would have understood to include executable instructions for a processor. *See also* EX1010-598-FWD, 23. In Garcia/Meier, the application would have been *provid[ed]* by and *associated with a bank* by virtue of the check images being sent to a computer at the **financial institution** for processing. EX1003-Garcia, 1:15-19, 4:1-8, 4:11-18. Because Garcia discloses replacing an in-person deposit with a remote one (EX1003-Garcia, 1:15-2:14, 7:18-8:14), a POSITA would have found it obvious for the depositor's bank to provide the application. In the combination with Meier, the image capture and processing steps described below with reference to limitations 1[d]-1[k] would have been performed by the downloaded application. EX1002-Decl., ¶¶201-202.

e. Claims 1[d]/9[b]/18[d]/26[d]

Garcia/Luo teach *providing Instructions* (e.g., Luo's instructions) *to the user for capturing [an image of] a check* (e.g., Garcia). EX1002-Decl., ¶203.

⁵ Limitation 9[a] instead recites "the system being configured." This limitation is obvious for at least the same reasons as the bracketed text.

Garcia teaches “[c]apturing the digital image of the obverse and the reverse side of the **document**.” EX1003-Garcia, 10:10-11, 12:4-9. This involves “an interactive session...with the **receiving institution** through the mobile communications operator.” *Id.*, 10:1-3. In this context, Garcia’s real-time interactive session would have necessarily included instructions or prompts guiding the user to correctly position the check for image capture. Such guidance was standard in mobile imaging applications at the time and would have been readily understood as implied in Garcia’s description of real-time validation and feedback. *Id.*, 4:11-18, 5:1-9, 12:17-13:5, claim 4; EX1045-Zhu,⁶ 9 (“[C]amera system displays instructional text on said screen to guide the **mobile phone** user to perform correct operations during the execution of each step.”); EX1046-Lin, [0154]; EX1017-Acharya, 7:5-13; EX1004-Luo, 6; EX1007-Yoon, [0022], [0026], [0028]. EX1002-Decl., ¶¶204, 206.

Additionally, Luo provides “*instructions* to the user when the **straight edge** displayed in the **preview window** is substantially parallel to the corresponding

⁶ Zhu, originally published in Chinese, is provided in EX1045 Exhibit A. Citations to “EX1045” refer to EX1045 Exhibit B, which is a certified English translation.

reference line *before capturing the image of the object.*” EX1004-Luo, 6, claim 5; *see also id.*, Abstract, claims 11, 13, Fig.6. EX1002-Decl., ¶¶205-206.

f. Claims 1[e]/9[c]/18[e]/26[e]

Garcia/Luo/Meier teach *generating a live video of the check* (e.g., Garcia’s check) *in a field of view of the camera* (e.g., Garcia/Luo/Meier’s viewfinder/preview), *the downloaded app causing the live video to be generated by controlling the camera [through the software abstraction layer]* (e.g., Meier’s API). EX1002-Decl., ¶207.

In Garcia/Luo/Meier, the **document** captured by Luo’s technique would have been a *check*. EX1003-Garcia, 1:6-13, 4:11-18; *see also* §X.A.1.a. EX1002-Decl., ¶208.

Luo further teaches *generating a live video of a document in the field of view of the camera*. Luo’s **preview window** “is suitable for **displaying the image** received by the **image sensor 115**” and “can function as a viewfinder of a conventional **camera** and display in real time any **moving image of the scene in front of the image sensor 115.**” EX1004-Luo, 3. A POSITA would have understood the “viewfinder” would have shown video from the **camera**, and that “the scene in front of the **image sensor 115**” in Luo’s viewfinder is in *the field of view of the camera*, which would have included the **document** being imaged. EX1004-Luo, 3. EX1002-Decl., ¶209.

Meier also teaches *generating a live video of the check in a field of view of the camera*. For example, Meier discloses an API for controlling the **camera**, and that the capture process involves “previewing video” before capturing the image API. EX1005-Meier, 315, 319. A POSITA would have understood “preview video” to be live video. Because the Camera API (*software abstraction layer*) controls access to the **camera** hardware to control image preview and capture, the downloaded application in Garcia/Luo/Meier would *cause the live video to be generated by controlling the camera through the software abstraction layer (e.g., API)*. See EX1005-Meier, 315, 319; *supra* §§X.A.2.c-X.A.2.d. EX1002-Decl., ¶¶210-12.

g. Claims 1[f]/9[d]

Garcia/Luo/Meier teach *overlaying an alignment guide (e.g., Luo’s **straight edge** and **reference lines**) on the live video of the check in the field of view of the camera*. EX1002-Decl., ¶213.

In Garcia/Luo/Meier, the imaged **document** is a *check*. EX1003-Garcia, 1:6-13, 4:11-18; *see also* §X.A.1.a. As discussed above, Luo/Meier also teaches *the check in the field of view of the camera*. See §X.A.2.f. EX1002-Decl., ¶214.

Luo further teaches *overlaying **reference lines** and a **straight edge** (e.g., **alignment guide**) in the **preview window** (e.g., *on the live video*)*. EX1004-Luo, Abstract (disclosing displaying “a preview image depicting a **straight edge** (205) and at least two **reference lines** (135) simultaneously...in a **preview window** (125)

of the **camera system** (100), where each **reference line** (135) corresponds to a **straight edge** (205).”), 3 (explaining that **reference line** 135 is displayed in the **preview window** “[w]hen the mode selection switch 130 is set to the **document** capture mode.”), Fig.5:

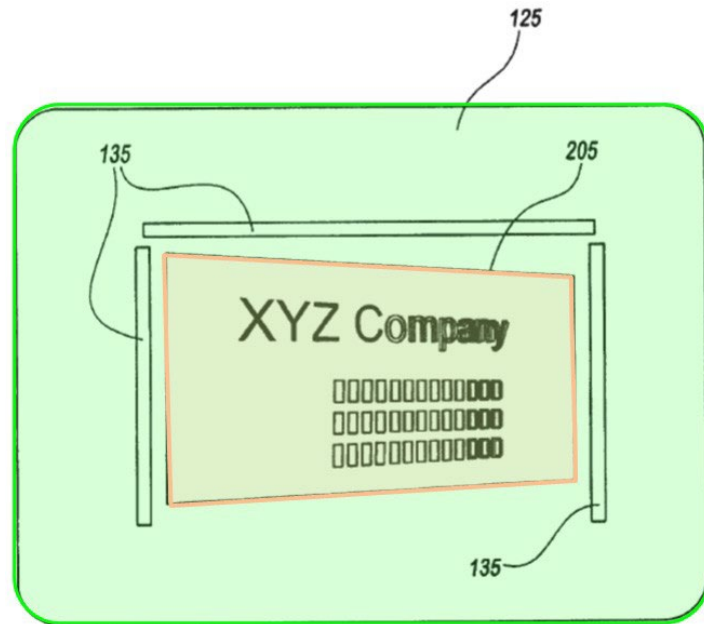


Fig. 5

EX1004-Luo, Fig.5. Luo’s projected **reference lines** are an **alignment guide** because they represent shapes or indicators for **guiding alignment**.

EX1002-Decl., ¶¶215-16.

h. Claims 1[g]/9[e]/18[f]/26[f]

Garcia/Luo/Meier teach *monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion*. EX1002-Decl., ¶217.

Garcia/Luo/Meier disclose displaying *live video of the check in the field of view of the camera*. §§X.A.1.a., X.A.2.f. As shown below, Luo further teaches *monitoring...with respect to a monitoring criterion* by monitoring whether the “**straight edge 205**” of an object “displayed *in the preview windows 125* is substantially parallel to the corresponding **reference line 135**” and “only when the **straight edge**...is substantially parallel to the corresponding **reference line 135** can the image of the object be captured.” EX1004-Luo, Abstract, 5-7. Waiting for **alignment** with the **reference lines** reduces the amount of “projective distortion” and blurriness, thereby improving the accuracy of OCR. *Id.*, 5, 7.

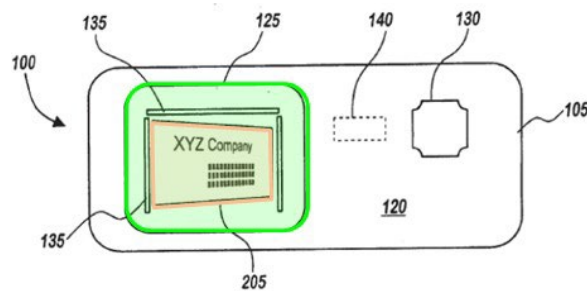


Fig. 2

Id., Fig.2. EX1002-Decl., ¶¶218-21.

i. Claims 1[h]/9[f]/18[g]/26[g]

Garcia/Luo/Meier teach *determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and then automatically capturing the video frame*. EX1002-Decl., ¶222.

Garcia/Luo/Meier discloses *monitoring a video frame...for a monitoring criterion*. §§X.A.1.a, X.A.2.f, X.A.2.h. EX1002-Decl., ¶223.

Luo further teaches “*automatically captur[ing]*” the image (*i.e.*, a video frame from the camera) “when the straight edge 205...is substantially parallel to the corresponding reference line 135”—*i.e.*, after the *monitoring criterion* is satisfied. EX1004-Luo, 6.; *see also id.*, Abstract, 7 (describing straight edge), claims 3, 10. A POSITA would have found it obvious to incorporate Luo’s automatic capture for the reasons in Section X.A.1.a. EX1002-Decl., ¶¶224-26.

j. Claims 1[i]/9[g]/18[h]/26[h]

Garcia/Luo/Meier/Cohen teach *when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback advising the user that the check has been captured*. EX1002-Decl., ¶227.

Garcia/Luo/Meier teaches *when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion*. §X.A.2.i. Garcia/Luo/Cohen each further teach *providing feedback advising the user that the check has been captured*. As noted in Section X.A.2.e, Luo teaches that feedback may be provided to “indicate to the user that an appropriate number of reference lines 135 are substantially parallel to the respective straight edges 205 of the object...” by sound, light, or image indicators. EX1004-Luo, 6-7,

claim 13. Because the image is captured when such criterion is satisfied, Luo's indications provides feedback that the image has been captured. Luo also teaches "the system 100 provides the user with an image of a captured object" after **alignment**, which provides further indication that the image is captured. *Id.*, 8. Garcia makes the image of the check available to the user, which also provides feedback to the user that an image has been captured. EX1003-Garcia, 6:6-7, 8:8-11, 11:15-19, 15:6-7. Similarly, Cohen teaches displaying a check image after capture. EX1006-Cohen, [0072], [0078], [0092]. Each of these disclosures provides feedback confirming capture. EX1002-Decl., ¶¶228-34.

k. Claims 1[j]/9[h]/18[i]/26[i]

Garcia/Luo/Meier teach *using a wireless network, transmitting a digital image of the check from the user's mobile device and submitting the check for mobile check deposit in the bank after automatically capturing the video frame, [wherein the digital image is the captured video frame or is based on the captured video frame].*⁷ EX1002-Decl., ¶235.

⁷ Limitation 9[h] instead recites "the digital image of the check being the captured video frame or being based on the captured video frame," which is obvious for similar reasons.

As Section X.A.2.i details, Garcia/Luo/Meier *automatically captures* a *video frame* corresponding to the *image of the check*. Garcia further teaches using a “digital image” of the check in its deposit. EX1003-Garcia, 4:1-8, 4:11-18, 5:21-6:7, 6:12-20, 10:10-18, 11:15-19, claim 1. EX1002-Decl., ¶236.

Garcia further teaches *transmitting* the “digital [check] image” over a “mobile telephone communications network, for example...GSM/GRPS....” EX1003-Garcia, 11:20-12:3; *see also id.*, 1:6-13, 4:11-18, 5:1-10, 6:3-5, 10:16-18, 11:7-15, claims 1-2. A POSITA would have recognized GSM/GPRS networks to be *wireless networks*. The image transmitted by the *mobile device* is *submitt[ed]* for “*deposit* into the existing account at a **banking institution**” (*i.e., for mobile check deposit*). *Id.*, 7:20-21, 16:19-20. EX1002-Decl., ¶¶237-39.

I. Claims 1[k]/9[j]/18[j]/26[j]

Garcia/Cohen teach *confirming that the mobile check deposit can go forward after optical character recognition is performed on the check [in the digital image], a magnetic ink character recognition (MICR) line on the check [in the digital image] is recognized, and an amount payable on the check [in the digital image] is validated*. EX1002-Decl., ¶240.

Garcia’s **institution** has equipment for “recognizing, verifying and processing” the received check image, including an “**optical character recognition (OCR) system**.” EX1003-Garcia, 2:7-14, 4:11-18, 5:1-10, 11:7-15, 12:17-22, claim

4. Garcia also discloses “[c]apturing the data associated with the **document**, such as the **amount** and the check number.” EX1003-Garcia, 10:12-14. A POSITA would have understood this disclosure to teach or render obvious using OCR to capture (or *recognize*) the **MICR line** and an *amount payable* to withdrawn the appropriate funds from the correct bank account. EX1041-559-FWD, 43-44; EX1010-598-FWD, 44, 51-52; EX1047-136-FWD, 28-30. EX1002-Decl., ¶241.

Garcia also teaches “verifying”/“validating” information on the check image (EX1003-Garcia, 1:6-13, 2:7-14, 4:11-18, 5:1-10, 6:8-10, 11:7-15, 12:17-22, claims 1, 4), and that the user can enter data from the check, such as the amount. *Id.*, 5:14-20, 9:19-10:13, 12:9-13, claim 1. From these disclosures, a POSITA would have understood Garcia to teach or render obvious verifying and *validating an amount payable* by comparing data (*e.g.*, legal amount/courtesy amount read from the check and the entered amount) to ensure the correct deposit amount, as was well known at the time. EX1049-Gustin, [0005], [0017], [0028], [0211]-[0213], claims 14, 36. EX1002-Decl., ¶¶242-44.

Cohen also teaches “**OCR** and parsing” of the “check **amount**” and “**MICR Line** information.” EX1006-Cohen, [0022], [0043]; *see also id.*, [0017], [0019]-[0021], [0059], [0076], Fig.2, claims 8, 14. Cohen further teaches calculating a “confidence level of the accuracy of the OCR results” including the check amount,

which a POSITA would have understood to *validate the amount payable*.⁸ *Id.*, [0022], Fig.2. EX1002-Decl., ¶245.

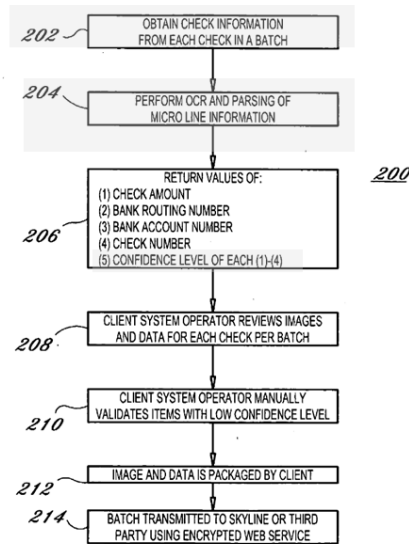


FIG. 2

EX1006-Cohen, Fig.2. EX1002-Decl., ¶246.

Cohen teaches three examples of *confirming that the mobile check deposit can go forward*. First, determining high confidence levels for information read from an image confirms that deposit can go forward successfully. EX1006-Cohen, [0022], [0043]-[0044], [0077]-[0088], [0093], Fig.2. Second, consistent with the '095 patent's disclosure of seeking user confirmation (EX1001-USP095, 12:61-67,

⁸ This is consistent with how the '095 patent describes this process, which involves “determin[ing] whether the...amount payable, or the like may be readable such that they may be parsed and processed.” EX1001-USP095, 5:10-12, 17:8-11.

claims 1-2, 5-6, 8-11, 14-15), Cohen displays the image, read information, and confidence levels to a user, who then approves (*i.e., confirms*) deposit. EX1006-Cohen, [0022], [0043]-[0044], [0077]-[0088], [0093], Fig.2. Finally, deposit only goes forward after the operator chooses to upload a batch. *Id.*, [0044]. EX1002-Decl., ¶¶247-51.

m. Claim 1[l]

Garcia teaches *a server, remote from the user's mobile device, comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the server to perform operations including*. EX1002-Decl., ¶252.

As Section X.A.2.k details, Garcia discloses *transmitting* the check image to a **financial institution**. EX1003-Garcia, Abstract, 4:11-18, 5:1-9, 6:3-5, 6:12-20, 10:16-18, 11:10-15, 20-12:3, 12:9-13, claims 1-2. Garcia's **mobile device** and the **institution** are "*remote*." *Id.*, 8:6-8. The **institution** "*ultimately obtain[s] [e.g., receives] a digital photograph of the check and a data set that allows it to automatically process the deposit of the check....*" *Id.*, 11:7-10, 5:1-9, 12:17-22. Garcia further teaches that the **institution** has "**computer equipment**" and "*system and means of transmitting data to the institution's document processing system*." *Id.*, 9:16-19, 11:13-15. A POSITA would have understood Garcia's "**computer equipment**" to be *a server comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the server to perform*

operations, including the steps described in Sections X.A.2.n-X.A.2.o. EX1002-Decl., ¶¶253-55.

n. Claim 1[m]

Garcia teaches *receiving the digital image of the check transmitted by the user's mobile device*. EX1002-Decl., ¶256.

As Section X.A.2.m details, Garcia's **institution** “ultimately obtain[s] [e.g., *receiving*] a **digital photograph of the check** and a data set that allows it to automatically process the deposit of the check....” EX1003-Garcia, 11:7-10, 5:1-9, 12:17-22. EX1002-Decl., ¶257.

o. Claim 1[n]

Garcia/Cohen teach *processing the digital image of the check (e.g., Garcia's and/or Cohen's processing and verifying) including performing optical character recognition on the check in the digital image and verifying that the digital image of the check is acceptable for mobile check deposit, the user's mobile device receiving an Indication of a result of the server's processing before confirming that the mobile check deposit can go forward (e.g., Cohen's displayed information)*. EX1002-Decl., ¶258.

As Section X.A.2.1 details, Garcia/Cohen disclose various *processing* steps, *including performing [OCR] on the check in the digital image*. Garcia further teaches “*verifying*” and “*validat[ing]*” the received **document** before deposit

(EX1003-Garcia, 1:6-13, 2:7-14, 5:1-10, 6:8-10, 11:7-15, 12:17-22, claims 1, 4), which a POSITA would have understood to teach or render obvious *verifying that the digital image of the check is acceptable for mobile check deposit*. EX1041-559-FWD, 48-51. Moreover, as Section X.A.2.1 details, Cohen teaches “verif[ying]” information including “images” of the check by providing confidence levels for data read therefrom and/or showing the image and information to an operator for review. EX1006-Cohen, [0022], [0032]-[0035], [0043]-[0044], [0077]-[0088], [0093]. EX1002-Decl., ¶¶259-61.

As Sections X.A.1.b and X.A.2.1 detail, it would have been obvious to perform the above processing steps either on the **mobile device** or at the **institution**. Moreover, as Section X.A.2.1 details, Cohen teaches the *confirming* step based on information read from the check image and further processing of that information to arrive at confidence levels. Therefore, the user’s **device** would need to *receive an indication of a result of the processing*—either from its own internal processing or, in the case of limitation 1[n] from the remote server—*before* the user can *confirm* that the information is acceptable. EX1002-Decl., ¶¶262-63.

p. Claim 1[o]/9[k]/18[k]/26[l]

Garcia/Cohen teach a *[computer comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the computer]*⁹ to *update a balance of an account at a financial institution of the user to reflect an amount of funds associated with the check submitted for mobile check deposit by the user's mobile device, after the [submitting the check] for mobile check deposit [in the bank], [the] confirming that the mobile check deposit can go forward, and [the] [verifying that the digital image of the check is acceptable for mobile check deposit]*.¹⁰ EX1002-Decl., ¶264.

Garcia/Cohen teaches the *confirming, verifying, and submitting* steps. See §§X.A.2.k-X.A.2.l, X.A.2.o. Garcia further teaches that after receiving and processing the image (*i.e.*, after *verifying, confirming, and submitting* steps), the **financial institution** “**automatically process the deposit of the check...into the service user's account,**” which a POSITA would have understood discloses *updating the balance of the user's account to reflect the amount of the check*. EX1003-Garcia, 4:11-18, 7:18-8:3, 12:17-22, claim 4. Because the **institution's**

⁹ Limitations 9[k] and 26[l] instead recite “a [bank] computer programmed,” which is obvious for similar reasons.

¹⁰ Limitation 18[k] does not recite a verifying step.

computer¹¹ performs check processing, a POSITA would have understood the computer to be a *bank computer*. As was known in the art, the **institution's** computer would have included a memory with instructions to be executed on a processor. EX1002-Decl., ¶¶265-69.

q. Claim 9[i]

Garcia/Cohen teach *processing the digital image of the check Including performing optical character recognition and verifying that the digital image of the check is acceptable for mobile check deposit. See, supra, §X.A.2.o. EX1002-Decl., ¶270.*

r. Claim 26[k]

Garcia/Cohen teach *the system configured to perform image processing operations on an image of the check, the image processing operations including performing optical character recognition and verifying that the image of the check is acceptable for mobile check deposit, wherein the image of the check is the digital*

¹¹ To the extent the claim requires “bank computer” to be distinct from “server,” a POSITA would have found such requirement obvious, as it was well known to distribute different processing tasks across multiple individual servers. EX1002-Decl., ¶¶266-67, 317-19.

image transmitted by the user's mobile device or is based on the digital image transmitted by the user's mobile device. See, supra, §X.A.2.n. EX1002-Decl., ¶271.

3. Dependent Claims 2-4, 6-8, 10-12, 14-17, 19-21, 23-25, 27-30

a. Claims 2[a]/10[a]/19[a]/27[a]

Garcia/Meier/Luo teach *wherein the downloaded app causes the user's mobile device to perform additional operations.*¹² As Sections X.A.2.c-X.A.2.d detail, Garcia/Meier teach *a downloaded app causes the user's mobile device to perform [] operations*, which includes Luo's autocapture features. *See, supra, §X.A.1.a.* The limitations in Sections X.A.3.b-X.A.3.c would have been obvious for similar reasons. EX1002-Decl., ¶272.

b. Claims 2[b]/10[b]/19[b]/27[b]

Garcia/Luo/Meier teach *before determining that the video frame of the live video of the check satisfies the at least one monitoring criterion, determining that a different video frame of the live video of the check does not satisfy the at least one monitoring criterion.* EX1002-Decl., ¶273.

As Sections X.A.2.h-X.A.2.i detail, Garcia/Luo/Meier discloses monitoring live video frames to determine when the edge of a check in the **preview window**

¹² Claim 10 recites “wherein the system is configured to perform additional operations,” and is obvious for the same reasons.

displaying live video is parallel to a **reference line**, at which point image capture occurs. Thus, before **alignment** is determined, the **mobile device** determines that each video does *not satisfy the monitoring criterion*. EX1002-Decl., ¶¶274-75.

c. Claims 2[c]/10[c]/19[c]/27[c]

Garcia/Luo teach *after determining that the different video frame of the live video of the check does not satisfy the at least one monitoring criterion, providing feedback to the user*. EX1002-Decl., ¶276.

Garcia/Luo/Meier/Cohen disclose or render obvious, *when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback*. §§X.A.1.b, X.A.2.j. In Garcia/Luo/Meier, the **reference line** in its initial color (prior to changing) is feedback that the image *does not satisfy the monitoring criterion*. In response to this initial color, the user would have understood to adjust the **camera** relative to the check. Furthermore, since Luo discloses multiple monitoring **reference lines** (EX1004-Luo, Abstract, 4-7, Fig.2), the contrast between a first **reference line** that has changed color and a second **reference line** that has not is feedback to move the **camera** to satisfy the requirements of the second **reference line**. The same reasoning applies to flickering in addition to/as an alternative to color changes. EX1002-Decl., ¶¶277-79.

Luo also teaches providing instructions to the user. EX1004-Luo, 6, claims 5, 11, 13, Fig.6. From this disclosure, a POSITA would have found it obvious to display instructions regarding how to satisfy monitoring criterion (e.g., text indicating **reference line(s)** lacking **alignment**, instructions to move the **mobile device** to **align** the **document** with all **reference lines**, or other forms of feedback). EX1002-Decl., ¶280. Providing such instructions was well-known. EX1004-Luo, 6, claims 5, 11, 13, Fig.6; EX1045-Zhu, 9; EX1046-Lin, [0154]; EX1017-Acharya, 7:5-13; EX1007-Yoon, [0022], [0026], [0028]. Adding instructions would have predictably provided users with more information to obtain a better picture, and would have merely involved writing code to conditionally overlay text. EX1002-Decl., ¶¶281-82.

d. Claims 3/12/20/28

Luo teaches *wherein the at least one monitoring criterion is a plurality of monitoring criteria based on two or more selected from a group consisting of light contrast, light brightness, check positioning, check dimensions, character spacing, skewing, warping, corner detection, edge detection, and magnetic ink character recognition (MICR) line detection*. As Section X.A.2.h details, Luo detects “**straight edge 205**” (*edge detection*) and monitoring to determine whether the detected **document** edge is parallel to one or more **reference lines** (EX1004-Luo, 7, Fig.5), which reduces projective distortion from tilted (*i.e., skew[ed]*)

documents (EX1004-Luo, 1, 4-6). Luo teaches additional *skewing* detection, including taking advantage of the “vanishing point” effect. EX1004-Luo, 6. Moreover, as shown below, Luo teaches multiple perpendicular **reference lines** that intersect at the **document** corners, which a POSITA would have understood teaches *corner detection*. EX1002-Decl., ¶¶283-88.

Luo also teaches detecting check positioning/check dimensions by placing **reference lines** at fixed on-screen locations. Finally, Luo repeatedly discusses identifying “**straight**” **edges**, which would rule out *warp[ed]* **documents** that would lack **straight edges**. Luo therefore teaches simultaneously using two or more monitoring criteria.

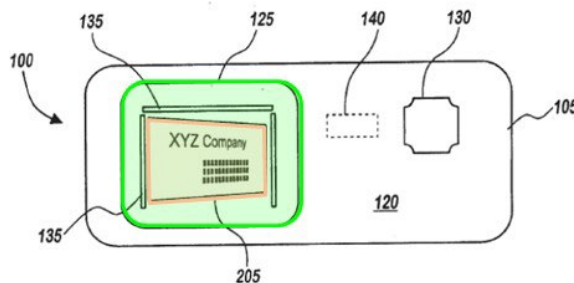


Fig. 2

EX1004-Luo, Fig.2. EX1002-Decl., ¶¶289-91.

e. Claims 4/29

Garcia/Luo/Cohen render obvious *wherein the plurality of monitoring criteria Includes a criterion based on magnetic ink character recognition (MICR) line detection*. As Sections X.A.1.a, X.A.2.h-X.A.2.i, and X.A.3.d detail, Garcia/Luo

renders obvious using various monitoring criteria to determine when to automatically capture an image of a check to increase the readability of the resulting image. Cohen further teaches that when depositing a check using its image, a readable **MICR line** is “required” data. EX1006-Cohen, [0075], [0079]. As Section X.A.2.1 details, Cohen thus teaches reading the **MICR**, calculating an accuracy confidence level, and presenting the check image and read/calculated information to a user for confirmation that there are no errors and before submitting the check. *See* EX1006-Cohen, [0022], [0043]-[0044], [0077]-[0088], [0093]. A user must rescan images that have insufficient quality. *Id.*, [0042], [0072]. EX1002-Decl., ¶¶292-95.

In light of these teachings, a POSITA would have found it obvious to use **MICR line** detection as an additional monitoring criterion. A POSITA would have recognized that the **MICR line** is crucial data for deposit, and that a check image without it would have been unusable. Therefore, once Luo’s monitoring criteria are satisfied, a POSITA would have been motivated to further confirm that the **MICR line** can be detected before capturing the image. EX1002-Decl., ¶¶296. Doing so before further reading the rest of the text on the image, submitting the image, and processing the image at a remote bank server would have provided the same benefits as Luo’s other monitoring criteria—for example reducing bandwidth usage and transmission delays. EX1004-Luo, 6-7. A POSITA would have recognized that waiting to capture the image until the **MICR** is detected would improve a user’s

experience by avoiding the need to retake the image after it is later determined the **MICR line** cannot be read. EX1002-Decl., ¶¶297-98.

A POSITA would have also had a reasonable expectation of success adding **MICR** detection as a monitoring criterion. Luo already teaches techniques that increase the readability of the captured image, EX1004-Luo, 1, 5, 7, Fig.4, so a POSITA would have expected that the **MICR** could be detected once Luo's criteria are satisfied. As Section X.B details, other references like Yoon teach using additional monitoring criteria, which would lead a POSITA to expect that combining multiple criteria would be successful. Indeed, it was already known to *automatically* capture an image after an important element—for example OCR'd text, a barcode, a human face/smile, movement, and/or another device's screen—was successfully detected. EX1050-Pilu, [0050] (OCR'd text); EX1043-Attia, 6:19-27, 4:13-18 (barcode); EX1051-Jeong, [0036] (human face); EX1052-VX-11000, 5 (smile); EX1053-Landschaft, [0014] (movement); EX1054-Gejdos, [0022] (screen). And by 2007, live text tracking for **cameras**-based imaging **devices** was already available. EX1055-Merino. 10-11, 13-17. Thus, adding **MICR line** detection would have simply been the application of other known autocapture techniques to the field of check deposit. EX1002-Decl., ¶¶299-300.

Adding **MICR** detection as a monitoring criterion would have simply involved writing code to identify the **MICR** in the image—as taught by Garcia and

Cohen—before capturing the image. Performing **MICR** detection in real time would have been within the capabilities of existing devices. Indeed, by 2008 it was already known to analyze live images by performing OCR, detecting a barcode, to recognize gestures, and to produce image-based augmented reality all on a **mobile device**. EX1050-Pilu, [0050]; EX1043-Attia, 4:13-18, 6:19-27; EX1056-Haro, 2, 4; EX1057-Handel, 8:62-9:14. The '095 patent itself recognizes that “[a]ny known **MICR line** detection technique(s) may be used by the **camera** 207, the **mobile device** 106, and/or the **financial institution**,” EX1001-USP095, 8:59-62, which confirms that **MICR line** detection techniques were known and within the level of ordinary skill. *Uber*, 957 F.3d, 1339. EX1002-Decl., ¶301.

f. Claims 6/14/23

Garcia/Cohen teach *wherein the confirming that the mobile check deposit can go forward is performed after the transmitting the digital image of the check from the user’s mobile device*. EX1002-Decl., ¶302.

As Sections X.A.2.b, X.A.2.l, X.A.2.o detail, it would have been obvious to perform processing steps either on the **mobile device** or at the bank. Moreover, as Section X.A.2.o details, the user’s **device** would need to *receive an indication of a result of the processing*—either from its own internal processing or from the remote server—*before* the user can *confirm* that the information is acceptable. In the case where processing is performed on the server, the confirming would occur *after* the

user first transmitted the check image to the remote server and after receiving the indication of the result of processing. EX1002-Decl., ¶¶303-305.

g. Claims 7/24

Garcia/Luo/Meier teaches *wherein the digital image is a modified version of the captured video frame*. For example, Garcia encrypts the image and other data before transmission, which a POSITA would have understood to *modif[y] the captured video frame* by changing the file format. EX1003-Garcia, 6:1-4, 6:12-20, 10:14-18, 12:13-22, claims 1-2; *see also* §X.A.2.k (transmitting video frame). EX1002-Decl., ¶¶306-308.

h. Claims 8/17/25/30

Garcia teaches *wherein the wireless network is a cellular network*. Garcia teaches *transmitting* the “digital [check] image” over a “mobile telephone communications network, for example a GSM/GPRS network.” EX1003-Garcia, 1:6-13, 4:11-18 (“[C]apturing and transmitting digital images....”), 5:1-10, 6:3-5, 10:16-18, 11:7:15, claims 1-2. A POSITA would have recognized such networks to be *cellular networks*. EX1002-Decl., ¶¶309-12.

i. Claim 11

Garcia/Luo/Meier renders obvious *further comprising one or more computers programmed to perform operations comprising the monitoring, the determining, or both the monitoring and the determining*. As Sections X.A.2.h-X.A.2.i detail,

Garcia/Luo/Meier teach the determining and monitoring. As explained more in Section X.D, it would have been obvious to perform the monitoring/determining at a remote computer, either based on Garcia/Luo/Meier alone or in view of the additional teachings of Attia. EX1002-Decl., ¶¶313-15.

j. Claim 15

Garcia/Cohen teach *wherein the user's mobile device receives an Indication of a result of the processing the digital image of the check before the confirming step. See, supra, §X.A.2.o. EX1002-Decl., ¶316.*

k. Claim 16

Garcia/Luo/Meier teach *wherein the one or more computers include the bank computer.* As Section X.D details, the monitoring/determining would have been obvious to perform at a remote bank computer, either based on Garcia/Luo/Meier alone or in view of the additional teachings of Attia. EX1002-Decl., ¶¶317-19.

l. Claim 21

Garcia/Luo/Cohen render obvious *wherein the plurality of monitoring criteria being based on magnetic ink character recognition (MICR) line detection and one or both of corner detection and edge detection. See, supra, §§X.A.3.d (corner and edge detection), X.A.3.e (MICR line detection).* It would have been obvious to use each of these for the reasons in Sections X.A.1, X.A.3.d-X.A.3.e. EX1002-Decl., ¶320.

B. Ground II: Claims 5/13/22 are Obvious Over Garcia with Luo/Meier/Cohen/Yoon

Garcia/Luo/Yoon teach *wherein the plurality of monitoring criteria Includes criteria based on light brightness, skewing, and warping*. EX1002-Decl., ¶¶321-22.

As Section X.A.3.d details, Luo teaches numerous monitoring criteria, including *skewing* and *warping*. EX1004-Luo, 1, 4-6; EX1007-Yoon, [0022], [0023]. Luo further teaches that an image requires light to propagate through the **camera** lens (EX1004-Luo, 4), which would have lead a POSITA to other references that teach evaluating brightness as a monitoring criterion. EX1002-Decl., ¶323.

Yoon specifically identifies image brightness as one factor that can limit readability of an imaged small rectangular **document**, such as a business card. EX1007-Yoon, [0007]. To address this problem, Yoon teaches a portable terminal (shown in Figure 1) that uses image brightness as a monitoring criterion to determine when an image can be automatically captured. For example, Yoon's technique "converts the brightness of an image received from the **camera** sensor into measurable brightness data,...checks a brightness environment under which the business card is to be photographed, and controls whether to perform automatic photographing on the business card." *Id.*, [0019]-[0020]. Yoon further teaches "comparing the brightness data with a reference brightness value for recognizing the business card." *Id.*, [0025]. Yoon further teaches providing feedback if the image

brightness is not satisfactory, rather than capturing an image. *Id.*, [0026]. Thus, Yoon’s controller uses the “brightness data” as a monitoring criterion and determines whether to capture an image based on this criterion, among others. *Id.* Fig.2. EX1002-Decl., ¶324.

A POSITA would have found it obvious to combine Garcia/Luo/Meier and Yoon to incorporate Yoon’s teaching to use brightness as an additional monitoring criterion. **First**, like Garcia/Luo/Meier, Yoon is analogous art to the Challenged Claims because it is in the same field as the Challenged Claims—capturing and processing **document** images. EX1007-Yoon, Abstract, [0003], [0006]-[0007], [0032], Fig.2. EX1002-Decl., ¶¶325-26.

Second, a POSITA would have been motivated to implement Yoon’s brightness monitoring criteria in Garcia’s mobile check deposit system for the reasons Section X.A.1.a details with respect to Luo’s monitoring criteria and autocapture approach. For example, like Luo, Yoon teaches that using brightness as a criterion before capturing an image increases the readability of a captured **document** (EX1007-Yoon, [0006], [0019], [0025]-[0026], [0032], Fig.2), which a POSITA would have understood would be directly applicable to Garcia’s mobile check deposit system, and would have further improved the images captured using Yoon’s technique. EX1002-Decl., ¶327.

Implementing Garcia’s mobile check deposit system using Yoon’s additional brightness-based monitoring criteria would have amounted to applying a known technique/method (*e.g.*, Yoon’s brightness monitoring techniques) to a known device/method (*e.g.*, Garcia’s **mobile device** equipped with a **camera** for capturing a check image) ready for improvement (*e.g.*, to improve OCR of Garcia’s images) to yield predictable results (*e.g.*, a better check image). *KSR*, 550 U.S., 417 (2007). EX1002-Decl., ¶328.

Third, a POSITA would have reasonably expected success in implementing Garcia/Luo/Yoon. Like Garcia and Luo, Yoon is directed to **mobile devices** with **cameras** and image capture software (EX1007-Yoon, Abstract, [0019], [0032], claim 1), which suggests the teaching from one reference would have been applicable to the others. Moreover, Garcia/Luo/Yoon teach capturing images of the same subject—a small paper **document** with text, like a business card or check. EX1003-Garcia, 12:4-9; EX1004-Luo, 1, 4, 6; EX1007-Yoon, Abstract, [0018]-[0019]. And as Section X.A.1.a details, Garcia assumes a POSITA could implement image capture details like those in Luo/Yoon using simple computer code. EX1007-Yoon, [0031] (discussing “computer readable code”). Moreover, a POSITA would have expected Luo/Yoon’s monitoring criteria to work together to further improve image capture, since Yoon itself discloses using **reference lines** like Luo’s as an

additional monitoring criterion. EX1007-Yoon, [0019], [0022], [0024]-[0030], Fig.2. EX1002-Decl., ¶¶329-33.

Finally, the Board has already found obvious combining a similar mobile check deposit reference like Garcia with Luo's *and* Yoon's. EX1009-571-FWD, 73-74. Combining Garcia/Luo/Yoon would have been obvious for similar reasons.

C. Ground III: Claims 7/24 are Obvious Over Garcia with Luo/Meier/Cohen/Randle

Garcia/Luo/Meier/Randle render obvious *wherein the digital image is a modified version of the captured video frame*. EX1002-Decl., ¶334.

As Section X.A.3.g details, Garcia teaches encrypting the digital image of the check. Randle, like Garcia and Cohen, is directed to processing checks using an image, and further discloses various processing steps to provide "quality assurance." EX1048-Randle, Abstract, [0004], [0014], [0019], [0021]. Randle explains that a check image, as captured, can be formatted according to "a high level of quality," such as an "8 bit gray scale" or "8 bit...color" format, or a "high dpi format" such as "100 dpi" or "200 dpi." *Id.*, [0043]. As part of the quality assurance process, the image can be subject to "data reduction" that converts it "to a less size intensive format for transmission and use in the check processing chain." *Id.* "Examples of data reduction include: 1) 8 bit gray scale to bi-tonal (black and white);...6) color (grey scale or full color) to bi-tonal (black and white)." *Id.* In combination with

Garcia/Luo/Meier, such converted image would be a *modified version of the captured video frame*. EX1002-Decl., ¶¶335-37.

A POSITA would have found it obvious to combine Garcia/Luo/Meier and Randle to incorporate Randle’s teaching to modify the check image. **First**, like Garcia, Randle is analogous art to the Challenged Claims because it is in the same field as the Challenged Claims—capturing and processing **document** images. EX1048-Randle, [0007], [0019]-[0021], [0028], [0036], [0042]-[0043], [0054], [0074] (disclosing a check processing system that “validate[s] and clear[s] transactions” based on the electronic image of a check at the server). EX1002-Decl., ¶¶338-40.

Second, a POSITA would have been motivated to implement Randle’s image conversion process in Garcia’s **mobile device**. Randle itself teaches the benefits of such conversion: “increas[ing] transmission speed and reduc[ing] storage requirements.” EX1048-Randle, [0043]. These motivations would have been particularly applicable to Garcia’s system because Garcia’s cellular networks (*see, supra*, §X.A.2.h) were bandwidth constrained and costly for sending large amounts of data. Such benefits would be realized regardless of whether additional processing is performed on the **mobile device**, remote server, or both. *See, supra*, §X.A.1.a. Thus, a POSITA would have been motivated to modify the image *before* transmitting it to Garcia’s **financial institution**. EX1002-Decl., ¶¶341-42.

In addition, a POSITA would be motivated to convert the image to a bitonal TIFF format—which was an uncommon format for **camera** output. It was well known that bi-tonal (sometimes referred to as “binarized”) images are easier to OCR, including for images taken by **mobile devices**. EX1072-Bae, 539-40, 544; EX1076-Laine, 1, 5; EX1078-Liu, 29-32; EX1079-Wu, 3-4. Moreover, the Federal Reserve Bank’s DSTU X9.37-2003 Format requires a bi-tonal TIFF. EX1015-DSTU. Thus, a POSITA would have been motivated to convert the check image to a bi-tonal TIFF to comply with the Federal Reserve’s requirements and improve OCR. EX1002-Decl., ¶¶343-44.

Third, a POSITA would have had a reasonable expectation of success in combining Garcia’s system with Randle’s image conversion techniques. Like Garcia, Randle is directed to check image processing (EX1048-Randle, [0002], [0006]-[0007], [0074]), which suggests the teaching from one reference would have been applicable to the others. As Section X.A.1.b details, Garcia assumes a POSITA could implement check image processing details like those in Randle, including image conversion. EX10048-Randle, [0043]. This is consistent with the ubiquity of converting (binarizing) **mobile-device**-captured images before performing OCR. Randles’s QA, including conversion, can be performed “at any point in processing.” *Id.*, [0014], Fig.4. EX1002-Decl., ¶¶345-48.

Finally, the Board has already found obvious combining Garcia with Randle’s conversion techniques. EX1041-559-FWD, 52-59. Combining Garcia/Luo/Meier/Randle would have been obvious for similar reasons.

D. Ground IV: Claims 11, 16 are Obvious Over Garcia with Luo/Meier/Cohen/Attia.

1. Garcia in view of Luo/Meier/Cohen/Attia

First, like Garcia/Luo/Meier/Cohen, Attia is analogous art to the Challenged Claims because it is in the same field as the Challenged Claims—capturing and processing **document** images. EX1043-Attia, Abstract, 1:12-16, 3:4-20, 3:24-27, 4:1-7, Fig.2A-C, 4B, 5A (using **mobile device** for “capturing...and analyzing” and a server “for decoding” a barcode image). EX1002-Decl., ¶¶349-51.

Second, a POSITA would have been motivated to incorporate Attia’s teachings of monitoring and determining when to capture **document** images by a server into Garcia/Luo/Meier/Cohen’s system. As Section X.A.1.a details, the Garcia/Luo/Meier automatically captures check images based on monitoring criteria and processing those images to extract deposit information either on the **mobile device** or at a remote bank server. For the same reasons, a POSITA would have found it obvious to perform Luo’s teachings, including the monitoring and determining steps, on either the **mobile device** or at a remote bank server. When faced with the alternatives of performing monitoring and determining on the **mobile**

device or the server, a POSITA would have found both obvious. *ACCO*, 813 F.3d, 1367. Consistent with Garcia’s teaching to perform processing on a remote computer, a POSITA would have been motivated to perform these steps at the bank’s server where the rest of the verification takes place and to avoid processing burden on the **mobile device**. EX1042-PNC, *10; EX1043-Attia, 4:1-7; EX1044-Nepomniachtchi, 10:29-48. EX1002-Decl., ¶¶352-55.

Attia’s teachings confirm that each such option would have been obvious. Attia teaches monitoring images of a barcode in real-time and capturing the image when the barcode can be decoded. EX1043-Attia, 4:8-18. Attai teaches “[t]he location of the decoding depends entirely upon the processing capabilities of the **mobile device**”—“if the...a **mobile device** [has] lower system capabilities...[it] automatically send[s] the digital image of the barcode to a server for decoding.” *Id.*, 4:1-7. Thus, Attia teaches performing real-time monitoring on either a **mobile device** or at a remote server. In combination with Garcia/Luo/Meier/Cohen, Attia’s teaching to monitor an image at a remote server to determine when it can be decoded (*i.e.*, passes a monitoring criteria) would have led a POSITA to perform Luo’s monitoring and determining steps in Garcia’s **receiving institution’s** computer. The combination amounts to using a known technique (Attia’s teaching of image monitoring and decoding at the server) to improve a similar device (Garcia/Luo/Meier/Cohen’s **mobile device** image processing system) in the same

way (applying image monitoring and decoding at the server to improve performance of *monitoring* and *determining*). EX1002-Decl., ¶¶356-57.

Third, a POSITA would have had a reasonable expectation of success in incorporating Attia's teachings into Garcia/Luo/Meier/Cohen's system because Attia suggests performing remote monitoring/processing as an alternative to local without any purported challenges, and because the combination could have been implemented by writing computer code. EX1002-Decl., ¶¶358-59.

2. Claim 11

Garcia/Luo/Meier/Attia render obvious *further comprising one or more computers programmed to perform operations comprising the monitoring, the determining, or both the monitoring and the determining*. EX1002-Decl., ¶360.

As Sections X.A.2.h-X.A.2.i detail, Garcia/Luo/Meier teach the monitoring and determining limitations. In combination with Attia, the monitoring and determining limitations would be performed by a remote server. *See, supra*, §X.D.1. EX1002-Decl., ¶¶361-62.

3. Claim 16

Garcia/Luo/Meier/Attia render obvious *wherein the one or more computers include the bank computer*. EX1002-Decl., ¶363.

As Section X.D.2 details, Garcia/Luo/Meier/Attia teach the monitoring and determining at a remote server. As Sections X.A.2.d and X.A.2.p detail, Garcia teaches that the images are sent to a bank computer at the **financial institution**.

EX1003-Garcia, 1:15-19, 4:1-8, 4:11-18. A POSITA would have found it obvious to implement the remote server for monitoring and determining on the same *bank computer*, for example to provide the bank with control over which images are ultimately being used for deposit and to reduce the number of remote servers required to implement Garcia/Luo/Meier/Attia. EX1002-Decl., ¶¶364-66.

E. Ground V: Claims 1-4, 6-12, 14-21, 23-30 are Obvious Over Garcia with Luo/Goyal/Cohen

1. Garcia in view of Luo/Goyal/Cohen

As Section X.A detail, Garcia/Luo/Meier/Cohen render claims 1-4, 6-12, 14-21, 23-30 obvious. For similar reasons, Garcia/Luo/Goyal/Cohen renders claims 1-4, 6-12, 14-21, 23-30 obvious. EX1002-Decl., ¶¶367-70.

a. Garcia in view of Luo/Goyal

First, like Garcia/Luo, Goyal is analogous art to the Challenged Claims because it is in the same field as the Challenged Claims—capturing and processing **document** images. EX1008-Goyal, 1, 127 (disclosing software toolkit that access the **mobile device camera** for “captur[ing] snapshots or full videos,” which could be of a **document**). EX1002-Decl., ¶371.

Second, a POSITA would have been motivated to implement Goyal's downloaded application and APIs for controlling **mobile device cameras** in Garcia's mobile check deposit system and Luo's monitoring criteria and autocapture approach for the reasons in Section X.A.1.a with respect to Meier. Like Meier, Goyal teaches a downloaded application and APIs for controlling **mobile device cameras**, which a POSITA would have understood that these would be the software components needed to implement Garcia's mobile check deposit system/Luo's images capturing system. Accordingly, a POSITA would have been motivated to apply teachings from the prior art like Goyal to fill in implementation details in Garcia/Luo. EX1002-Decl., ¶372.

Goyal fills in those implementation details with well-known and readily available software components. Goyal is a guide to building applications and teaches developers how to “take...advantage of the **[mobile] device's** features” including the **device camera**. EX1008-Goyal, 127. Goyal explains that mobile applications can be downloaded onto the **device** and “capture snapshots or full videos.” *Id.*, 1, 66-67, 127. The MMAPI places developers “in...control of the **[device's]** capabilities that it wants enabled and can do so with a single API interface” to the **camera**. *Id.*, 127; *see also id.*, 12, 128-30, 174-79. Video APIs are MMAPI's “biggest advantage.” *Id.*, 127. EX1002-Decl., ¶373.

A POSITA would have been motivated to implement Garcia/Luo with Goyal's downloadable application and Camera APIs. By mid-2000s, mobile applications were becoming increasingly popular, including those that accessed **camera** functionality. *See, supra*, §§V.C-V.D; EX1008-Goyal, 1, 3, 6, 127, 174, back cover. Benefits to using downloaded applications are detailed in Section X.A.1.a, including providing **camera** access without writing **mobile device** software from the ground up. EX1008-Goyal, 1, 66, 127, 174-79. Downloaded applications with APIs for controlling image capture were already used for desktop check deposit (EX1036-Westerman; EX1037-EasCorp; EX1038-eServices), so a POSITA would have been motivated to use the equivalent architecture for **mobile devices**. *See generally* EX1039-Hariharan. Java ME was the mobile equivalent to the well-known Java environment for downloaded desktop applications. EX1002-Decl., ¶374.

A POSITA would have been motivated to use guides like Goyal to implement the teachings of Garcia and Luo on a mobile platform, like Java ME. In Garcia/Luo/Goyal, Goyal's downloadable application and Camera API would include the software required for Garcia's/Luo's teachings. For example, the downloaded application would facilitate Luo's **preview window** and image capture using the Camera API that provides third-party mobile applications access to video preview from a **device camera** (*e.g.*, using the `Canvas` feature on **devices** like Motorola C975 or BenQ M75) and the ability to capture a picture from that video

feed (*e.g.*, using `getSnapshot()`). EX1004-Luo, Abstract, 5-7, claims 5, 11, 13, Fig.6; EX1008-Goyal, 174; *see also id.*, 13-14, 66, 175-79, 191. Moreover, Goyal provides other implementation details, such as initializing the **camera** and controlling settings. *See, e.g.*, EX1008-Goyal, 1, 13-14, 174-79, 253. EX1002-Decl., ¶375-79.

Implementing Garcia's/Luo's software using Goyal's teaching of a downloaded application and API would have amounted to applying a known technique/method (*e.g.*, Goyal's well-known software architecture) to a known device/method (*e.g.*, Garcia/Luo's mobile check capture and processing software) ready for improvement (*e.g.*, facilitating Garcia/Luo's functionality without requiring repeated downloads and writing **camera** control software) to yield predictable results (*e.g.*, capturing/processing a check image with a **mobile device**). *KSR*, 550 U.S., 416. EX1002-Decl., ¶380.

Third, the similarity between the references and the teachings therein would have led a POSITA to reasonably expect success in implementing Garcia/Luo with Goyal's software architecture. All three are directed to **mobile devices** with **cameras** and image capture software (EX1003-Garcia, 1:7-13, 11:1-6; EX1004-Luo, 6; EX1008-Goyal, 1, 127, 174), which suggests the teaching from one reference would have been applicable to the others. EX1002-Decl., ¶381.

Regarding the references themselves, Garcia teaches a “computer application” in a **mobile device** that engages in an interactive session with a **financial institution** for a check deposit without expressing difficulties implementing such features. EX1003-Garcia, 9:19-10:18. Thus, Garcia assumes that implementing known details like Luo’s image capture process or Goyal’s software architecture would have been well within the level of skill of a POSITA, and could have been accomplished using computer code. EX1004-Luo, 1, 3, 7, 8; EX1008-Goyal, 1, 127, 174. Other contemporaneous evidence confirms that controlling a **mobile device camera** using an API was known and “trivial.” EX1040-CodeGuru, 1.¹³ Moreover, Goyal teaches that embedding video in an application is “the biggest advantage that MMAPI brings” and MMAPI is “a single, simple yet powerful medium” that “provides the means [to] using your **device**.” EX1008-Goyal, 127. Accordingly, it would have been obvious to combine Garcia’s with Luo and Goyal to incorporate Luo’s and Goyal’s teachings regarding monitoring/capture/feedback and a software application for download. EX1002-Decl., ¶¶382-83.

¹³ The ’095 patent similarly assumes a POSITA would understand how to implement the claimed image capture process and software architecture. *See, supra*, n.4.

Finally, the Board has already found obvious the combination of a similar mobile check deposit reference like Garcia with Luo's image capture techniques to be obvious (EX1009-571-FWD, 23-72), and Garcia with another prior art disclosure regarding downloaded applications similar to Goyal (EX1010-EX1010-598-FWD, 20-25). Combining Garcia/Luo/Goyal would have been obvious for similar reasons.

b. Garcia in view of Cohen

As discussed above, a POSITA would have been motivated to combine the teachings of Garcia with Cohen's teachings regarding performing OCR, reading the **MICR line**, confirmation/verification steps, and image processing location to achieve the claimed invention for the reasons explained in Section X.A.1.b. EX1002-Decl., ¶384.

2. Claims 1-4, 6-12, 14-21, 23-30

a. Goyal Renders Obvious a Downloaded Applications (limitations

1[c]/1[e]/2[a]/9[a]/9[c]/18[c]/18[e]/19[a]/26[c]/27[e]/27[a])

As Sections X.A.2.d, X.A.2.f, and X.A.3.a detail, Meier renders obvious the use of a downloaded application. Goyal renders these limitations obvious for similar reasons. EX1002-Decl., ¶385.

As Section X.A.2.d details, Garcia discloses a **mobile device** with a **camera** that takes image of a check using a "computer application." EX1003-Garcia, 9:19-10:18. Goyal discloses a downloadable application like that described in Garcia that

can implement the capturing of an image of a check from a **mobile device**. EX1008-Goyal, 1, 66, 127. EX1002-Decl., ¶386.

First, Goyal teaches that developers can write Java-based mobile applications called “MIDlets” that can access a **device camera** and which a POSITA would have found obvious to download. EX1008-Goyal, 1, 3-4, 66-67, 127, 174-79. Downloaded applications were well known, *see, supra*, §V.D., and by 2004 skilled artisans were already downloading Java API-based software applications. EX1058-Series60; EX1059-Topley, 75-76. When faced with the choice of whether the software is preinstalled on the **mobile device** or downloaded from the web, a POSITA would have understood that downloading an application is beneficial because it allows users to choose which applications they want on their **device**, allows third parties to deploy applications outside of a manufacturer’s software update, prevents the **mobile device** from being overloaded with unnecessary software, and is easier than plugging the **mobile device** into another computer or storage medium to obtain new software. EX1002-Decl., ¶¶387-88.

Second, Goyal discloses deploying mobile applications (MIDlets) using OTA (EX1008-Goyal, 66-67), which a POSITA would have understood to disclose downloading applications. *See, e.g.*, EX1059-Topley, 75 (“[OTA] is the most common way in which MIDlets are downloaded to **cell phones** and similar **wireless devices**”). Moreover, for the reasons in §X.E.1.a, a POSITA would have found it

obvious to use this well-known and common way for installing an application on a **mobile device**. EX1002-Decl., ¶389.

In the Garcia/Goyal combination, the application would be *provid[ed]* by and *associated with a bank* for the reasons in Section X.A.2.d. *See also* EX1003-Garcia, 4:1-8. EX1002-Decl., ¶390.

b. Goyal Renders Obvious a Software Abstraction Layer that Controls a Device Camera (limitations 1[b]-1[c]/1[e]/18[b]-18[c]/18[e]/26[b]-26[c]/26[e])

As Sections X.A.2.c-X.A.2.d, X.A.2.f detail, Meier renders obvious the use of a software abstraction layer to control a **mobile device camera**. Goyal renders these limitations obvious for similar reasons. EX1002-Decl., ¶391.

Goyal teaches that downloadable applications can use an APIs (*software abstraction layer*) of **mobile devices** “to hook into a **device camera**,” for example to “capture snapshots or full videos.” EX1008-Goyal, 127, 174; *see also id.*, 1, 66, 130, 173, 179, 191. Developers can use Canvas and CaptureVideoCanvas APIs “to display the video through the viewfinder to the user.” EX1008-Goyal, 174. Goyal discloses another API (*getSnapshot*) that can capture a snapshot from the displayed video. *Id.*, 174, 178, 191. Goyal’s APIs and associated software, *when executed, cause[s] the user’s mobile device to perform operations*, such as control **camera** and capture settings. EX1008-Goyal, 253. In combination

with Garcia/Luo/Cohen, the software would perform additional operations.

§§X.A.2.e-X.A.2.1, X.E.1. EX1002-Decl., ¶¶392-94.

In the combination with Goyal, the image capture and processing steps described below with reference to limitations 1[d]-1[k] would have been performed by the downloaded application. EX1002-Decl., ¶395.

**c. Goyal Renders Obvious Live Video Frames
(limitations 1[pre]/1[e]-1[j]/2[b]-2[c]/7/9[pre]/9[c]-
9[h]/10[b]-10[c]/18[pre]/18[e]-18[i]/19[b]-
19[c]/24/26[pre]/26[e]-26[i]/27[b]-27[c])**

As Sections X.A.2.a, X.A.2.f-X.A.2.k, X.A.3.b-X.A.3.c, X.A.3.g detail, Meier renders obvious live video frames. Goyal renders these limitations obvious for similar reasons. EX1002-Decl., ¶396.

As Section X.E.2.b detail, Goyal discloses “previewing video” before image capture. EX1008-Goyal, 174; *see also id.*, 13-14, 66, 175-79, 191. A POSITA would have understood “viewfinder” to display live video. Because the Camera API (*software abstraction layer*) controls access to the **camera** hardware to control image preview and capture, the downloaded application in the Garcia/Luo/Goyal combination would *caus[e] the live video to be generated by controlling the camera through the software abstraction layer (e.g., API). See* EX1008-Goyal, 174-78; *supra* §X.E.2.b. EX1002-Decl., ¶¶397-98.

As Section X.E.2.b also details, Goyal further teaches that an API of a **mobile device** can “provide means to capture snapshots or full videos.” EX1008-Goyal, 127; *see also id.*, 1, 130, 173, 179. For example, Goyal teaches capturing an image/frame from the video displayed on a viewfinder. EX1008-Goyal, 174 (“[T]he `getSnapshot()` method is a method of the `VideoControl` class, you can take an image of any video that is playing on a **device** screen, not just captured video.”). EX1002-Decl., ¶399.

Goyal therefore teaches or renders obvious limitations in the Challenged Claims that require the use of live video frames for similar reasons that Meier teaches or renders obvious such limitations. EX1002-Decl., ¶400.

d. Additional Limitations

A POSITA would have found the remaining limitations in claims 1-4, 6-12, 14-21, 23-30 obvious in view of Garcia/Luo/Goyal/Cohen for the reasons in Sections X.A.2.b, X.A.2.e, X.A.2.l-X.A.2.r, X.A.3.d-X.A.3.f, X.A.3.h-X.A.3.l. EX1002-Decl., ¶401.

F. Grounds VI, VII, & VIII

As Sections X.B, X.C, and X.D detail, Garcia/Luo/Meier/Cohen in view of Yoon/Randle/Attia render obvious claims 5, 13, 22; claims 7, 24; and claims 11, 16, respectively. For similar reasons, Garcia/Luo/Goyal/Cohen in view of

Yoon/Randle/Attia render obvious claims 5, 13, 22; claims 7, 24; and claims 11, 16, respectively. EX1002-Decl., ¶¶402-404.

XI. FEES

Petitioner authorizes the Board to charge Deposit Account DA506403 for the necessary fees for this Petition.

XII. CONCLUSION

For reasons set forth above, Petitioner respectfully requests institution of an *IPR* to cancel claims 1-30 of the '095 patent.

Respectfully submitted,

Date: February 27, 2026
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CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing, Petition for *Inter Partes* Review, contains 13,999 words as measured by the word processing software used to prepare the document, in compliance with 37 C.F.R. §42.24 (d), excluding the parts of the Petition exempted from the word count by 37 C.F.R. §42.24(a)(1).

/Aaron Maurer/
Aaron Maurer
Reg. No. 44,911

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. §§ 42.6 and 42.105, that a complete copy of the attached Petition for Inter Partes Review of U.S. Patent No. 12,211,095, including all exhibits (Nos. 1001-1082) and related documents, are being served via Federal Express on the 27th day of February, 2026, the same day as the filing of the above-identified document in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon Patent Owner by serving the correspondence address of record with the USPTO as follows:

Carmichael IP, PLLC /USAA
Attn: James T. Carmichael, Stephen Schreiner, Minghui Yang
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The same materials were sent via electronic means to the email addresses specified for electronic service in Patent Owner's updated mandatory notices in IPR2025-01356:

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LISTING OF CLAIMS

Claim 1	
Limitation	Claim Language
1[pre]	A system enabling mobile check deposit auto-capture functionality via video frame processing, the system comprising:
1[a]	a mobile device of a user, the user's mobile device including a camera, a processor, and a memory coupled to the processor, the memory storing
1[b]	a software abstraction layer for controlling the camera, the software abstraction layer comprising Instructions that, when executed by the processor, control the camera; and
1[c]	a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera through the software abstraction layer, the downloaded app comprising Instructions that, when executed by the processor, cause the user's mobile device to perform operations including:
1[d]	providing Instructions to the user for capturing an image of a check;

1[e]	generating a live video of the check in a field of view of the camera, the downloaded app causing the live video to be generated by controlling the camera through the software abstraction layer;
1[f]	overlaying an alignment guide on the live video of the check in the field of view of the camera;
1[g]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
1[h]	determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and then automatically capturing the video frame;
1[i]	when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback advising the user that the check has been captured;
1[j]	using a wireless network, transmitting a digital image of the check from the user's mobile device and submitting the check for mobile check deposit in the bank after automatically capturing the video frame, wherein the digital image is the captured video frame or is based on the captured video frame; and

1[k]	confirming that the mobile check deposit can go forward after optical character recognition is performed on the check in the digital image, a magnetic ink character recognition (MICR) line on the check in the digital image is recognized, and an amount payable on the check in the digital image is validated;
1[l]	a server, remote from the user's mobile device, comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the server to perform operations including:
1[m]	receiving the digital image of the check transmitted by the user's mobile device, and
1[n]	processing the digital image of the check including performing optical character recognition on the check in the digital image and verifying that the digital image of the check is acceptable for mobile check deposit, the user's mobile device receiving an Indication of a result of the server's processing before confirming that the mobile check deposit can go forward; and
1[o]	a computer comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the

	computer to update a balance of an account at a financial institution of the user to reflect an amount of funds associated with the check submitted for mobile check deposit by the user's mobile device, after the submitting the check for mobile check deposit in the bank, the confirming that the mobile check deposit can go forward, and the verifying that the digital image of the check is acceptable for mobile check deposit.
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Claim 2	
Limitation	Claim Language
2[a]	The system of claim 1, wherein the downloaded app causes the user's mobile device to perform additional operations including:
2[b]	before determining that the video frame of the live video of the check satisfies the at least one monitoring criterion, determining that a different video frame of the live video of the check does not satisfy the at least one monitoring criterion; and

2[c]	after determining that the different video frame of the live video of the check does not satisfy the at least one monitoring criterion, providing feedback to the user.
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Claim 3

The system of claim 1, wherein the at least one monitoring criterion is a plurality of monitoring criteria based on two or more selected from a group consisting of light contrast, light brightness, check positioning, check dimensions, character spacing, skewing, warping, corner detection, edge detection, and magnetic ink character recognition (MICR) line detection.

Claim 4

The system of claim 3, wherein the plurality of monitoring criteria Includes a criterion based on magnetic ink character recognition (MICR) line detection.

Claim 5

The system of claim 3, wherein the plurality of monitoring criteria
Includes criteria based on light brightness, skewing, and warping.

Claim 6

The system of claim 1, wherein the confirming that the mobile check deposit
can go forward is performed after the transmitting the digital image of the check
from the user's mobile device.

Claim 7

The system of claim 1, wherein the digital image is a modified version of
the captured video frame.

Claim 8

The system of claim 1, wherein the wireless network is a cellular network.

Claim 9

Limitation	Claim Language
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9[pre]	A system enabling mobile check deposit auto-capture functionality via video frame processing, the system comprising:
9[a]	a mobile device of a user, the user's mobile device including a camera, a processor, and a memory coupled to the processor, the memory storing a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera, the system being configured to perform operations including:
9[b]	providing Instructions to the user for capturing an image of a check;
9[c]	generating a live video of the check in a field of view of the camera, the downloaded app causing the live video to be generated by controlling the camera;
9[d]	overlaying an alignment guide on the live video of the check in the field of view of the camera;
9[e]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
9[f]	determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and then automatically capturing the video frame;

9[g]	When the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback advising the user that the check has been captured;
9[h]	using a wireless network, transmitting a digital image of the check from the user's mobile device and submitting the check for mobile check deposit in the bank after automatically capturing the video frame, the digital image of the check being the captured video frame or being based on the captured video frame;
9[i]	processing the digital image of the check Including performing optical character recognition and verifying that the digital image of the check Is acceptable for mobile check deposit; and
9[j]	confirming that the mobile check deposit can go forward after optical character recognition is performed on the check in the digital image, a magnetic ink character recognition (MICR) line on the check in the digital image is recognized, and an amount payable on the check in the digital image is validated; and
9[k]	a bank computer programmed to update a balance of an account at a financial institution of the user to reflect an amount of funds

	associated with the check submitted for mobile check deposit by the user's mobile device, after the check is submitted for mobile check deposit in the bank, confirming that the mobile check deposit can go forward, and verifying that the digital image of the check is acceptable for mobile check deposit.
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Claim 10	
Limitation	Claim Language
10[a]	The system of claim 9, wherein the system is configured to perform additional operations including:
10[b]	before determining that the video frame of the live video of the check satisfies the at least one monitoring criterion, determining that a different video frame of the live video of the check does not satisfy the at least one monitoring criterion; and
10[c]	after determining that the different video frame of the live video of the check does not satisfy the at least one monitoring criterion, providing feedback to the user.

Claim 11

The system of claim 9, further comprising one or more computers programmed to perform operations comprising the monitoring, the determining, or both the monitoring and the determining.

Claim 12

A The system of claim 9, wherein the at least one monitoring criterion is a plurality of monitoring criteria based on two or more selected from a group consisting of light contrast, light brightness, check positioning, check dimensions, character spacing, skewing, warping, corner detection, edge detection, and magnetic ink character recognition (MICR) line detection.

Claim 13

The system of claim 12, wherein the plurality of monitoring criteria
Includes criteria based on light brightness, skewing, and warping.

Claim 14

The system of claim 9, wherein the confirming that the mobile check deposit can go forward is performed after the transmitting the digital image of the check from the user's mobile device.

Claim 15

The system of claim 14, wherein the user's mobile device receives an Indication of a result of the processing the digital image of the check before the confirming step.

Claim 16

The system of claim 11, wherein the one or more computers include the bank computer.

Claim 17

The system of claim 9, wherein the wireless network is a cellular network.

Claim 18

Limitation	Claim Language
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18[pre]	A system enabling mobile check deposit auto-capture functionality via video frame processing, the system comprising:
18[a]	a mobile device of a user, the user's mobile device including a camera, a processor, and a memory coupled to the processor, the memory storing:
18[b]	a software abstraction layer, the software abstraction layer comprising Instructions that, when executed by the processor, control the camera; and
18[c]	a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera through the software abstraction layer, the downloaded app comprising Instructions that, when executed by the processor, cause the user's mobile device to perform operations including:
18[d]	providing Instructions to the user for capturing an image of a check;
18[e]	generating a live video of the check in a field of view of the camera, the downloaded app causing the live video to be generated by controlling the camera through the software abstraction layer;

18[f]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
18[g]	determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and then automatically capturing the video frame;
18[h]	when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback advising the user that the check has been captured;
18[i]	using a wireless network, transmitting a digital image of the check from the user's mobile device and submitting the check for mobile check deposit in the bank after automatically capturing the video frame, wherein the digital image is the captured video frame or is based on the captured video frame; and
18[j]	confirming that the mobile check deposit can go forward after optical character recognition is performed on the check, a magnetic ink character recognition (MICR) line on the check is recognized, and an amount payable on the check is validated; and

18[k]	a computer comprising a processor coupled to a memory storing Instructions that, when executed by the processor, cause the computer to update a balance of an account at a financial institution of the user to reflect an amount of funds associated with the check submitted for mobile check deposit by the user's mobile device, after the submitting the check for mobile check deposit and the confirming that the mobile check deposit can go forward.
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Claim 19	
Limitation	Claim Language
19[a]	The system of claim 18, wherein the downloaded app causes the user's mobile device to perform additional operations including:
19[b]	before determining that the video frame of the live video of the check satisfies the at least one monitoring criterion, determining that a different video frame of the live video of the check does not satisfy the at least one monitoring criterion; and

19[c]	after determining that the different video frame of the live video of the check does not satisfy the at least one monitoring criterion, providing feedback to the user.
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Claim 20

The system of claim 18, wherein the at least one monitoring criterion is a plurality of monitoring criteria based on two or more selected from a group consisting of light contrast, light brightness, check positioning, check dimensions, character spacing, skewing, warping, corner detection, edge detection, and magnetic ink character recognition (MICR) line detection.

Claim 21

The system of claim 20, wherein the plurality of monitoring criteria being based on magnetic ink character recognition (MICR) line detection and one or both of corner detection and edge detection.

Claim 22

The system of claim 20, wherein the plurality of monitoring criteria
Includes criteria based on light brightness, skewing, and warping.

Claim 23

The system of claim 18, wherein the confirming that the mobile check deposit
can go forward is performed after the transmitting the digital image of the
check from the user's mobile device.

Claim 24

The system of claim 18, wherein the digital image is a modified version of
the captured video frame.

Claim 25

The system of claim 18, wherein the wireless network is a cellular network.

Claim 26

Limitation	Claim Language
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26[pre]	A system enabling mobile check deposit auto-capture functionality via video frame processing, the system comprising:
26[a]	a mobile device of a user, the user's mobile device including a camera, a processor, and a memory coupled to the processor, the memory storing:
26[b]	a software abstraction layer, the software abstraction layer comprising Instructions that, when executed by the processor, control the camera; and
26[c]	a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera through the software abstraction layer, the downloaded app comprising Instructions that, when executed by the processor, cause the user's mobile device to perform operations including:
26[d]	providing Instructions to the user for capturing a check;
26[e]	generating a live video of the check in a field of view of the camera, the downloaded app causing the live video to be generated by controlling the camera through the software abstraction layer;

26[f]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
26[g]	determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and then automatically capturing the video frame;
26[h]	when the video frame of the live video of the check in the field of view of the camera is determined to satisfy the at least one monitoring criterion, providing feedback advising the user that the check has been captured;
26[i]	using a wireless network, transmitting a digital image of the check from the user's mobile device and submitting the check for mobile check deposit in the bank after automatically capturing the video frame, wherein the digital image is the captured video frame or is based on the captured video frame; and
26[j]	confirming that the mobile check deposit can go forward after optical character recognition is performed on the check, a magnetic ink character recognition (MICR) line on the check is recognized, and an amount payable on the check is validated;

26[k]	the system configured to perform image processing operations on an image of the check, the image processing operations including performing optical character recognition and verifying that the image of the check is acceptable for mobile check deposit, wherein the image of the check is the digital image transmitted by the user's mobile device or is based on the digital image transmitted by the user's mobile device; and
26[l]	a computer programmed to update a balance of an account at a financial Institution of the user to reflect an amount of funds associated with the check submitted for mobile check deposit by the user's mobile device, after the submitting the check for mobile check deposit in the bank, the confirming that the mobile check deposit can go forward, and the verifying that the image of the check is acceptable for mobile check deposit.

Claim 27	
Limitation	Claim Language
27[a]	The system of claim 26, wherein the downloaded app causes the user's mobile device to perform additional operations including:

27[b]	before determining that the video frame of the live video of the check satisfies the at least one monitoring criterion, determining that a different video frame of the live video of the check does not satisfy the at least one monitoring criterion; and
27[c]	after determining that the different video frame of the live video of the check does not satisfy the at least one monitoring criterion, providing feedback to the user.

Claim 28

The system of claim 26, wherein the at least one monitoring criterion is a plurality of monitoring criteria based on two or more selected from a group consisting of light contrast, light brightness, check positioning, check dimensions, character spacing, skewing, warping, corner detection, edge detection, and magnetic ink character recognition (MICR) line detection.

Claim 29

The system of claim 28, wherein the plurality of monitoring criteria Includes a criterion based on magnetic ink character recognition (MICR) line detection.

Claim 30

The system of claim 26, wherein the wireless network is a cellular network.

TABLE OF EXHIBITS

Exhibit Number	Description
1001	U.S. Patent No. 12,211,095 (“USP095”)
1002	Declaration of Dr. Daniel Lopresti (“Decl.”)
1003	International Patent Application Publication No. WO 2005/043857 and Declaration of Translation (“Garcia”)
1004	Chinese Patent Application Publication No. CN 1897644A and Declaration of Translation (“Luo”)
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1006	U.S. Patent Application Publication No. 2007/0194102 (“Cohen”)
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1009	PTAB-IPR2021-01073 Final Written Decision (“571-FWD”)
1010	PTAB-IPR2022-00076 Final Written Decision (“598-FWD”)
1011	U.S. Patent No. 7,590,275 (“Clarke”)
1012	US Patent Publication No. 2006/0186194 (“Richardson”)
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1081	Declaration of John. C. Hart, PhD
1082	<i>Curriculum vitae</i> of John C. Hart, PhD