

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

FIFTH THIRD BANK, NATIONAL ASSOCIATION
Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION
Patent Owner

INTER PARTES REVIEW OF U.S. PATENT NO. 12,505,414
Case No. IPR2026-00450

**PETITION FOR *INTER PARTES* REVIEW OF
CLAIMS 1-12 OF U.S. PATENT No. 12,505,414
UNDER 35 U.S.C § 312 AND 37 C.F.R. § 42.104**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES	3
A.	Real Party-in-Interest	3
B.	Entities Owning 10% or More Stock, Shares or Membership Interest	3
C.	Related Matters.....	3
D.	Lead and Backup Counsel and Service Information.....	5
III.	CERTIFICATION OF GROUNDS FOR STANDING	5
IV.	OVERVIEW OF CHALLENGE AND RELIEF REQUESTED.....	6
A.	Prior Art References.....	6
B.	Grounds for Challenge	8
V.	TECHNOLOGY BACKGROUND.....	9
A.	Checks	9
B.	Electronic Check Processing.....	10
C.	Image-Based Document Processing with Camera Phones	11
D.	Mobile Applications	13
VI.	THE '414 PATENT.....	14
A.	Brief Description	14
B.	Prosecution History	16
VII.	CLAIM CONSTRUCTION	17
VIII.	PERSON OF ORDINARY SKILL	17
IX.	PRIOR ART REFERENCES	18

A.	Garcia (EX1003)	18
B.	Luo (EX1004).....	19
C.	Harrison (EX1005).....	24
D.	Cohen (EX1006).....	25
E.	Goyal (EX1008)	26
F.	Randle (EX1048).....	27
G.	Gausemeier (EX1082).....	28
X.	SPECIFIC GROUNDS FOR UNPATENTABILITY.....	28
A.	Ground I: Claims 1-12 are Obvious Over Garcia with Luo/ Harrison/Cohen	28
1.	Garcia/Luo/Harrison/Cohen.....	28
2.	Independent Claims 1, 4, 8, 11	40
3.	Dependent Claims 2, 3, 5, 6, 7, 9, 10, 12.....	62
B.	Ground II: Claims 2 and 9 are Obvious Over Garcia with Luo/Harrison/Cohen/Randle	65
C.	Ground III: Claims 5-6 are Obvious Over Garcia with Luo/Harrison/Cohen/Gausemeier.....	67
1.	Claim 5.....	70
2.	Claim 6.....	71
D.	Ground IV: Claims 1-12 are Obvious Over Garcia with Luo/Goyal/Cohen	72
1.	Garcia/Luo/Goyal/Cohen.....	72
2.	Claims 1-12.....	78
E.	Ground V: Claims 2 and 9 are Obvious Over Garcia with Luo/Goyal/Cohen/Randle.....	82

F.	Ground VI: Claims 5-6 are Obvious Over Garcia with Luo/Goyal/Cohen/Gausemeier.....	82
XI.	FEES	82
XII.	CONCLUSION.....	83

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>ACCO Brands Corp. v. Fellowes, Inc.</i> , 813 F.3d 1361(Fed. Cir. 2016)	39
<i>Advanced Bionics v. MED-EL Elektromedizinische Geräte GmbH</i> , IPR2019-01469, Paper 6 (P.T.A.B. Feb. 13, 2020)	3
<i>Google v. Hammond Development Int’l</i> , 54 F.4th 1377 (Fed. Cir. 2022)	19, 24, 27
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	31, 34, 76
<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	17
<i>Uber Techs., Inc. v. X One, Inc.</i> , 957 F.3d 1334 (Fed. Cir. 2020)	36
Statutes	
35 U.S.C. §102	6, 7, 8
35 U.S.C. §103	6, 8, 9
Regulations	
37 C.F.R. § 42.104	5
37 C.F.R. § 42.8	3, 5
37 C.F.R. §42.101	6

Fifth Third Bank, National Association (“Petitioner”) respectfully requests *inter partes* review of claims 1-12 of U.S. Patent No. 12,505,414, owned by United Services Automobile Association (“USAA”/“Patent Owner”/“PO”).

I. INTRODUCTION

U.S. Patent No. 12,505,414 (“’414 patent”) claims methods 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 the Challenged Claims purport to add concern the use of existing technologies to control a mobile device camera and automatically capture check images. By 2009, these elements were 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 Chinese Patent Application Publication No. CN 1897644A (“Luo”), relied on herein. EX1009-571-FWD, 23-74. And in another proceeding, the Board found—and the Federal Circuit again affirmed—that implementing Garcia’s method with a downloaded application using software abstraction layers (e.g., “application programming interfaces” or “APIs”) was

obvious. EX1010-598-FWD, 23-31, 69. The '414 patent adds nothing meaningful to the previously invalidated claims.

Notably, the Board recently instituted *inter partes* review on two closely-related patents on almost identical grounds as those raised here.¹ The '414 patent is even broader than the patents in those proceedings—it lacks limitations describing indications to a user that certain potential images are unacceptable. Institution on narrower patents supports institution *a fortiori* on this broader patent.

The Director should not exercise discretion to deny institution, including because the Examiner materially erred during prosecution of the '414 patent.² While the Garcia/Cohen/Luo/Goyal/Randle references cited herein were disclosed in voluminous IDSs, they were not the basis of a rejection or substantively evaluated by the Examiner. The Examiner therefore did not consider the teachings cited in this petition, particularly in the combinations proposed. This petition also includes expert

¹ *Regions Bank v. USAA*, IPR2025-01326, Paper 19 (P.T.A.B. February 10, 2026) (U.S. Pat. 12,159,310); *Regions Bank v. USAA*, IPR2025-01356, Paper 18 (P.T.A.B. February 10, 2026) (U.S. Pat. 12,211,095).

² Petitioner reserves full discretionary denial arguments for briefing pursuant to USPTO guidance.

testimony explaining how a POSITA would have understood the teachings of these references. Therefore, both parts of the framework set out in *Advanced Bionics v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020), favor institution. The Examiner also did not have the benefit of the Board's institution on materially similar petitions challenging related patents.

Petitioner respectfully requests that the Board institute review and hold claims 1-12 of the '414 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, Fifth Third Financial Corporation, and Fifth Third Bancorp are the real parties-in-interest.

B. Entities Owning 10% or More Stock, Shares or Membership Interest

Petitioner identifies that The Vanguard Group, Inc. owns more than 10% of the stock of Fifth Third Bancorp, Petitioner's indirect parent entity.

C. Related Matters

Petitioner has filed petitions for *inter partes* review of related patents U.S. Patent Nos. 12,159,310 and 12,211,095 (the "'310" and "'095 patents"), which are pending with the Board in IPR2026-00279 and IPR2026-00277, respectively.

The '414 patent, along with the '310 and '095 patents and related patent 12,632,899 (the "'899 patent"), has been asserted in a complaint filed July 21, 2026 in *United Services Automobile Association v. Fifth Third Bancorp, et al.*, Case No. 2:26-cv-00595, (E.D. Tex.).

The '310 and '095 patents were asserted in *United Services Automobile Association v. Regions Bank*, Case No. 2:25-cv-00082 (E.D. Tex.). This case was dismissed due to settlement on March 20, 2026. The '310 patent was the subject of *Regions Bank v. United Services Automobile Association*, IPR2025-01326 (instituted February 10, 2026). The '095 patent was the subject of *Regions Bank v. United Services Automobile Association*, IPR2025-01356 (instituted February 10, 2026). Both IPRs were terminated on March 25, 2026 due to settlement.

Thirteen prior post-grant proceedings have been filed pertaining to patents in the '414 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 8,699,779) – challenged claims 1-2, 7, 10, and 15-17 unpatentable

(2) IPR2021-01073 (U.S. Patent 8,977,571) – challenged claims 1-6, 9, 10, 12, and 13 unpatentable

D. 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. Petitioner consents to service by email on lead and backup counsel.

LEAD COUNSEL	BACKUP COUNSEL
Aaron Maurer Reg. No. 44,911 amaurer@wc.com <u>Postal and Hand Delivery Address:</u> Williams & Connolly LLP 680 Maine Avenue S.W. Washington, DC 20024 Phone: 202-434-5000 Fax: 202-434-5029	Jessamyn Berniker Reg. No. 72,328 jberniker@wc.com <u>Postal and Hand Delivery Address:</u> Williams & Connolly LLP 680 Maine Avenue S.W. Washington, DC 20024 Phone: 202-434-5000 Fax: 202-434-5029

III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies under 37 C.F.R. §42.104(a) that the patent for which review is sought is available for *inter partes* review and under 37 C.F.R.

§§42.101(a)-(c) that Petitioner is not barred or estopped from requesting *inter partes* review.

IV. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Under Rules 42.22(a)(1) and 42.104(b)(1)-(2), Petitioner requests cancellation of claims 1-12 of the '414 patent.

A. Prior Art References

The '414 patent was filed on December 2, 2024, and claims priority through a series of continuation applications to Application No. 12/545,127, filed on August 21, 2009, now Pat. No. 8,977,571.³ The following references are pertinent to the grounds of unpatentability presented below:

1. International Patent Application Publication No. WO2005/043857 (“Garcia”) (EX1003),⁴ published May 12, 2005, is prior art at least under 35 U.S.C. §§102(a)-(b). Garcia appears on the face of the '414 patent but did not form the basis of a rejection during prosecution.

³ This Petition applies pre-AIA provisions of 35 U.S.C. §§102, 103.

⁴ Garcia was originally published in Spanish, provided in Exhibit A of EX1003. Citations to “EX1003” refer to Exhibit B, a certified English translation.

2. Chinese Patent Application Publication No. CN1897644A (“Luo”) (EX1004),⁵ published January 17, 2007, is prior art under 35 U.S.C. §§102(a)-(b). Luo appears on the face of the ’414 patent but did not form the basis of a rejection during prosecution.

3. Richard Harrison & Mark Shackman, *Symbian OS C++ for Mobile Phones*, Volume 3, Wiley & Sons (2007) (“Harrison”) (EX1005), is prior art under 35 U.S.C. §§102(a)-(b). Harrison was publicly available by August 31, 2007. EX1062-Munford ¶15.

4. U.S. Patent Application Publication No. 2007/0194102 (“Cohen”) (EX1006), published August 23, 2007, is prior art under 35 U.S.C. §§102(a)-(b). Cohen appears on the face of the ’414 patent but did not form the basis of a rejection during prosecution.

5. Vikram Goyal, *Pro Java ME MMAPi: Mobile Media API for Java Micro Edition*, Apress (2006) (“Goyal”) (EX1008), is prior art under 35 U.S.C. §§102(a)-(b). Goyal was publicly available on or about June 19, 2006, and at least by January 25, 2007. EX1062-Munford ¶15; EX1084-Gilson1. Goyal appears on the face of the ’414 patent but did not form the basis of a rejection during prosecution.

⁵ Luo was originally published in Chinese, provided in Exhibit A of EX1004. Citations to “EX1004” refer to Exhibit B, a certified English translation.

6. U.S. Patent Application Publication No. 2006/0106717 (“Randle”) (EX1048), published May 18, 2006, is prior art under 35 U.S.C. §§102(a)-(b). Randle appears on the face of the ’414 patent but did not form the basis of a rejection during prosecution.

7. Juergen Gausemeier et al., “Development of a Real Time Image Based Object Recognition Method for Mobile AR-Devices,” PROCS. OF THE 2D INTERNATIONAL CONFERENCE ON COMPUTER GRAPHICS, VIRTUAL REALITY, VISUALIZATION AND INTERACTION IN AFRICA 133-39 (Feb. 3, 2003) (“Gausemeier”) (EX1082), is prior art under 35 U.S.C. §§102(a)-(b). Gausemeier was publicly available on or about August 2, 2005, and at least by June 14, 2006. EX1062-Munford ¶15; EX1083-O’Bryan.

B. Grounds for Challenge

Petitioner requests cancellation of claims 1-12 of the ’414 patent. The grounds for challenge are:

Ground	References	Basis	Claims Challenged
I	Garcia/Luo/Harrison/Cohen	§103	1-12
II	Garcia/Luo/Harrison/Cohen/Randle	§103	2, 9
III	Garcia/Luo/Harrison/Cohen/Gausemeier	§103	5-6

IV	Garcia/Luo/Goyal/Cohen	§103	1-12
V	Garcia/Luo/Goyal/Cohen/Randle	§103	2, 9
VI	Garcia/Luo/Goyal/Cohen/Gausemeier	§103	5-6

This Petition is supported by the declaration of John C. Hart, PhD (EX1002).

V. TECHNOLOGY BACKGROUND

A. Checks

Checks are financial instruments directing 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 the payor's bank routing number, the customer account number, and check number:

John Smith 2 Jefferson Rd E. Brunswick, NJ		<u>April 29, 1999</u>
Pay To The Order Of:	COMCS	\$ 37 no/00
<u>Thirty-Seven and no/100</u>		
<u>John Smith</u>		
0210000891: 1234567891 ■ 0000003700		

EX1014-Slater, Fig.11.⁶

B. Electronic Check Processing

Check deposit was originally a manual process. However, “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; EX1002-Decl., ¶23.

By the early 2000s, banks had the automated technology necessary to process check deposits using check images without a physical copy. EX1012-Richardson, [0007]. For example, banks had “well known” optical character recognition (“OCR”) technology that could read information from a check image. EX1006-Cohen, [0007]; EX1003-Garcia, 11:7-15; EX1014-Slater, [0023]. In 2004, Congress enacted the Check Clearing for the 21st Century Act (“Check 21 Act”), requiring banks to accept a digital image of a check in lieu of the paper check. EX1006-Cohen, [0010]; EX1012-Richardson, [0007]-[0008]; EX1013-FDIC. The process of replacing a paper check with an electronic image for processing is known as

⁶ All figures’ colored boxes herein are added for illustration.

“truncation.” EX1006-Cohen, [0004]; EX1012-Richardson, [0008]. EX1002-Decl., ¶¶24-28.

C. Image-Based Document Processing with Camera Phones

By the mid-2000s, **camera phones** had become increasingly common. 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 new 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** (135 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.

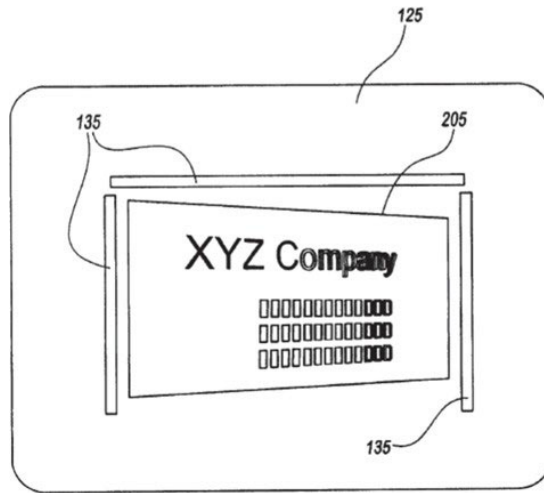


Fig. 5

EX1004-Luo, Fig.5; EX1002-Decl., ¶¶29-32.

And auto-capture 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.

It was well-recognized by the early/mid-2000s that one natural and foreseeable application of this technology was the ability to scan and transmit bank checks. EX1003-Garcia, Abstract; EX1017-Acharya, Abstract; EX1018-Burks, 1:31-36, 14:15-31; EX1002-Decl., ¶¶33-34. A 2005 academic paper demonstrated a working prototype that used a standard **camera phone** to capture and process bank checks. EX1019-Parikh, 80. By the late 2000s, two banks had already introduced mobile deposit applications. EX1020-Bruno-Britz; EX1021-Mitek, 37; EX1022-Bruene.

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 the mid-2000s, **PDA**s included high-quality **cameras**. EX1024-Rajeswari, 1863; EX1025-Slocombe, 1-4. **Cellphone** capabilities increased significantly, too: the iPhone released in 2007 with a 2-megapixel **camera** and a nearly-half-a-gigahertz processor. EX1026-Apple; EX1027-EveryiPhone; EX1028-Nokia; EX1002-Decl., ¶¶35-36.

These increased capabilities enabled the ubiquity of downloadable mobile applications. EX1005-Harrison, 5; EX1008-Goyal, 66-67; EX1081-Meier, 5. 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 app developer easily access **device** features like the **camera** without having to write code to make the **camera** operate. EX1005-Harrison, 36-39; EX1008-Goyal, 1, 127, 174; EX1081-Meier, 5-6; EX1030-Aiello, 3, 10; EX1031-Raento, 51, 53, 58. The mid-2000s thus saw the advent of sophisticated **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**. EX1081-Meier, 320; EX1032-Patrick, 2; EX1082-Gausemeier; EX1002-Decl., ¶¶37-39.

VI. THE '414 PATENT

A. Brief Description

The '414 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 in compliance with Check 21. EX1001-USP414, 1:29-34; EX1002-Decl., ¶40.

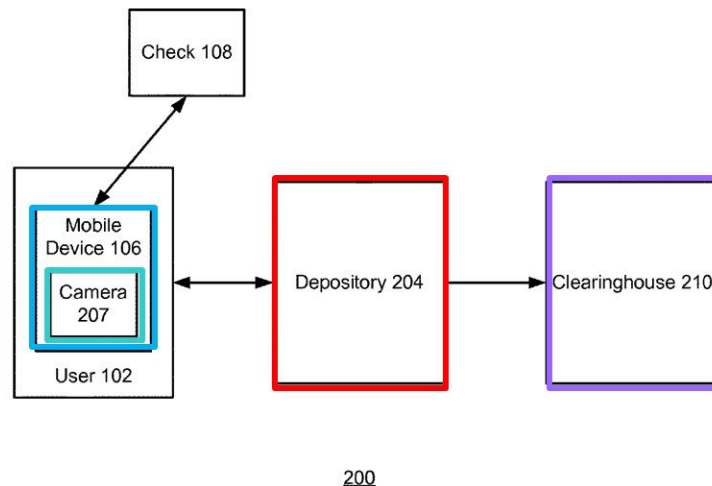


FIG. 2

EX1001-USP414, Fig.2; EX1002-Decl., ¶40.

The '414 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-USP414, Abstract, 1:45-50.

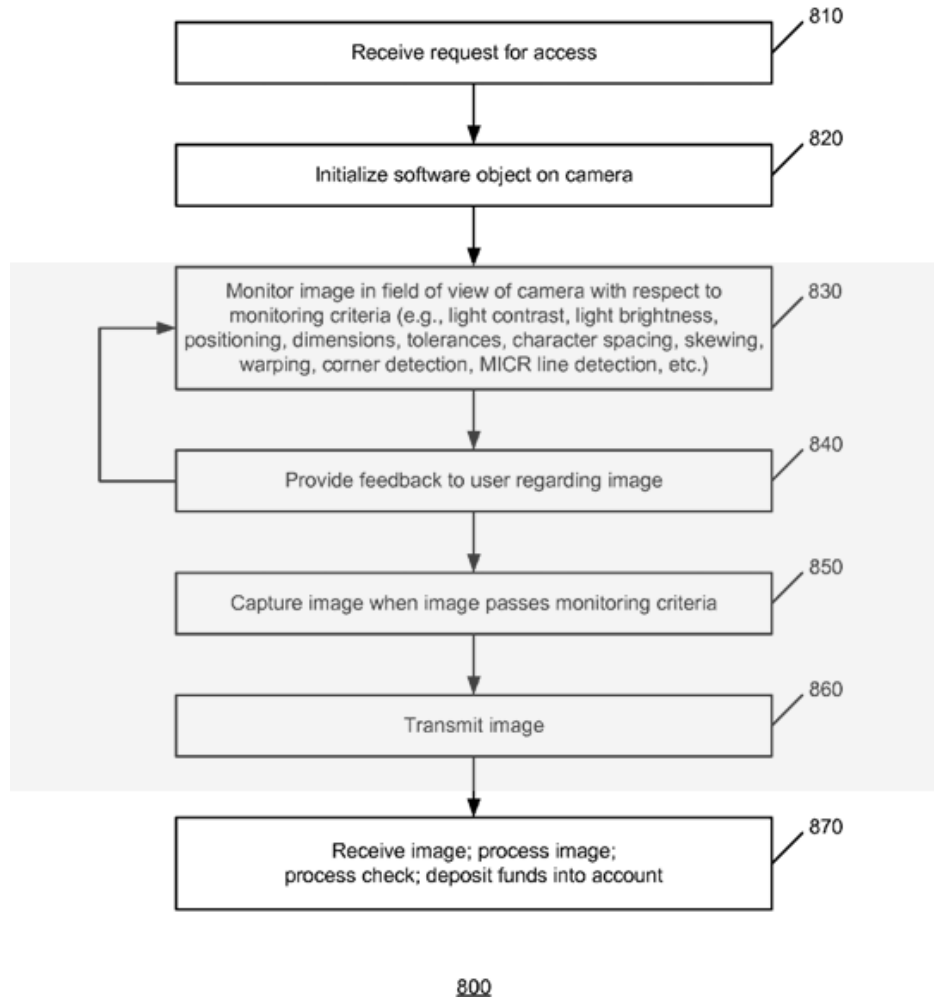


FIG. 8

EX1001-USP414, Fig.8; EX1002-Decl., ¶41.

The patent lists potential monitoring criteria, including contrast, light brightness, positioning, dimensions, tolerances, character spacing, skewing, warping, corner detection, and MICR line detection. EX1001-USP414, 4:15-19.

The patent provides no detail regarding how to implement this criteria, but instead relies on “known” techniques. *Id.*, 7:17-18 (“The edge 257 may be detected using any known technique(s).”); 7:66-67 (“Any known technique(s) for edge detection and/or corner detection may be used.”); 8:59-63 (“Any known MICR line detection technique(s) may be used....”); 10:17-19 (“Any known technique for generating a histogram for an image...may be used.”); EX1002-Decl., ¶¶42-43.

The ’414 patent also discusses basic software components for implementing the purported invention. The patent explains that the mobile device camera can be “operate[d] through a software abstraction layer, such as an application programming interface (API).” EX1001-USP414, 11:26-28. The patent does not purport to invent new or improved APIs—it relies on known APIs in mobile operating systems like Windows Mobile, Symbian OS, iPhone OS, and Android. *Id.*, 11:39-41; EX1002-Decl., ¶44.

B. Prosecution History

Application No. 18/966,097, which issued as the ’414 patent, was filed on December 2, 2024, as a continuation of the ’856 Application (which issued as the ’310 patent). EX1001-USP414, cover; EX1033-FH414, 1-159. The Examiner rejected claims under 35 U.S.C. §103 as unpatentable over U.S. Patent No. 10,380,562 (“Prasad”) in view of U.S. Patent No. 10,504,185 (“Buentello”), both assigned to PO, and additionally rejected certain claims under 35 U.S.C. §112(b) as

indefinite. *Id.*, 405-16. PO cancelled certain claims and argued that Prasad was not prior art because it postdated the application's effective filing date and was disqualified under §102(b)(2)(C) based on common ownership. *Id.*, 477-79. The Examiner issued a Notice of Allowance. *Id.*, 482-90. USAA filed additional Information Disclosure Statements along with a Request for Continued Examination. *Id.*, 778-857. The Examiner then issued a second Notice of Allowance on November 18, 2025. *Id.*, 861-69.

VII. CLAIM CONSTRUCTION

The Board need only 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.

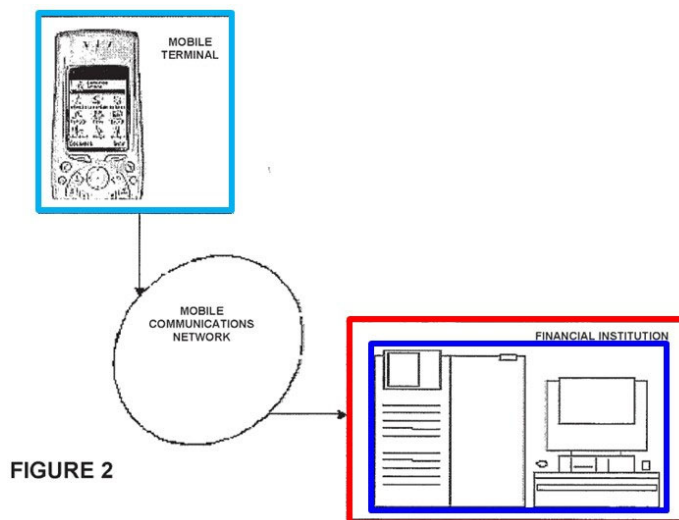
VIII. PERSON OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) as of the claimed priority date of the ’414 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 processing or 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., ¶¶46-48.

IX. PRIOR ART REFERENCES

A. Garcia (EX1003)

Like the '414 patent, Garcia discloses a remote check deposit method “for processing and accepting **documents**, such as...bank checks...using...a **mobile device** capable of capturing and sending images.” EX1003-Garcia, 1:7-13. Garcia’s Figure 2 illustrates the method that includes a user’s “**mobile device**” and “**computer equipment** at the **financial institution**.” *Id.*, 9:11-18.



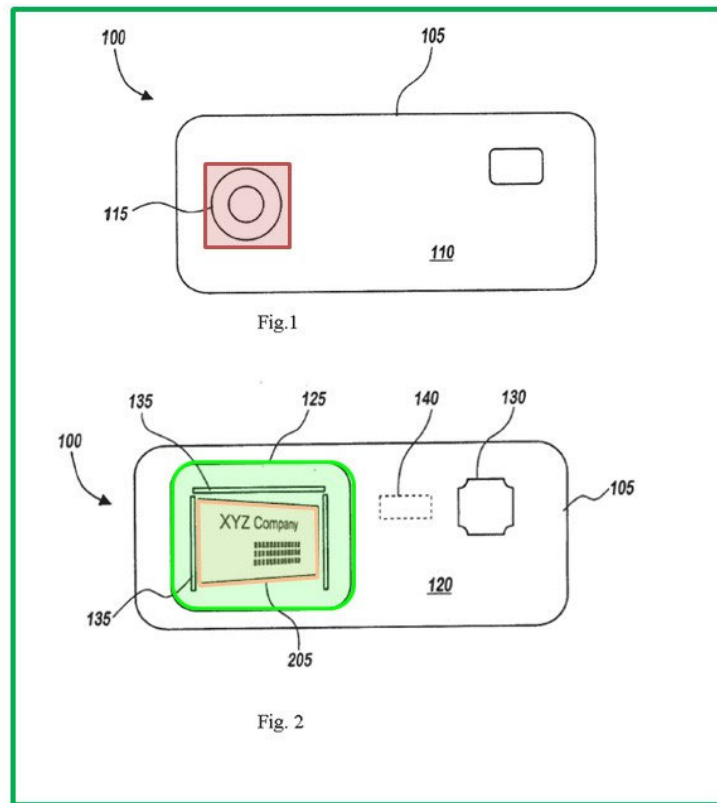
Id., Fig.2., EX1002-Decl., ¶¶51-53.

Like the '414 patent, the **mobile device** can capture and send the image of a check and information associated with the deposit to a **financial institution**. EX1003-Garcia, 10:10-13, 10:16-18, 11:20-12:3, 12:9-13. The **institution** then recognizes, verifies, and processes the received information “by the usual means (truncation systems),” “ultimately obtaining 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, 11:15-19, 12:17-22. That automatic processing uses “**computer equipment**...that has an optical character recognition (OCR) system.” *Id.*, 11:7-19, Fig.1; EX1002-Decl., ¶¶53-57. The Board has already found, in decisions affirmed by the Federal Circuit, that Garcia teaches using a check’s image to remotely deposit the check, including performing OCR. EX1041-559-FWD, 19-21, 30-31 (*affirmed*, *USAA v. PNC*, Nos. 2023-1920, 2025 WL 341868 (Fed. Cir. Jan. 20, 2025)). USAA is estopped from taking positions inconsistent with these final factual findings. *See Google v. Hammond Development Int’l*, 54 F.4th 1377, 1381-83 (Fed. Cir. 2022).

B. Luo (EX1004)

Like Garcia and the ’414 patent, Luo is directed to use of “digital **cameras**” in **devices** including “**mobile phones**.” EX1004-Luo, 1. Luo depicts a **handheld camera system** 100 including 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** of the scene in front of the **image sensor** 115.” *Id.*, 3. EX1002-Decl., ¶¶58-61.



EX1004-Luo, Figs.1-2; EX1002-Decl., ¶61.

Luo discloses techniques 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 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 on the **document**. *Id.*, 1; EX1002-Decl., ¶¶62-64.

For example, 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 the “image plane 320”) are not “substantially parallel.” EX1004-Luo, 4; EX1002-Decl., ¶64.

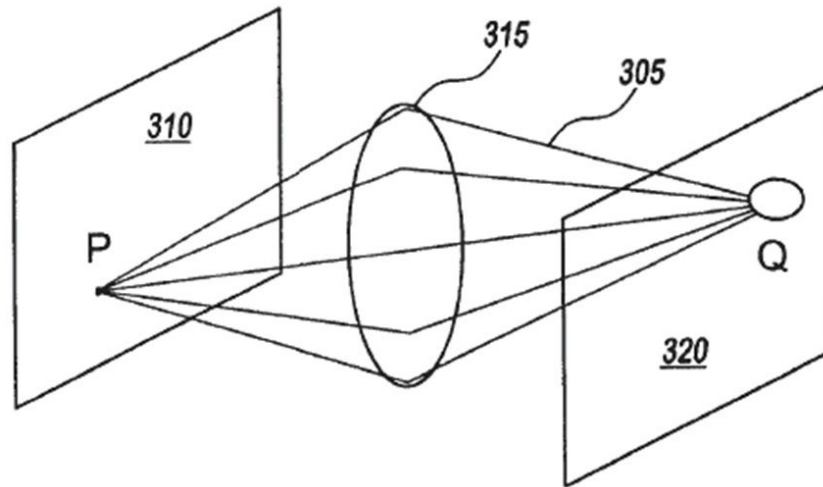


Fig. 3

EX1004-Luo, Fig.3. As illustrated in Figure 5, such projective deformation or distortion causes portions of the **document** to be blurred, which may negatively affect subsequent image processing steps, such as OCR. *Id.*, 1, 5.

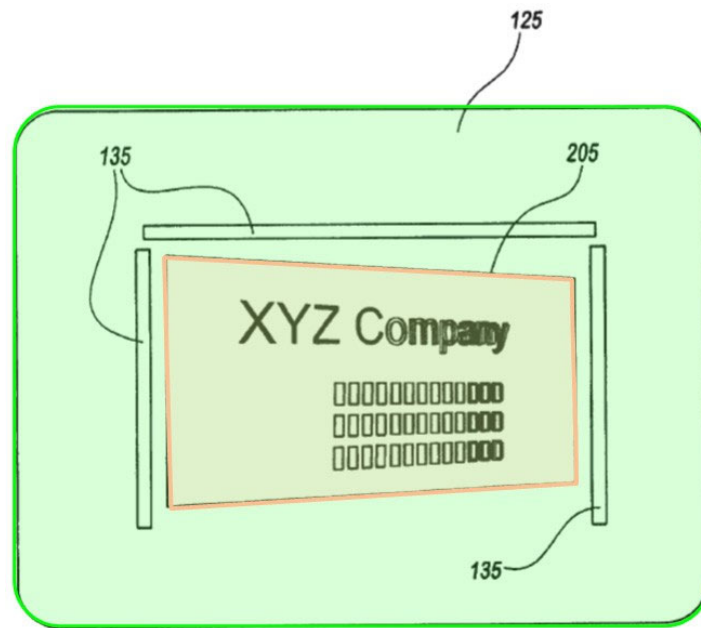


Fig. 5

EX1004-Luo., Fig.5, EX1002-Decl., ¶¶64-65.

Luo addresses these problems using “**reference lines**.” Luo’s “**reference lines**” work the same way as the ’414 patent’s “**alignment guide**,” which “may take any shape such as a bounding rectangle or other bounding box or shape, horizontal and/or vertical bars, parallel lines, etc., for example.” EX1001-USP414, 8:7-19:

Luo, FIGURE 5

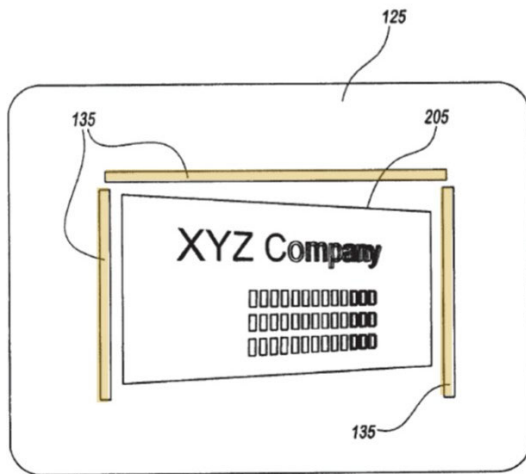


Fig. 5

'414 Patent, FIGURE 3

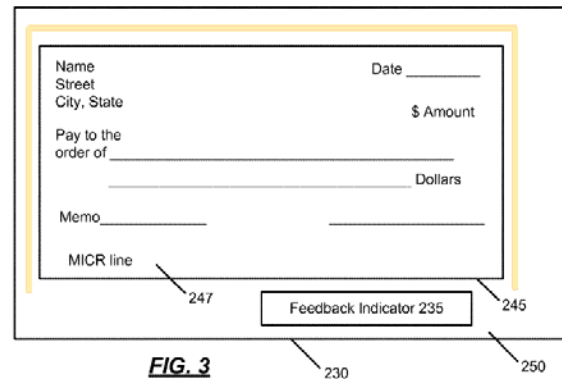


FIG. 3

EX1004-Luo, Fig.5; EX1001-USP414, Fig.3 (yellow line added); EX1002-Decl., ¶68. Luo discloses that “projective distortion in the image is reduced” by monitoring the **document** image 205 relative to **reference lines** 135 and allowing “the image of the object [to] be captured” “**only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135....**” EX1004-Luo, 7. To ensure proper **alignment**, Luo provides the user with instructions and feedback throughout the process, e.g., by changing the color or flicker of the **reference lines** when the method determines an edge of the **document** in the **preview window** is parallel to one of the **reference lines**. *Id.*, 4, 6, Fig.6, claim 5; EX1002-Decl., ¶¶66-70.

The Board has already found, in decisions affirmed by the Federal Circuit, that Luo’s disclosure teaches monitoring of a document in the field of view of a

camera on a mobile device and automatically capturing an image of the document when the straight edges of the document are substantially parallel with the reference lines, or alignment guide, reducing projective distortion of the document, so that optical character recognition can be performed more accurately. *See, e.g.*, EX1009-571-FWD, 30-31, 55-69 (*affirmed, USAA v. PNC*, Nos. 2023-2124, 2023-2125, 2025 WL 370141 (Fed. Cir. Feb. 3, 2025); EX1087-779-FWD, 24-35 (same). USAA is estopped from taking positions inconsistent with these final factual findings. *See Google*, 54 F.4th at 1381-83.

C. Harrison (EX1005)

Harrison is a guide for developing mobile applications—specifically, C++ applications for Symbian OS-based **devices**; Symbian OS is a prior art operating system identified by the '414 patent. EX1005-Harrison, xxiii–xxv; EX1001-USP414, 11:36-41. Harrison discloses that Symbian OS's "APIs" are structured so that "application engines expose APIs to the applications that use them," enabling developers to write applications for **mobile devices**. EX1005-Harrison, 37. Symbian OS provides "Multimedia APIs" that "can be used to play and record audio and video data, perform image processing and manipulation, and access any **camera** and radio tuner hardware present on a phone." EX1005-Harrison, 651; EX1002-Decl., ¶¶71-75. Applications are packaged into "Symbian OS installation (SIS) files," that end

users can download to a phone from sources including “email and an Internet connection.” EX1005-Harrison, 269-70, 279.

D. Cohen (EX1006)

Cohen, like Garcia and the '414 patent, is directed to depositing a check using its image. EX1006-Cohen, [0008], [0022]. Cohen discloses that 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, the magnetic **MICR line** to be read.” *Id.*, [0021].

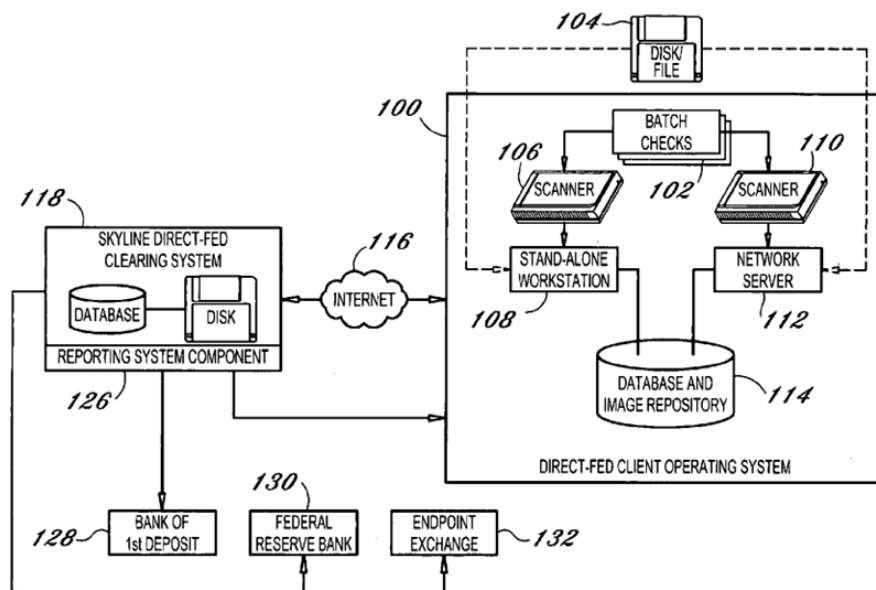


FIG. 1

Id., Fig.1; EX1002-Decl., ¶¶76-79.

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 “quantitative measurements, or 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 the “merchant site 100 reviews the images and data for each check” including the accuracy confidence levels, to validate the images and information read therefrom and confirm there are no errors. *Id.* The images are then transmitted to a clearing system 118 for deposit. *Id.*, [0016], [0022]-[0023].

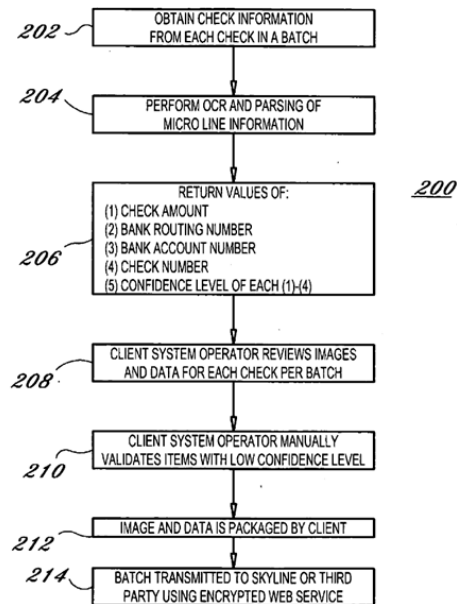


FIG. 2

Id., Fig.2; EX1002-Decl., ¶80.

E. Goyal (EX1008)

Goyal is a guide for developing mobile applications for Java-enabled devices. EX1008-Goyal, 5, 15, back cover. Goyal discloses that “MMAPI [MultiMedia API] allows you to create applications”—referred to as “MIDlets”—“for Java-enabled

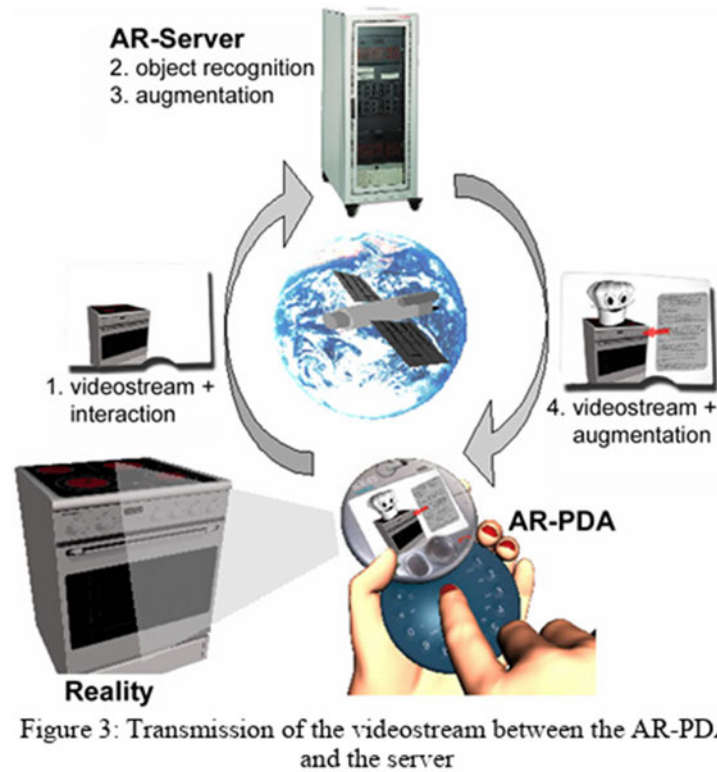
devices that can discover and use the multimedia capabilities of the device that they are running.” *Id.*, 1, 3, 127. Goyal discloses that Java-enabled device MMAPIs can be used to “capture snapshots or full videos” from within a mobile application. *Id.* 127; *see also id.*, 1, 16, 128, 174, 253. Once completed, users can download applications via an “over the air” (“OTA”) interface. *Id.*, 66-67; EX1002-Decl., ¶¶81-84.

F. Randle (EX1048)

Randle, like Garcia and the ’414 patent, discloses a check image processing system. EX1048-Randle, [0002], [0006]-[0007]. Randle discloses 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., ¶¶85-89. The Board has already found, in decisions affirmed by the Federal Circuit, that Randle teaches “computer equipment at a bank that can OCR and store a check image as well as process a check,” including image data reduction methods. EX1041-559-FWD, 21-22, 31-32 (*affirmed*, *USAA v. PNC*, Nos. 2023-1920, 2025 WL 341868 (Fed. Cir. Jan. 20, 2025)). USAA is estopped from taking positions inconsistent with these factual findings. *See Google*, 54 F.4th at 1381-83.

G. Gausemeier (EX1082)

Gausemeier discloses an augmented reality system in which a mobile device captures live video images and transmits the videostream to a remote server for processing, including image recognition and tracking. EX1082-Gausemeier, 133-34; EX1002-Decl. ¶¶91-95.



EX1082-Gausemeier, FIG.3.

X. SPECIFIC GROUNDS FOR UNPATENTABILITY

A. Ground I: Claims 1-12 are Obvious Over Garcia with Luo/Harrison/Cohen

1. Garcia/Luo/Harrison/Cohen

Garcia/Harrison/Cohen/Luo are analogous art, and a POSITA would have been motivated to combine them with a reasonable expectation of success. EX1002-Decl., ¶¶97-100.

a. Garcia in view of Luo/Harrison

First, Garcia/Luo/Harrison are analogous art. Garcia/Luo/Harrison are in the same field as the Challenged Claims—capturing and processing **document** images. *See, e.g.*, EX1001-USP414, claim 1; EX1003-Garcia, 1:7-13 (disclosing a method “for processing and accepting **documents**, such as...bank checks. . . through a **mobile device**”); EX1004-Luo, 6-7 (describing image-capturing method applicable to image **documents**), 1 (describing OCR); EX1005-Harrison, 699-706 (disclosing software development platform/kits that “allow access to any onboard **camera** on the [**mobile**] **phone**” to “capture still images” or “capture video,” which could be of a **document**). EX1002-Decl., ¶¶101-04.

Second, a POSITA would have been motivated to combine Garcia’s mobile remote check deposit method with well-known **mobile device** image capture techniques, including Luo’s guidance and auto-capture techniques and Harrison’s downloaded application and APIs for controlling **mobile device cameras**. EX1002-Decl., ¶105.

As §IX.A details, Garcia discloses a remote check deposit method that extracts deposit information from images captured by a **mobile device**. EX1003-

Garcia, 1:7-13, 11:7-15. Garcia explains that the “**mobile equipment** that performs the initial processes of capturing, digitizing and processing the image consists of a **mobile telephone** equipped with the features and functions necessary for said purpose, particularly a **mobile telephone** with a **camera** and processing capacity.” *Id.*, 11:1-6; 9:21-10:3 (discussing “computer application”). A POSITA would have been motivated to apply teachings from prior art like Luo/Harrison to fill implementation details regarding how the check image is captured and determined suitable for capture or deposit, and the software architecture on the **mobile device**. EX1002-Decl., ¶106.

Luo provides such teachings with respect to capturing check images on a **mobile device**. Specifically, Luo discloses improving **mobile device** images of **documents** for OCR by providing instructions/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 further discloses automatically capturing the image of the **document** when the **document** is properly **aligned** in the **preview window**. *Id.* Luo discloses that such techniques result in a system that is “user friendly and intuitive in use,” ensures the “image is clearer and more accurate,” and reduces projective distortion, which “accelerate[s] [the] image capture process” and allows “optical character recognition... with high accuracy.” *Id.*, 7; EX1002-Decl., ¶¶107-08.

A POSITA would have been motivated to incorporate Luo's teachings into Garcia. Luo discloses that the disclosed image capture techniques, including parallel **reference lines** and instructions to the user, can produce higher quality images that reduce problems such as "projective distortion" and "blur," which improves OCR accuracy. 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 use in Garcia's check deposit method. EX1002-Decl., ¶109. A POSITA would have recognized that Luo's techniques would have been directly applicable to check image capture to predictably increase the likelihood of obtaining images suitable for "[r]ecognizing, verifying, and electronically treating and processing," as disclosed by Garcia. EX1003-Garcia, 6:8-10; EX1002-Decl., ¶¶109-10.

Implementing Garcia's mobile check deposit method using Luo's **camera** method would have amounted to applying a known technique/method (e.g., Luo's **preview window**, instructions, feedback, **document alignment**, and automatic capture techniques) to a known device/method (e.g., Garcia's mobile phone 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 Int'l v. Teleflex*, 550 U.S. 398, 416 (2007); EX1002-Decl., ¶111.

Garcia discloses using “a computer application in the **mobile telephone**” and “features and functions necessary” to carry out check image capture. EX1003-Garcia, 9:21-10:1, 11:4. Luo similarly discloses 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 prior art like Harrison to supply implementation details regarding software architecture and how software is loaded onto the **mobile device**. EX1002-Decl., ¶112.

Harrison provides well-known, readily available software components for this purpose. Harrison is a guide to developing mobile applications for programmers looking to “exploit the potential of mobile solutions with Symbian OS technology,” including taking advantage of the **device camera**. EX1005-Harrison, xxiv, 651, 699-706. Harrison explains that mobile applications can be downloaded onto the **device**—packaged as “Symbian OS installation (SIS) files” that a user can “download . . . straight from a website”—and that such applications can access “any onboard **camera** on the phone” to “capture still images” or “capture video.” *Id.*, 269, 279-80, 699-706. To that end, Harrison discloses “Multimedia APIs” that provide “access [to] any **camera** ... hardware present on a phone.” *Id.*, 651, 699-706, 713 (summarizing “Camera APIs”); EX1002-Decl., ¶¶113-14.

A POSITA would have been motivated to implement the Garcia/Luo combination with Harrison's downloadable application and Camera APIs. By the mid-2000s, mobile applications were becoming increasingly popular, including those that accessed **camera** functionality. *See* §§V.C, V.D; EX1081-Meier, 315, 319-20. Downloaded applications allowed enterprises, such as a bank in the case of Garcia, to provide customers with customized functionality that is more complex than solutions such as webpages. EX1034-Yuan, 52. Downloaded applications need only be installed once and can provide more security than a webpage. *Id.*, 44, 52. They also facilitate access to device features like the **camera** without **mobile device** software needing to be written anew. EX1005-Harrison, 269, 279-80, 651-706. Downloaded applications with APIs for controlling image capture were already used for desktop check deposit (EX1036-Westerman; EX1037-EasCorp; EX1038-eServices), and a POSITA would have been motivated to use equivalent architecture for **mobile devices**. *See generally* EX1039-Hariharan; EX1002-Decl., ¶¶115-18.

A POSITA would have been motivated to look to guides like Harrison to implement the teachings of Garcia/Luo on a mobile platform. In the Garcia/Luo/Harrison combination, Harrison'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 provides third-party mobile applications

access to video preview from a **device camera** (e.g., Symbian's StartViewFinderDirectL or StartViewFinderBitMapsL features) and the ability to capture a picture from that video feed (e.g., using CaptureImage). EX1004-Luo, Abstract, 5-7, claims 5, 11, 13, Fig.6; EX1005-Harrison, xxiv, 699-706, 713. Harrison provides numerous other implementation details, such as how to initialize the **camera** and control additional settings. *E.g.*, EX1005-Harrison, 699-706; EX1002-Decl., ¶119.

Implementing Garcia/Luo's software using Harrison's teaching of a downloaded application and API would have amounted to applying a known technique/method (e.g., Harrison'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. at 416; EX1002-Decl., ¶120.

Third, the similarity 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 using the teachings of Luo's capture method and Harrison'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, 3, 6-8; EX1005-Harrison, 651), and the teaching from one reference would have been applicable to the others. Moreover, Garcia/Luo teach capturing images of the same subjects—Luo’s disclosure of small rectangular **documents** with **straight edges** would include Garcia’s “bank checks.” EX1003-Garcia, 12:4-7; EX1004-Luo, 1, 4, 6; EX1002-Decl., ¶¶121-23.

Regarding the references themselves, Garcia discloses a “computer application” in a **mobile device** that engages in an interactive session with a **financial institution** for a check deposit. EX1003-Garcia, 9:19-10:18. Thus, Garcia assumes and confirms that implementing known details like Luo’s image-capture process or Harrison’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; EX1005-Harrison, 699-706. Other contemporaneous evidence confirms that controlling a **mobile device camera** using an API was known and “trivial.” EX1040-CodeGuru, 1 (“[a] number of Windows Mobile 5.0 APIs...make it trivial for a mobile application developer to access a **camera**”).⁷

⁷ The ’414 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-USP414, 7:54-60, 8:7-19, 8:24-30, 10:42-

Harrison is directed to “**any** C++ programmer” at “**any** level,” as well as “**any** other programmer or manager looking to exploit the potential of **mobile** solutions with Symbian OS technology.” EX1005-Harrison, xxiv. Accordingly, it would have been obvious for a POSITA to combine the teachings of Garcia with Luo/Harrison to incorporate Garcia into Luo/Harrison’s teachings regarding monitoring, monitoring criterion, capturing the image when it passes the monitoring criterion, feedback to a user, and a software application for download to Garcia’s mobile check deposit method that incorporates a **camera**. EX1002-Decl., ¶¶124-26.

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 Harrison (EX1010-598-FWD, 20-25). The combination of Garcia with Luo and Harrison would have been obvious for the same reasons.

b. Garcia in view of Cohen

51, 11:26-51, 16:19-39, 21:1-27, claims 1-2, 5-6, 8, 9; *Uber v. X One*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) (specification silence on implementation “suggest[s]” POSITA is “more than capable of selecting between the known methods”).

First, like Garcia, Cohen is analogous art. Cohen is in the same field as the Challenged Claims—capturing and processing **document** images. EX1001-USP414, claim 1; EX1006-Cohen, [0002] (disclosing a method for “captur[ing], processing, and archiving” check images). EX1002-Decl., ¶127.

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 details regarding Garcia’s “verifying” and “processing” steps. 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., ¶¶128-32.

A POSITA would have been motivated to combine Garcia’s mobile check deposit method with Cohen’s check image processing teachings, including OCR, validation, and confirmation techniques, to improve reliability and automation of

remote check deposit. Garcia 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 because it is directed to techniques for ensuring that an image captured by a user’s **device** is of sufficient quality for deposit. These techniques would have been applied to Garcia’s mobile check deposit method. 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., ¶¶132-35.

In combination, Garcia discloses 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 discloses 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 “[e]ach of these two design choices [to be] an obvious combination of prior-art elements.” *ACCO Brands v. Fellowes*, 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]. On the other hand, 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., ¶¶135-39.

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 the information received by [a **financial institution**]” encompasses Cohen’s complementary teaching of more detailed steps like OCRing the **MICR** and amount, and obtaining accuracy confidence levels for deposit information. Indeed, Garcia’s teaching to process the check image with the “usual means” like Cohen’s truncation 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., ¶¶140-42.

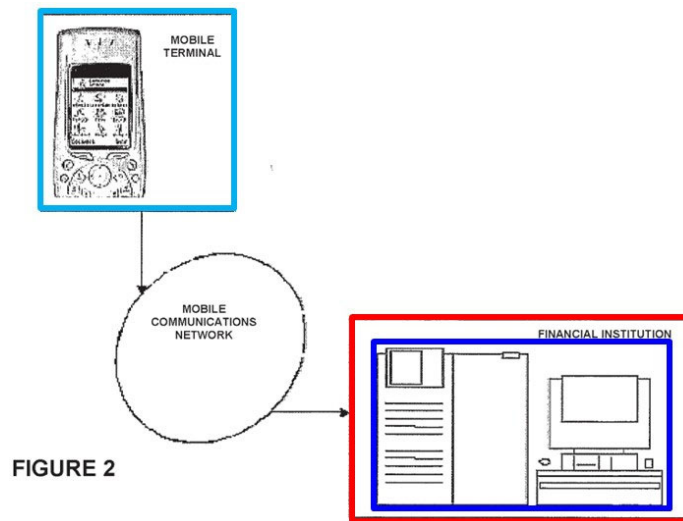
2. Independent Claims 1, 4, 8, 11

a. Claims 1[pre]/4[pre]/8[pre]/11[pre]

Garcia/Harrison/Luo disclose a *method enabling mobile check deposit* (e.g., method of 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 (Harrison)). EX1002-Decl., ¶143.

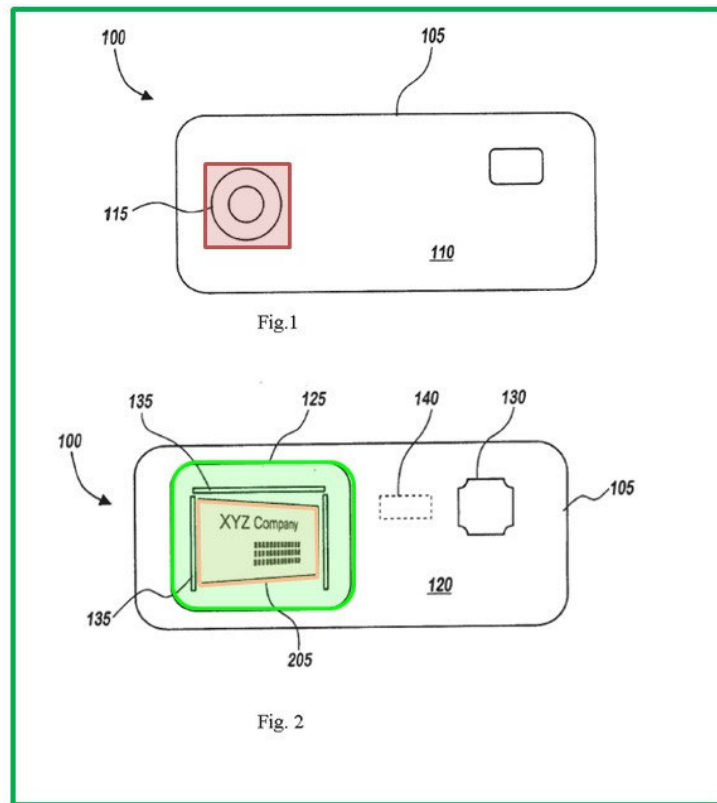
Garcia discloses a method for *mobile check deposit* in which a **mobile device** captures an image of a check and transmits the image over a communications

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.



Id., Fig.2, EX1002-Decl., ¶144.

Luo discloses a method for automatically capturing an image of a **document** using a **handheld device**. EX1004-Luo, 3, 6, Figs.1-2.



Id., Figs.1-2. Luo discloses obtaining **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., ¶¶145-46. A POSITA would have understood that Luo's **preview window** displays a live stream of successive frames (i.e., video frames) and that Luo discloses processing those video frames by evaluating them against reference alignment criteria. EX1002-Decl., ¶146.

Harrison discloses methods that allow a **mobile device** to display and process video frames from a **camera**. For example, Harrison discloses that the ECAM API of a **mobile device** can be used to “display a viewfinder and capture still images

from the **camera**” and to “capture video.” EX1005-Harrison, 699. Harrison discloses that when the API uses the viewfinder, “the **camera** passes bitmaps to the application at regular intervals, and the application draws them on the screen as appropriate,” with “bitmaps...passed at a rate fast enough to ensure a smooth viewfinder display.” EX1005-Harrison, 702-03. Harrison discloses that a viewfinder can alternatively “be rendered” using “direct screen access,” where “[t]he **camera** subsystem takes care of the rendering and is usually...optimized to make use of any hardware acceleration present.” *Id.*, 702-03. Further, Harrison discloses that “[v]ideo is recorded from the built-in **camera** on the phone” and a call to “Record() ...starts the capturing and encoding of video frames from the **camera**,” demonstrating real-time processing of video frames from the captured video feed. EX1005-Harrison, 674-75, 705; EX1002-Decl., ¶148.

b. Claims 1[a]/8[a]

Garcia/Harrison disclose *providing an app for download to a mobile device of a user* (e.g., Garcia’s **mobile device** include computer application/Harrison’s downloadable software application), *the user’s mobile device including a camera and a memory storing* (e.g., on Garcia’s **mobile device**) *a software abstraction layer [for controlling the camera]* (e.g., Harrison’s API), *the app associated with a bank to control check deposit* (e.g., Garcia’s remote deposit application) *by controlling the camera through the software abstraction layer, wherein the app, when*

downloaded to the user's mobile device and executed by the user's mobile device, is configured to cause the user's mobile device to perform operations comprising. EX1002-Decl., ¶150.

Garcia discloses a **mobile device** with a **camera** that takes a check image using a “computer application.” EX1003-Garcia, 9:19-10:18. Additionally, Garcia discloses a **mobile device** “that performs the [] processes of capturing, digitizing, and processing the image consists of a **mobile telephone** equipped with the *features and functions necessary for said purpose, particularly a mobile telephone with camera and processing capacity*,” and submits the image of the check to a bank for deposit (i.e., *control check deposit*). *Id.*, 4:11-18, 7:18-22, 11:1-6, 16:19-20. Further, a POSITA would have understood that the **mobile device** disclosed in Garcia would have included a *memory* coupled to a processor to store software to perform the “features and functions” of Garcia’s method. EX1002-Decl., ¶¶150-54.

Harrison discloses a downloadable application that can implement the “features and functions” described in Garcia—capturing an image of a check from a **mobile device**. EX1005-Harrison, 269, 279-80, 699, 705. Harrison further discloses that such an application can use an API (*software abstraction layer*) of the **mobile device** to “[provide] access to any onboard **camera** on the **phone**,” to “display a viewfinder and capture still images from the **camera**” and “capture video.” *Id.*, 651-52, 699. Consistent with the ’414 patent, a POSITA would have recognized an API

to be an example of a software abstraction layer. EX1002-Decl., ¶¶155-56; EX1001-USP414 11:26-28 (“[T]he software object may operate through a software abstraction layer, such as an application programming interface (API).”). Harrison’s API and associated software, *when executed, cause[s] the user’s mobile device to perform operations, such as configuring capture settings via “PrepareImageCaptureL(),” taking pictures via “CaptureImage(),” and starting, stopping, or otherwise manipulating the streaming camera viewfinder via “StartViewFinderDirectL(),” “StartViewFinderBitmapsL(),” and “StopViewFinder().”* EX1005-Harrison, 702-05. In combination with Garcia/Luo/Cohen, the software would perform additional operations. §§X.A.2.c-X.A.2.j; X.A.1; EX1002-Decl., ¶¶155-57.

In the Garcia/Harrison combination, the app 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 Harrison, the image capture and processing steps described below with reference to limitations 1[b]-1[i] would have been performed by the downloaded application. EX1002-Decl., ¶¶158-59.

c. Claims 1[b]/4[b]/8[b]/11[b]

Garcia/Luo render obvious *providing instructions* (e.g., Luo’s instructions) *to the user for capturing an image of a check* (e.g., Garcia). EX1002-Decl., ¶160.

Garcia discloses “[c]apturing the digital image of the obverse and the reverse side of the **document**.” EX1003-Garcia, 10:10-11, 12:4-9. The method described in Garcia is further described as “an interactive session...with the **receiving institution** through the mobile communications operator.” *Id.*, 10:1-3. A POSITA would understand that in the context of such a real-time interactive session, the method would necessarily include instructions guiding the user to correctly position the check for imaging. 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,⁸ 9 (“[S]aid **camera** 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-

⁸ Zhu was originally published in Chinese, which is provided in Exhibit A of EX1045. Citations to “EX1045” refer to Exhibit B of EX1045, which is a certified English translation.

Acharya, 7:5-13; EX1004-Luo, 6; EX1007-Yoon, [0022], [0026], [0028]; EX1002-Decl., ¶161.

Additionally, Luo discloses providing “*instructions* to the user when the **straight edge** displayed in the **preview window** is substantially parallel to the corresponding **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., ¶¶162-63.

d. Claims 1[c]/4[c]/8[c]/11[c]

Garcia/Luo/Harrison disclose *generating a live video of the check* (e.g., Garcia’s check) *in a field of view of the camera* (e.g., Garcia/Luo/Harrison’s viewfinder/preview), *the downloaded app causing the live video to be generated by controlling the camera through the software abstraction layer* (e.g., Harrison’s API). EX1002-Decl., ¶164.

In the Garcia/Luo/Harrison combination, the **document** captured by Luo’s method would have been a *check*. EX1003-Garcia, 1:6-13, 4:11-18; *see also* §X.A.1.a; EX1002-Decl., ¶165.

Luo further discloses *generating a live video of a document in the field of view of the camera*. Luo discloses that the **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” or “**preview window**” to show (or “generate”) live video from the **camera**, and that 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. *Id.*; EX1002-Decl., ¶166.

Harrison also discloses *generating a live video of the check in a field of view of the camera*. Harrison discloses a Camera API for controlling the **camera**, and that the capture process involves displaying a “viewfinder” before “captur[ing] still images from the **camera**.” EX1005-Harrison, 699, 702-03. A POSITA would have understood the “viewfinder” to display live video, given Harrison’s disclosure that the **camera** “passes bitmaps to the application at regular intervals” at “a rate fast enough to ensure a smooth viewfinder display.” *Id.*, 702-703; EX1002-Decl., ¶167. Because the Camera API (*software abstraction layer*) controls access to **camera** hardware to control image preview and capture, the downloaded application in the Garcia/Luo/Harrison combination would *cause the live video to be generated by controlling the camera through the software abstraction layer* (e.g., API). See EX1005-Harrison, 651, 699, 701-06; §X.A.2.b; EX1002-Decl., ¶¶167-169.

e. Claims 1[d]/4[d]

Garcia/Luo/Harrison disclose *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., ¶170.

In the Garcia/Luo/Harrison combination, the imaged **document** is a *check*. EX1003-Garcia, 1:6-13, 4:11-18; *see also* §X.A.1.a. As discussed above, Luo/Harrison also teaches *the check in the field of view of the camera*. *See* §X.A.2.d; EX1002-Decl., ¶171.

Luo further discloses *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:

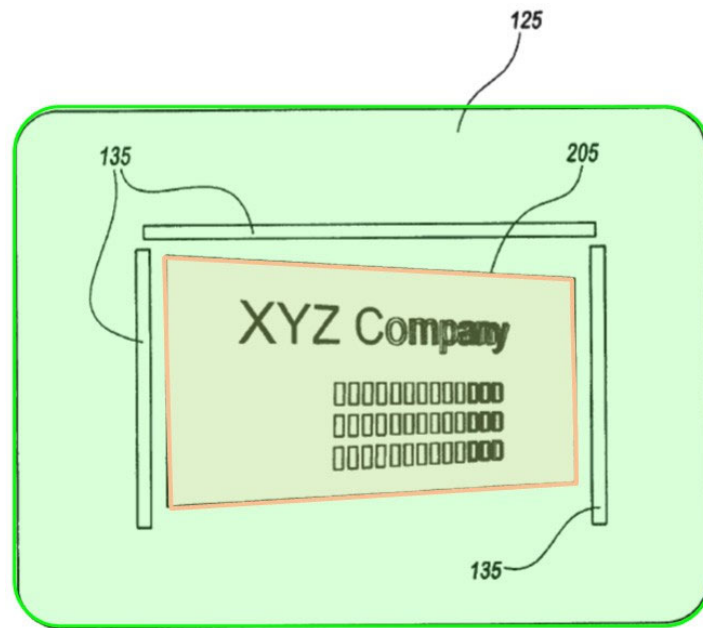


Fig. 5

EX1004-Luo, Fig.5. Luo's projected **reference lines** are an **alignment guide** because they represent shapes or indicators for **guiding alignment**. EX1002-Decl., ¶¶172-73.

f. Claims 1[e]/8[d]/11[d]

Garcia/Luo/Harrison disclose *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., ¶174.

The Garcia/Luo/Harrison combination discloses displaying *live video of the check in the field of view of the camera*. §§X.A.1.a., X.A.2.d; EX1002-Decl., ¶175.

As shown below, Luo further discloses *monitoring...with respect to a monitoring criterion* by monitoring whether the “**straight edge 205**” of an object “displayed **in the preview window 125** is substantially parallel to the corresponding

reference line 135” and “only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135 can the image of the object be captured.” EX1004-Luo, Abstract, 5-7. As Luo explains, waiting for alignment with the reference lines reduces the amount of “projective distortion” and blurriness, thereby improving accuracy of OCR. *Id.*, 5, 7.

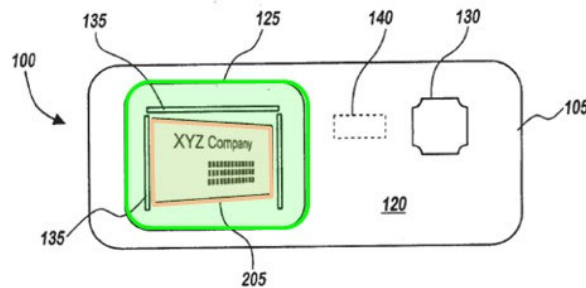


Fig. 2

Id., Fig.2, EX1002-Decl., ¶¶176-78.

g. Claims 1[f]/4[f]/8[e]/11[e]

Garcia/Luo/Harrison disclose *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., ¶179.

The Garcia/Luo/Harrison combination discloses *monitoring a video frame of the live video of the check for a monitoring criterion*. §§X.A.1.a, X.A.2.d, X.A.2.f; EX1002-Decl., ¶180.

Luo further discloses “*automatically captur[ing]*” the image (*i.e.*, a video frame from the camera) “when the straight edge 205 displayed on the preview

window 125 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 further operation of **straight edge**), claims 3, 10; EX1002-Decl., ¶¶181-83.

h. Claims 1[g]/4[g]/8[f]/11[f]

Garcia/Luo/Harrison/Cohen disclose *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., ¶184.

As discussed in §X.A.2.g, Garcia/Luo/Harrison discloses *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*. EX1002-Decl., ¶185.

Garcia/Luo/Cohen each further disclose *providing feedback advising the user that the check has been captured*. For example, as noted in §X.A.2.c, Luo discloses 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 depicted in the **preview window** 125,” 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 would provide feedback that the image has been captured. Luo also discloses “the system 100 provides the user with an image

of a captured object” after the monitoring criterion is satisfied. *Id.*, 8. Garcia further discloses making the image of the check available to the user. EX1003-Garcia, 6:6-7, 8:8-11, 11:15-19, 15:6-7. Similarly, Cohen discloses displaying a check image after capture. EX1006-Cohen, [0072], [0078], [0092]. Each of these disclosures provides feedback that an image has been captured. EX1002-Decl., ¶¶186-91.

i. Claims 1[h]/8[g]/11[g]

Garcia/Luo/Harrison disclose *using a wireless network* (e.g., Garcia’s communications 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.* EX1002-Decl., ¶192.

As discussed in §X.A.2.g, the Garcia/Luo/Harrison combination *automatically captures a video frame* corresponding to the *image of the check*. Garcia further discloses 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., ¶193.

Garcia further discloses *transmitting* the “digital [check] image” over a “mobile telephone communications network, for example a GSM/GPRS network.” EX1003-Garcia, 11:20-12:3; *see also id.*, 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 *wireless networks*. EX1002-Decl., ¶188. 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.*, 4:14-15, 7:20-21, 16:19-20; EX1002-Decl., ¶¶194-96.

j. Claims 1[i]/4[i]/8[h]/11[h]

Garcia/Cohen disclose *[before the submitting,]* 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., ¶197.

Garcia discloses that the **banking institution** has equipment necessary for “recognizing, verifying and processing” the check image sent by the user, which includes 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.” *Id.*, 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 guarantee the appropriate funds are withdrawn from the correct bank account. EX1041-559-FWD, 43-44; EX1010-598-FWD, 44, 51-52; EX1047-136-FWD, 28-30; EX1002-Decl., ¶198.

Garcia also discloses “verifying” and “validating” the 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 various data, such as the legal amount and/or courtesy amount read from the check and the amount entered by the user to ensure the correct deposit amount. Indeed, comparing such amounts was well known at the time. EX1049-Gustin, [0005], [0017], [0028], [0211]-[0213], claims 14, 36; EX1002-Decl., ¶¶199-201.

Cohen also discloses performing “**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 discloses 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*.⁹ *Id.*, [0022], Fig.2; EX1002-Decl., ¶¶202-03.

⁹ This is consistent with how the ’414 patent describes this process, which involves “determin[ing] whether the...amount payable, and the like may be readable such that it may be parsed...and processed.” EX1001-USP414, 5:10-13.

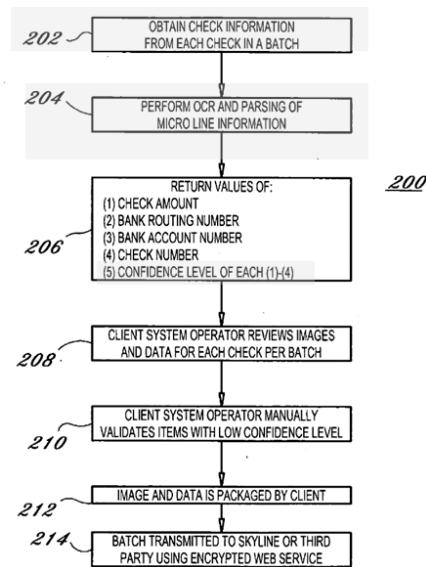


FIG. 2

Id., Fig.2; EX1002-Decl., ¶203.

Cohen discloses 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 a deposit can go forward successfully. EX1006-Cohen, [0022], [0043]-[0044], [0077]-[0088], [0093], Fig. 2. Second, consistent with the '414 patent's disclosure of seeking user confirmation (EX1001-USP414, 12:61-67, claims 1, 4, 8, 11), Cohen also displays the image, information read therefrom, and confidence levels to a user, who then approves (*i.e., confirms*) the deposit. EX1006-Cohen, [0022], [0043]-[0044], [0077]-[0088], [0093], Fig.2. Finally, the deposit only goes forward after the operator chooses to upload a batch. *Id.*, [0044]; EX1002-Decl., ¶¶204-06.

As discussed in §X.A.1.b, a POSITA would have found it obvious to perform processing, which would include Garcia’s/Cohen’s OCR, **MICR** recognition, and amount validation on the user’s device or on the server. Performing such processing on the user’s device would therefore be accomplished *before submitting*¹⁰ the check image for deposit. As discussed in more detail in §X.A.2.1, Cohen discloses displaying the information read from the check image to the user *before submitting* for deposit. Thus, even when performed on the server, the processing would be accomplished *before submitting* the final image and deposit information for deposit. EX1002-Decl., ¶¶207-08.

k. Claims 1[j]

Garcia/Cohen disclose *receiving the digital image of the check transmitted by the user’s mobile device*. EX1002-Decl., ¶209.

As discussed in §X.A.2.i, 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. 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-

¹⁰ The “before the submitting” requirement only appears in limitations 1[i], 8[h], and 11[h].

22. Moreover, Cohen discloses *transmitting* the check image to a **financial institution**. EX1006-Cohen, [0005], [0008], [0019], [0036], claims 1, 13, 17; EX1002-Decl., ¶¶210-12.

I. Claims 1[k]

Garcia/Harrison/Cohen disclose *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, wherein the app, when downloaded and executed by the user’s mobile device, is configured to cause the user’s mobile device to perform additional operations* (e.g., Harrison’s downloadable application) *including receiving an indication of a result of the processing before confirming that the mobile check deposit can go forward* (e.g., Cohen’s displayed information). EX1002-Decl., ¶213.

As discussed in §X.A.2.j, Garcia/Cohen disclose various *processing* steps, *including performing [OCR] on the check in the digital image*. Garcia further discloses “*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 disclose or render obvious *verifying that the digital image of the check is acceptable for mobile check deposit*. EX1041-559-FWD, 48-51. Moreover, as discussed in §X.A.2.m, Cohen discloses

“verif[ying]” information including “images” of the check, for example 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., ¶¶214-16.

As discussed in §§X.A.1.b and X.A.2.j, it would have been obvious to perform these processing steps either on the **mobile device** or at the **institution**. Moreover, as discussed in §X.A.2.j, Cohen discloses 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*—from either its own internal processing or the remote server—*before* the user can *confirm* that the information is acceptable. EX1002-Decl., ¶¶217-18.

Finally, as discussed in §§X.A.1.a and X.A.2.b-X.A.2.j, Harrison discloses that the *downloaded app* that is *executed by the user’s mobile device* and *causes the user’s mobile device to perform additional operations*, such as those described with reference to limitations 1[b]-1[i]. In the combination with Cohen, the downloaded application would also receive the indication of the result of processing in order to then display the image, recognized data, and confidence levels to the user. EX1002-Decl., ¶¶218-19.

m. Claims 1[l]/4[j]/8[i]/11[j]

Garcia/Cohen disclose *updating, by a [bank] computer, 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]* (e.g., a method of check processing (Cohen)). EX1002-Decl., ¶220.

As discussed in §§X.A.2.i-X.A.2.j and X.A.2.l, the Garcia/Cohen combination discloses *confirming, verifying, and submitting* steps. Garcia further discloses 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 in question 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; EX1002-Decl., ¶¶220-23.

n. Claims 4[a]

Garcia/Luo/Harrison disclose *monitoring a live video of a check in a field of view of a camera with respect to at least one monitoring criterion, wherein the live video is generated by a mobile device of a user, the user's mobile device including the camera and a downloaded app, the downloaded app associated with a bank to*

control check deposit by controlling the camera, the downloaded app, when executed by the user's mobile device, being configured to cause the user's mobile device to perform operations comprising. See §§X.A.2.b (downloaded app on mobile device), X.A.2.d (live video of a check), X.A.2.f (monitoring live video with respect to a monitoring criterion). EX1002-Decl., ¶¶224-28.

o. Claims 4[e]

Garcia/Luo/Harrison disclose using a wireless network, submitting the check for mobile check deposit in the bank after a frame of the live video of the check in the field of view of the camera is automatically captured. See §§X.A.2.i (submitting using wireless network), X.A.2.f-X.A.2.h (monitoring/automatically capturing live video). EX1002-Decl., ¶¶229-32.

p. Claims 4[h]

Garcia/Cohen disclose processing a 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, the digital image of the check being the captured video frame or being based on the captured video frame. See §§X.A.2.1 (image processing), X.A.2.h (captured video frame); EX1002-Decl., ¶¶233-36.

q. Claims 11[a]

Garcia/Harrison/Cohen disclose receiving an image of a check, wherein the image of the check is provided for mobile check deposit in a bank by a mobile device

of a user, the user's mobile device including a camera and a memory storing a software abstraction layer and a downloaded app, the downloaded app associated with the bank to control check deposit by controlling the camera through the software abstraction layer, and the downloaded app, when executed by the user's mobile device, being configured to cause the user's mobile device to perform operations comprising. See §§X.A.2.b (downloaded app for controlling camera), X.A.2.i (transmitting a digital image of the check for mobile check deposit in a bank), X.A.2.k (receiving the digital image); EX1002-Decl., ¶¶237-40.

r. Claims 11[i]

Garcia/Cohen disclose performing image processing operations on the 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. See §§X.A.2.i (transmitting image), X.A.2.l (image processing); EX1002-Decl., ¶¶241-44.

3. Dependent Claims 2, 3, 5, 6, 7, 9, 10, 12

a. Claims 2, 9

Garcia/Luo/Harrison discloses wherein the digital image is a modified version of the captured video frame. For example, Garcia encrypts the image and other data

pre-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.i (transmitting video frame); EX1002-Decl., ¶¶245-47.

b. Claims 3, 7, 10, 12

Garcia discloses *wherein the wireless network is a cellular network*. Garcia discloses *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., ¶¶248-51.

c. Claims 5-6

Garcia/Luo/Harrison/Cohen discloses *one or more of one or more computers, remote from the user’s mobile device, performs the monitoring, the determining, or both the monitoring and the determining, and wherein the one or more computers include the bank computer*. EX1002-Decl., ¶¶252-54. As discussed above, Garcia/Luo/Harrison disclose monitoring a live video of the check with respect to at least one monitoring criterion and determining that a video frame of the live video of the check satisfies the at least one monitoring criterion. *See* §§X.A.2.f-g. A POSITA would have known that performing image processing either on the **mobile**

device or at the remote institution was a well-understood design choice in the art. EX1002-Decl., ¶¶253; 135-39.

Garcia/Luo/Harrison/Cohen also disclose *the downloaded app, when executed by the user's mobile device, is configured to cause the user's mobile device to perform additional operations comprising transmitting, using the wireless network, the live video of the check in the field of view of the camera*. EX1002-Decl., ¶¶255-58. Harrison teaches that operations performed by the **mobile device**, including generating a live video, would be performed by the downloaded application using APIs and software architecture. EX1005-Harrison, 699, 702-703. Garcia teaches transmitting the digital image and the recognition data from the **mobile device** to the receiving institution over a “mobile telephone communications network, for example a GSM/GPRS network.” EX1003-Garcia, 6:3-5, 10:16-18, 11:20-12:3; EX1002-Decl., ¶256. A POSITA would have found it obvious for the downloaded application to transmit the live video of the check over the wireless network to the remote institution for such processing, where Garcia already teaches transmitting check image data from the mobile device over a wireless network to the receiving institution for processing. EX1002-Decl., ¶257.

B. Ground II: Claims 2 and 9 are Obvious Over Garcia with Luo/Harrison/Cohen/Randle

Garcia/Luo/Harrison/Randle render obvious *wherein the digital image is a modified version of the captured video frame*. EX1002-Dec1., ¶259.

As §X.A.3.a details, Garcia discloses 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/Harrison, such converted image would be a *modified version of the captured video frame*. EX1002-Dec1., ¶¶260-62.

A POSITA would have found it obvious to combine Garcia/Luo/Harrison and Randle to incorporate Randle’s teaching to modify the check image. **First**, like Garcia, Randle is analogous art 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., ¶¶263-65.

Second, a POSITA would have been motivated to implement Randle’s image conversion process in Garcia’s **mobile device**. Randle itself discloses 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* §X.A.2.f) 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* §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., ¶¶266-67.

In addition, a POSITA would have been 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., ¶¶268-69.

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 §X.A.1.b details, Garcia assumes a POSITA could implement check image processing details like those in Randle, including image conversion. EX1048-Randle, [0043]. This is consistent with the ubiquity of converting (binarizing) **mobile-device**-captured images before performing OCR. Randle's QA, including conversion, can be performed "at any point in processing." *Id.*, [0014], Fig.4; EX1002-Decl., ¶¶270-73.

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

C. Ground III: Claims 5-6 are Obvious Over Garcia with Luo/Harrison/Cohen/Gausemeier

As discussed in §X.A.2, Garcia/Luo/Harrison/Cohen render obvious the limitations of independent claim 4, from which claims 5 and 6 depend.

Garcia/Luo/Harrison/Cohen in further combination with Gausemeier likewise render obvious claims 5 and 6.

A POSITA would have found it obvious to combine Garcia/Luo/Harrison/Cohen and Gausemeier to incorporate Gausemeier's teaching to transmit a live video stream from a mobile device to a remote server for processing. **First**, Gausemeier is analogous art because it is in the same field as the Challenged Claims—capturing and processing images using a **camera** on a **mobile device**. EX1082-Gausemeier, 133-34 (disclosing a “hardware and software system for a mobile personal digital assistant” in which an “integrated camera takes the live video images and the AR-PDA sends the video stream by mobile radiocommunication (e.g. UMTS) to the ARserver” for processing). EX1002-Decl., ¶¶273-76.

Second, a POSITA would have been motivated to implement Gausemeier's teaching to transmit a live video stream from the **mobile device** for server-side processing to the Garcia/Luo/Harrison/Cohen system. Gausemeier itself discloses the benefits of transmitting the video stream to the server for processing, explaining that mobile devices of the era could not perform such CPU-intensive image processing tasks, and that a client/server architecture was the known solution: “[t]oday's [*sic*] clients are not able to achieve the requirements for the CPU-intensive data processing.... Therefore the client primarily displays data and receives user interactions. The server is responsible for the intensive computing in the field of image recognition, image

processing and optical tracking. It receives the video data from the client via wireless broadband connection.” EX1082-Gausemeier, 134. This motivation would have been particularly applicable to Garcia’s mobile check deposit system, allowing the **mobile device** to offload the computationally intensive monitoring tasks described in Luo (e.g., determining whether the document edges are aligned with reference lines) and the image processing tasks (e.g., OCR, MICR recognition) to a server reducing the processing burden on the mobile device while leveraging the superior processing capabilities at Garcia’s receiving institution. EX1002-Decl., ¶¶277-78.

Further, Garcia already teaches transmitting images from the **mobile device** to the receiving **financial institution**. EX1003-Garcia, 6:3-5, 11:7-15, 12:17-22. A POSITA would have known that performing image processing either on the mobile device or at the remote institution was a well-understood design choice in the art. EX1002-Decl., ¶¶279, 253; 135-39. A POSITA would have been motivated to modify Garcia’s existing transmission architecture to transmit the live video stream from the mobile device to the receiving financial institution. EX1002-Decl., ¶279.

Third, a POSITA would have had a reasonable expectation of success in combining Garcia’s system with Gausemeier’s teachings. Like Garcia, Gausemeier teaches capturing images via a mobile device and transmitting image data from a mobile device to a remote server (EX1082-Gausemeier, 133-34; EX1003 6:3-5,

11:7-12:3), which suggests the teaching from one reference would have been applicable to the others. EX1002-Decl., ¶280.

Further, Gausemeier already discloses a working prototype that successfully transmits live video from a mobile device equipped with a camera to a server for real-time image processing and object recognition. EX1082-Gausemeier, 138; EX1002-Decl., ¶¶281-82. Gausemeier also mentions that its design is adaptable to split processing between the mobile device and the server. EX1082-Gausemeier, 134 (The scalable design of the whole architecture stays abreast of changes in the development of future mobile devices. So tasks could be distributed flexible between client and server.”); EX1002-Decl., ¶¶281-82.

1. Claim 5

The combination of Garcia/Luo/Harrison/Cohen/Gausemeier renders obvious *the method of claim 4, wherein one or more of one or more computers, remote from the user’s mobile device, performs the monitoring, the determining, or both the monitoring and the determining, and wherein the one or more computers include the bank computer.*

As §§X.A.2.f-g details, Garcia/Luo/Harrison teaches monitoring a live video of the check with respect to at least one monitoring criterion and determining that a video frame of the live video of the check satisfies the “at least one monitoring criterion.” Gausemeier expressly teaches that “[t]he server is responsible for the

intensive computing in the field of image recognition, image processing and optical tracking. It receives the video data from the client via wireless broadband connection.” EX1082-Gausemeier, 134. In Gausemeier, the server is remote from the user’s mobile device and performs analysis on the video it receives from the user’s mobile device. *See id.* 133, EX1002-Decl., ¶¶285-86. In combination with Garcia/Luo/Harrison/Cohen, the monitoring and/or determining steps would be performed on a computer remote from the user’s mobile device. EX1002-Decl., ¶¶284-87.

2. Claim 6

The combination of Garcia/Luo/Harrison/Cohen/Gausemeier renders obvious “the method of claim 5, wherein the downloaded app, when executed by the user’s mobile device, is configured to cause the user’s mobile device to perform additional operations comprising transmitting, using the wireless network, the live video of the check in the field of view of the camera.” Gausemeier teaches that the live video stream is transmitted from the mobile device to the server “via wireless broadband connection,” such as “TCP/IP over wireless LAN (IEEE802.11b).” EX1082-Gausemeier, 134; EX1002-Decl., ¶¶288-91.

Further, as §§X.A.2.b, X.A.3.c details, Harrison teaches that operations performed by the mobile device, including generating a live video, would be performed by the downloaded application using APIs and software architecture.

EX1005-Harrison, 699, 702-03. Garcia teaches transmitting the digital image and the recognition data from the mobile device to the receiving institution over a “mobile telephone communications network.” EX1003-Garcia, 6:3-5, 10:16-18, 11:20-12:3; EX1002-Decl., ¶256. A POSITA would have found it obvious for the downloaded application to transmit the live video of the check over the wireless network to the remote institution for such processing, where Garcia already teaches transmitting check image data from the mobile device over a wireless network to the receiving institution for processing. EX1002-Decl., ¶257. In the Garcia/Luo/Harrison/Cohen/Gausemeier combination, the downloaded application would use these APIs to generate the live video and then transmit that live video over the wireless network to the remote server for processing, consistent with Gausemeier’s teachings. EX1002-Decl., ¶¶290-91.

D. Ground IV: Claims 1-12 are Obvious Over Garcia with Luo/Goyal/Cohen

1. Garcia/Luo/Goyal/Cohen

As discussed in §X.A, Garcia/Luo/Harrison/Cohen render claims 1-12 obvious. For similar reasons, the Garcia/Luo/Goyal/Cohen combination renders claims 1-12 obvious. EX1002-Decl., ¶¶292-95.

a. Garcia in view of Luo and Goyal

First, like Garcia/Luo, Goyal is analogous art 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., ¶296.

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 method and Luo’s monitoring criteria and auto-capture approach for the same reasons discussed in §X.A.1.a with respect to Harrison. Like Harrison, Goyal discloses a downloaded application and APIs for controlling **mobile device cameras**, which a POSITA would have understood as the software components needed to implement Garcia’s mobile check deposit method/Luo’s images capturing method. Accordingly, a POSITA would have been motivated to apply teachings from the prior art like Goyal to fill in implementation details in the Garcia/Luo combination. EX1002-Decl., ¶297.

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 full 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 that such applications can “capture snapshots

or full videos.” *Id.*, 1, 66-67, 127. To that end, Goyal discloses when the MMAPI is implemented on a device, the developers are “in full control of the [device’s] capabilities that it wants enabled and can do so with a single API interface” such as the camera. *Id.*, 127; *see also id.*, 12, 128-30, 174-79 (summarizing “MMAPIs”). Indeed, Goyal refers to video APIs as MMAPI’s “biggest advantage.” *Id.*, 127; EX1002-Decl., ¶¶298-99.

A POSITA would have been motivated to implement the Garcia/Luo combination with Goyal’s downloadable application and camera APIs. By the mid-2000s, mobile applications were becoming increasingly popular, including those that accessed camera functionality. *See* §§V.C-V.D; EX1008-Goyal, 1, 3, 6, 127, 174, back cover. As detailed in §X.A.1.a, downloaded applications provide numerous benefits. Downloaded applications also facilitate access to device features like the camera 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. Indeed, Java ME was the mobile equivalent to the well-known Java environment for downloaded desktop applications. EX1002-Decl., ¶¶300-03.

A POSITA would have been motivated to look to guides like Goyal to implement the teachings of Garcia and Luo on a mobile platform, like Java ME. In the Garcia/Luo/Goyal combination, 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 numerous other implementation details, such as how to initialize the **camera** and control its settings. *See, e.g.*, EX1008-Goyal, 1, 13-14, 174-79, 253; EX1002-Decl., ¶304.

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. at 416; EX1002-Decl., ¶305.

Third, the similarity between the references and the teachings therein would have led a POSITA to reasonably expect success in implementing the Garcia/Luo combination 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., ¶306.

Regarding the references themselves, Garcia discloses 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 confirms 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 (stating “[a] number of Windows Mobile 5.0 APIs (for example, SHCameraCapture) make it trivial for a mobile application developer to

access a **camera**").¹¹ Moreover, Goyal discloses 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 for a POSITA to combine the teachings of Garcia with Luo and Goyal to incorporate into Garcia Luo's and Goyal's teachings regarding monitoring, monitoring criterion, capturing the image when the image passes the monitoring criterion, feedback to a user, and a software application for download to Garcia's mobile check deposit method that incorporates a **camera**. EX1002-Dec1., ¶¶307-08.

Finally, the Board has already found 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 the combination of Garcia with another prior art disclosure regarding downloaded applications similar to Goyal (EX1010-598-FWD, 20-25). The Garcia/Luo/Goyal combination would have been obvious for the same reasons.

b. Garcia in view of Cohen

¹¹ The '414 patent similarly assumes a POSITA would understand how to implement the claimed image capture process and software architecture. *See, supra*, n.7.

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 §X.A.1.b. EX1002-Decl., ¶309.

2. Claims 1-12

a. Goyal Renders Obvious a Downloaded Application (limitations 1[a]/1[c]/1[k]/4[a]/4[c]/8[a]/8[c]/11[a]/11[c])

As discussed in §§X.A.2.b, X.A.2.d, X.A.2.l, X.A.2.n, and X.A.2.q, Goyal renders obvious the use of a downloaded application. Goyal renders these limitations obvious for similar reasons. EX1002-Decl., ¶310.

As discussed in §X.A.2.b, 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., ¶311.

First, Goyal discloses 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* §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 for new software. EX1002-Decl., ¶¶312-13.

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 described above, a POSITA would have found it obvious to use this well-known and common way for installing an application on a **mobile device**. *See* §X.D.1.a; EX1002-Decl., ¶¶314-15.

In the Garcia/Goyal combination, the application would be *provid[ed]* by and *associated with a bank* for the same reasons discussed in §§X.A.2.b, X.A.2.n. *Id.*; *see also* EX1003-Garcia, 4:1-8; EX1002-Decl., ¶315.

b. Goyal Renders Obvious a Software Abstraction Layer that Controls a Device Camera (limitations 1[a]/1[c]/4[c]/8[a]/8[c]/11[a]/11[c])

As discussed in §§X.A.2.b, X.A.2.d, X.A.2.q, Harrison 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., ¶316.

Goyal further discloses that a downloadable application can use an API (*software abstraction layer*) of the **mobile device** “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. Goyal discloses that developers can use the Canvas and CaptureVideoCanvas APIs “to display the video through the viewfinder to the user.” *Id.*, 174. Goyal discloses another API (`getSnapshot`) that can capture a snapshot from the displayed video. *Id.*, 174, 178, 191. Therefore, Goyal’s APIs and associated software, *when executed, cause[s] the user’s mobile device to perform operations*, such as control “the exposure, the flash, focus, zoom, and burst shooting of snapshots” and “shutter control, **camera** rotation...” EX1008-Goyal, 253. In combination with Garcia/Luo/Cohen, the software would perform additional operations. §§X.D.2.a-X.D.2.b; §X.D.1; EX1002-Decl., ¶¶317-19.

In the combination with Goyal, the image capture and processing steps described below with reference to limitations 1[b]-1[i] would have been performed by the downloaded application. EX1002-Decl., ¶320.

**c. Goyal Renders Obvious Live Video Frames
(limitations 1[pre]/1[c]-1[h]/2/4[pre]/4[a]/4[c]-
4[h]/8[pre]/8[c]-8[g]/9/11[pre]/11[c]-11[g])**

As discussed in §§X.A.2.a, X.A.2.d-X.A.2.i, X.A.2.n, X.A.2.p, Harrison renders obvious live video frames. Goyal renders these limitations obvious for similar reasons. EX1002-Decl., ¶321.

As discussed in §X.D.2.b, Goyal discloses “previewing video” before capturing an image. EX1008-Goyal, 174; *see also id.*, 13-14, 66, 175-79, 191. A POSITA would have understood “viewfinder” to display live video. EX1002-Decl., ¶322. 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; §X.D.2.b; EX1002-Decl., ¶¶322-23.

As also discussed in §X.D.2.b, Goyal further discloses 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 discloses capturing an image/frame from the video displayed on a viewfinder. *Id.*, 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., ¶¶323-24.

Goyal therefore teaches or renders obvious limitations in the Challenged Claims that require the use of live video frames for similar reasons that Harrison teaches or renders obvious such limitations. EX1002-Decl., ¶325.

d. Additional Limitations

A POSITA would have found the remaining limitations in claims 1-12 obvious in view of Garcia/Luo/Goyal/Cohen for the same reasons discussed in §§X.A.2.c, X.A.2.j, X.A.2.k, X.A.2.m, X.A.2.r, and X.A.3; EX1002-Decl., ¶326.

E. Ground V: Claims 2 and 9 are Obvious Over Garcia with Luo/Goyal/Cohen/Randle

As discussed in §X.B, Garcia/Luo/Harrison/Cohen in view of Randle render obvious claims 2 and 9. For similar reasons, the Garcia/Luo/Goyal/Cohen combination in view of Randle renders claims 2 and 9 obvious. EX1002-Decl., ¶327.

F. Ground VI: Claims 5-6 are Obvious Over Garcia with Luo/Goyal/Cohen/Gausemeier

As discussed in §X.C, Garcia/Luo/Harrison/Cohen in view of Gausemeier render obvious claims 5 and 6. For similar reasons, the Garcia/Luo/Goyal/Cohen combination in view of Gausemeier renders claims 5 and 6 obvious. EX1002-Decl., ¶328.

XI. FEES

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

XII. CONCLUSION

For the reasons set forth above, Petitioner respectfully requests institution of an *inter partes* review to cancel claims 1-12 of the '414 patent.

Respectfully submitted,

Date: August 7, 2026
Williams & Connolly LLP
680 Maine Avenue, S.W.
Washington, DC 20024
(202) 434-5000

/Aaron Maurer/
Aaron Maurer
Attorney for Petitioner
Registration No. 44,911

CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing Petition for *Inter Partes* Review, contains 13,927 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
Attorney for Petitioner
Registration 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. 12,505,414, including all exhibits (Nos. 1001-1087) and related documents, are being served via Federal Express on the 7th day of August, 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
8607 Westwood Center Drive, Suite 270
Tysons, VA 22182

The same materials were sent via electronic means to the email addresses specified for electronic service in Patent Owner's mandatory notices in IPR2026-00277 and IPR2026-00279:

USAA-IPRs@irell.com
USAA-IPRs@carmichaelip.com

DATE: August 7, 2026.

/Aaron Maurer/
Aaron Maurer

U.S. Patent No. 12,505,414
Petition for *Inter Partes* Review

Reg. No. 44,911
Williams & Connolly LLP
680 Maine Avenue S.W.
Washington, DC 20024
Telephone: (202) 434-5000
Facsimile: (202) 434-5029

LISTING OF CLAIMS

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

1[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 through the software abstraction layer;
1[d]	overlaying an alignment guide on the live video of the check in the field of view of the camera;
1[e]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
1[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;
1[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;

1[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, wherein the digital image is the captured video frame or is based on the captured video frame; and
1[i]	before the submitting, 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[j]	receiving the digital image of the check transmitted by the user's mobile device;
1[k]	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, wherein the app, when downloaded and executed by the user's mobile device, is configured to cause the

	user's mobile device to perform additional operations including receiving an indication of a result of the processing before confirming that the mobile check deposit can go forward; and
1[1]	updating, by a computer, 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.

Claim 2

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

Claim 3

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

Claim 4	
Limitation	Claim Language
4[pre]	A method enabling mobile check deposit auto-capture functionality via video frame processing, the method comprising:
4[a]	monitoring a live video of a check in a field of view of a camera with respect to at least one monitoring criterion, wherein the live video is generated by a mobile device of a user, the user's mobile device including the camera and a downloaded app, the downloaded app associated with a bank to control check deposit by controlling the camera, the downloaded app, when executed by the user's mobile device, being configured to cause the user's mobile device to perform operations comprising:
4[b]	providing instructions to the user for capturing an image of the check;
4[c]	generating the live video of the check in the field of view of the camera, the downloaded app causing the live video to be generated by controlling the camera;

4[d]	overlaying an alignment guide on the live video of the check in the field of view of the camera; and
4[e]	using a wireless network, submitting the check for mobile check deposit in the bank after a frame of the live video of the check in the field of view of the camera is automatically captured;
4[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;
4[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;

4[h]	processing a 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, the digital image of the check being the captured video frame or being based on the captured video frame;
4[i]	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
4[j]	updating, by a bank computer, 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;
--	---

Claim 5

The method of claim 4, wherein one or more of one or more computers, remote from the user's mobile device, performs the monitoring, the determining, or both the monitoring and the determining, and wherein the one or more computers include the bank computer.

Claim 6

The method of claim 5, wherein the downloaded app, when executed by the user's mobile device, is configured to cause the user's mobile device to perform additional operations comprising transmitting, using the wireless network, the live video of the check in the field of view of the camera.

Claim 7

The method of claim 4, wherein the wireless network is a cellular network.

Claim 8	
Limitation	Claim Language
8[pre]	A method enabling mobile check deposit auto-capture functionality via video frame processing, the method comprising:
8[a]	providing an app for download to a mobile device of a user, the user's mobile device including a camera and a memory storing a software abstraction layer, the app associated with a bank to control check deposit by controlling the camera through the software abstraction layer, wherein the app, when downloaded to the user's mobile device and executed by the user's mobile device, is configured to cause the user's mobile device to perform operations comprising:
8[b]	providing instructions to the user for capturing an image of a check;
8[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 through the software abstraction layer;

8[d]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
8[e]	determining that a video frame of the live video of the check satisfies the at least one monitoring criterion and the automatically capturing the video frame;
8[f]	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;
8[g]	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

8[h]	before the submitting, 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
8[i]	updating, by a computer, 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.

Claim 9

The method of claim 8, wherein the digital image is a modified version of the captured video frame.

Claim 10

The method of claim 8, wherein the wireless network is a cellular network.

Claim 11	
Limitation	Claim Language
11[pre]	A method enabling mobile check deposit auto-capture functionality via video frame processing, the method comprising:
11[a]	receiving an image of a check, wherein the image of the check is provided for mobile check deposit in a bank by a mobile device of a user, the user's mobile device including a camera and a memory storing a software abstraction layer and a downloaded app, the downloaded app associated with the bank to control check deposit by controlling the camera through the software abstraction layer, and the downloaded app, when executed by the user's mobile device, being configured to cause the user's mobile device to perform operations comprising:
11[b]	providing instructions to the user for capturing the check;

11[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 through the software abstraction layer;
11[d]	monitoring the live video of the check in the field of view of the camera with respect to at least one monitoring criterion;
11[e]	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;
11[f]	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;
11[g]	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

11[h]	before the submitting, 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;
11[i]	performing image processing operations on the 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

11[j]	updating, by a computer, 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 12

The method of claim 11, wherein the wireless network is a cellular network.

TABLE OF EXHIBITS

Exhibit Number	Description
1001	U.S. Patent No. 12,505,414 (“USP414”)
1002	Declaration and <i>Curriculum vitae</i> of John. C. Hart, PhD
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”)
1005	Selected Chapters from Richard Harrison and Mark Shackman et al., <i>Symbian OS C++ for Mobile Phones</i> , vol. 3 (2007) (“Harrison”)
1006	U.S. Patent Application Publication No. 2007/0194102 (“Cohen”)
1007	U.S. Patent Application Publication No. 2007/0262148 (“Yoon”)
1008	Selected Pages from Goyal, Vikram, Pro Java ME MMAPi: Mobile Media API for Java Micro Edition, June 14, 2006 (“Goyal”)
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”)
1013	“FDIC: Check Clearing for the 21st Century Act (Check 21),” FED. DEPOSIT INS. CORP., Apr. 25, 2016 (retrieved from https://web.archive.org/web/20161005124304/https://www.fdic.gov/consumers/assistance/protection/check21.html) (“FDIC”)
1014	EP Patent Publication No. 0984410 (“Slater”)
1015	Whitney et al., <i>Reserve Banks to Adopt DSTU X9.37-2003 Format for Check 21 Image Services</i> (May 18, 2004) (retrieved from https://web.archive.org/web/20040609221704/http://www.frb-services.org/Retail/pdf/PRFormatForCheck21ImageSvcs.pdf) (“DSTU”)
1016	Excerpts from Motomanual MotoRokr™ E6 GSM, 2006, https://motorola.manymanuals.com/mobile-phones/e6/user-manual-8407 (“MotoRokr-Manual”)
1017	U.S. Patent No. 8,768,836 (“Acharya”)
1018	U.S. Patent No. 8,290,237 (“Burks”)
1019	Parikh, Tapan S., <i>Using Mobile Phones for Secure, Distributed Document Processing in the Developing World</i> , 4 IEEE PERVASIVE COMPUTING 74 (2005) (“Parikh”)

1020	Bruno-Britz, Maria, “Mitek Launches Mobile Phone Check Capture Solution,” Bank Systems and Technology Information Week (Jan. 24, 2008), available at https://www.banktech.com/payments/mitek-launches-mobile-phone-check-capture-solution/d/d-id/1291677.html (“Bruno-Britz”)
1021	Mitek Systems, “ImageNet Mobile Deposit,” presented at “FSTC’s 2008 Annual Conference” (June 2008), available at https://slideplayer.com/slide/9438811/ (“Mitek”)
1022	Bruene, Jim, <i>WV United Federal Credit Union is First with iPhone-based Remote Check Scan & Deposit</i> (July 12, 2009), available at https://finovate.com/wv_united_federal_credit_union_is_first_with_i_phone-based_remote_check_scan_deposit/ (“Bruene”)
1023	Edwards, Benj, <i>The Golden Age of PDAs</i> , PC MAG (Nov. 20, 2018), https://www.pcmag.com/news/the-golden-age-of-pdas (“Edwards”)
1024	Rajeswari, S., <i>An Overview of Handwriting Recognition Systems</i> , 12 MIDDLE-EAST J SCI. RSCH., 1861 (2012) (“Rajeswari”)
1025	Slocombe, Mike, <i>O2 Xda Exec Mobile PDA With 3G Launched</i> (Sept. 13, 2005), available at https://digital-lifestyles.info/2005/09/13/o2-xda-exec-mobile-pda-with-3g-launched/ (“Slocombe”)
1026	Press Release, <i>Apple Reinvents the Phone with iPhone</i> (Jan. 9, 2007), https://www.apple.com/newsroom/2007/01/09Apple-Reinvents-the-Phone-with-iPhone/ (“Apple”)
1027	EveryiPhone.com, <i>Apple iPhone (Original/1st Gen/EDGE) 4, 8, 16 GB Specs</i> (Oct. 6, 2011), available at https://web.archive.org/web/20111006045037/https://everymac.com/systems/apple/iphone/specs/apple-iphone-specs.html (“EveryiPhone”)
1028	Nokia Nseries, “Nokia N93 Technical Specifications” (Aug. 31, 2006), available at https://web.archive.org/web/20060831125141/http://www.nseries.com/nseries/v2/media/product/tech_specs/en-US/tech_specs_n93_en_US.html?lang=en&country=US (“Nokia”)
1029	Graham, Jefferson, <i>App Store for iPhone Already a Hit with Developers</i> (July 9, 2008), available at https://web.archive.org/web/20080710230711/https://www.usatoday.com/money/industries/technology/2008-07-09-apple-apps-store-iphone-ipod_N.htm (“Graham”)

1030	Aiello, Marco, “Introduction to Symbian OS” (2005), available at https://dsg.tuwien.ac.at/Teaching/Courses/symbian/SymbianOS.pdf (“Aiello”)
1031	Raento, Mika et al., <i>ContextPhone: A Prototyping Platform for Context-Aware Mobile Applications</i> , 4 IEEE PERVASIVE COMPUTING 51 (2005) (“Raento”)
1032	Patrick, Beau, Dylan Austin, & Charles O. Connor, <i>The Effect of Smartphone on the Society</i> , 4 IDOSR J. COMP. & APPLIED SCI, at 2 (2019) (“Patrick”)
1033	U.S. Patent No. 12,505,414 File History (“FH414”)
1034	Excerpts from Yuan, Michael Juntao & Kevin Sharp, <i>Developing Scalable Series 40 Applications: A Guide For Java Developers</i> (Dec. 2004) (“Yuan”)
1035	Siegemund, Frank, and Muhammad Haroon, <i>Using Digital Cameras for Text Input on Mobile Devices</i> , in Fifth Annual IEEE Int’l Conference on Pervasive Computing and Communications (PerCom’07) 1-8 (2007) doi: 10.1109/PERCOM.2007.38 (“Siegemund”)
1036	Westerman, Peter, <i>EasCorp Expands Capture</i> , CREDIT UNION TIMES (March 16, 2010), https://www.cutimes.com/2010/03/16/eascorp-expands-capture/ (“Westerman”)
1037	EasCorp, “EasCorp News” (Nov. 13, 2007), available at https://web.archive.org/web/20071113205105/http://www.eascorp.org:80/ (“EasCorp”)
1038	EasCorp, “eServices” (May 16, 2008), available at https://web.archive.org/web/20080516093021/http://www.eascorp.org/prodserv/Prod_EServ.aspx (“eServices”)
1039	Hariharan, Kulathumani, <i>Best Practices: Extending Enterprise Applications to Mobile Devices</i> , ARCHITECTURE J. (2008), available at https://web.archive.org/web/20080115152143/http://msdn2.microsoft.com:80/en-us/arcjournal/default.aspx (“Hariharan”)
1040	CodeGuru Staff, <i>Using a Camera with Windows Mobile 5</i> , codeguru.com, July 21, 2006, available at https://www.codeguru.com/multimedia/using-a-camera-with-windows-mobile-5/ (“CodeGuru”)
1041	PTAB-IPR2021-01077 Final Written Decision (“559-FWD”)

U.S. Patent No. 12,505,414
Petition for *Inter Partes* Review

1042	USAA v. PNC Bank N.A., No. 23-2171 (Fed. Cir. Jan. 30, 2025) (nonprecedential) (“PNC”)
1043	U.S. Patent No. 7,156,311 (“Attia”)
1044	U.S. Patent No. 7,978,900 (“Nepomniachtchi”)
1045	Chinese Patent Application Publication No. CN 1967565A and Declaration of Translation (“Zhu”)
1046	U.S. Patent Application Publication No. 2010/0082444 (“Lin”)
1047	PTAB-IPR2022-00075 Final Written Decision (“136-FWD”)
1048	U.S. Patent Application Publication No. 2006/0106717 (“Randle”)
1049	U.S. Patent Application Publication No. 2005/0035193A1 (“Gustin”)
1050	U.S. Patent Application No. 2003/0128875 (“Pilu”)
1051	U.S. Patent Application Publication No. 2008/0297617 (“Jeong”)
1052	Katta, Sanketh, <i>LG enV Touch (VX-11000) Review</i> , SKATTER (July 21, 2009), https://www.skatter.com/lg-env-touch-vx-11000-review/ (“VX-11000”)
1053	U.S. Patent Application Publication No. 2007/0082700 (“Landschaft”)
1054	U.S. Patent Application Publication No. 2009/0192813 (“Gejdos”)
1055	Merino, Carlos & Majid Mirmehdi, <i>A Framework Towards Real-time Detection and Tracking of Text</i> , PROCS. OF THE SECOND INT’L WORKSHOP ON CAMERA-BASED DOCUMENT ANALYSIS AND RECOGNITION 10 (Koichi Kise & David S. Doermann eds., Sept. 22, 2007) (“Merino”)
1056	Haro, Antonio et al., “Mobile Camera-Based Adaptive Viewing,” Nokia Research Center 78 (Dec. 8, 2005) (“Haro”)
1057	U.S. Patent No. 6,195,651 (“Handel”)
1058	Series 60 Platform, “Series 60 Platform FAQ,” Apr. 1, 2004, available at https://web.archive.org/web/20040401020848/http://series60.com/faq (“Series60”)
1059	Excerpts from Topley, Kim, J2ME in a Nutshell, Apr. 23, 2002 (“Topley”)
1060	USAA v. PNC Bank N.A., No. 23-2124 (Fed. Cir. Feb. 3, 2025) (nonprecedential) (“PNC2”)

1061	Xerox Document Services Platform Generic MICR Fundamentals Guide, Jan. 2003, https://download.support.xerox.com/pub/docs/DocuPrint_100_100MX/userdocs/any-os/en/MICRFundFinal_701P22140.pdf (“Xerox”)
1062	Declaration from June Munford (“Munford”)
1063	Woyke, Elizabeth, <i>Nokia’s Gigantic App Store</i> , FORBES (May 7, 2009), https://www.forbes.com/2009/05/07/nokia-ovi-store-technology-wireless-nokia.html (“Ovi”)
1064	Nokia Oyj, <i>Nokia Opens Online Software Shop</i> (Nov. 27, 2001), https://www.globenewswire.com/news-release/2001/11/27/1845381/0/en/Nokia-opens-online-software-shop.html (“Software-Market”)
1065	GetJar, <i>The App Store for the Three Billion People Who Don’t Have an iPhone GetJar Passes 300 Million Mobile Application Downloads</i> (Aug. 19, 2008), https://www.globenewswire.com/news-release/2008/08/19/1207826/0/en/The-App-Store-for-the-Three-Billion-People-Who-Don-t-Have-an-iPhone.html (“GetJar”)
1066	PRNewswire, (PRN) <i>Handango Releases Smartphone Content Statistics In 2006 Yardstick</i> (Feb. 12, 2007), https://www.chron.com/news/article/prn-handango-releases-smartphone-content-1806923.php (“Handango”)
1067	Lee, Wei-Meng, <i>Programming Windows Mobile 5.0 Applications Using the .NET Compact Framework</i> , CODE MAGAZINE (Aug. 18, 2006), https://www.codemag.com/article/0609051/Programming-Windows-Mobile-5.0-Applications-Using-the-.NET-Compact-Framework (“Windows”)
1068	ForumNokia, “S60 Platform: Camera Example with AutoFocus Support,” Apr. 12, 2008, available at https://web.archive.org/web/20080412151729/http://forum.nokia.com/info/sw.nokia.com/id/9fd0e9a7-bb4b-489d-84ac-b19b4ae93369/S60_Platform_Camera_Example_with_AutoFocus_Support.html (“Symbian”)
1069	Apple Developers, UIImagePickerController (2025), https://developer.apple.com/documentation/uikit/uiimagepickercontroller (“AppleDevelopers”)

1070	Palm OS® Platform Developer Guide Software and Hardware, Nov. 22, 2006, http://apitechwriter.com/Samples/Palm/PalmOS_Developer_Guide.pdf (“PalmOne”)
1071	Haritaoglu, Esin Darici & Ismail Haritaoglu, <i>Document Recognition and Translation with Handheld Mobile Devices</i> , in Proceedings of the 2005 Symposium on Document Image Understanding Technology 55-62 (2005) (“Haritaoglu”)
1072	Bae, K. S. et al., <i>Character Recognition System for Cellular Phone with Camera</i> , in Proceedings of the 29th Annual Int’l Computer Software and Applications Conference (COMPSAC 2005) 539-44 (2005) doi: 10.1109/COMPSAC.2005.55 (“Bae”)
1073	Zhang, Mi et al., <i>OCRdroid: A Framework to Digitize Text Using Mobile Phones</i> , in Mobile Computing, Applications, and Services 273-92 (2009) (“Zhang”)
1074	Koga, Masashi et al., <i>Camera-based Kanji OCR for Mobile-phones: Practical Issues</i> , in Eighth Int’l Conference on Document Analysis and Recognition (ICDAR’05) 635-39 (2005) doi: 10.1109/ICDAR.2005.65 (“Koga”)
1075	Ferreira, Silvio, Vincent Garin, & Bernard Gosselin, <i>A Text Detection Technique Applied in the Framework of a Mobile Camera-based Application</i> , in Proceedings of the First Int’l Workshop on Camera-based Document Analysis and Recognition (CBDAR) 133-39 (2005) (“Ferreira”)
1076	Laine, Mikael & Olli S. Nevalainen. <i>A Standalone OCR System for Mobile Cameraphones</i> , 2006 IEEE 17th Int’l Symposium on Personal, Indoor and Mobile Radio Comm’ns 1-5 (2006) doi: 10.1109/PIMRC.2006.254074 (“Laine”)
1077	Zhou, Steven Zhiying, Syed Omer Gilani, & Stefan Winkler, <i>Open Source OCR Framework Using Mobile Devices, Multimedia on Mobile Devices</i> , in 6821 Proceedings of the SPIE 1-6 (2008) (“Zhou”)
1078	Liu, Xu & David Doermann, <i>Mobile Retriever – Finding Document with a Snapshot</i> , PROCS. OF THE SECOND INT’L WORKSHOP ON CAMERA-BASED DOCUMENT ANALYSIS AND RECOGNITION 29-34 (Koichi Kise & David S. Doermann eds., Sept. 22, 2007) (“Liu”)

1079	Wu, Victor, R. Manmatha, & Edward M. Riseman, <i>Finding Text in Images</i> , Proceedings of the Second ACM Int’l Conference on Digital Libraries 3-12 (July 1, 1997) (“Wu”)
1080	CNN.com, “First Mobile Videophone Introduced,” May 18, 1999, available at https://web.archive.org/web/20080614223224/https://www.cnn.com/TECH/ptech/9905/18/japan.phonetv/ (“Kyocera”)
1081	Meier, Reto, Professional Android™ Application Development, June 25, 2008 (“Meier”)
1082	Juergen Gausemeier et al., <i>Development of a Real Time Image Based Object Recognition Method for Mobile AR-Devices</i> , PROCS. OF THE 2ND INTERNATIONAL CONFERENCE ON COMPUTER GRAPHICS, VIRTUAL REALITY, VISUALIZATION AND INTERACTION IN AFRICA 133-39 (Feb. 3, 2003) (“Gausemeier”)
1083	Declaration of Sean O’Bryan – Gausemeier (UT Libraries) (“O’Bryan”)
1084	Declaration of Dave Gilson – Goyal (UT Libraries) (“Gilson1”)
1085	Declaration of Dave Gilson – Meier (UT Libraries) (“Gilson2”)
1086	Declaration of Jeremy O’Hare – Meier (British Library) (“O’Hare”)
1087	PTAB-IPR2021-01070 Final Written Decision (“779-FWD”)