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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/060,274	**11/30/2022 03:44:38 PM ET**	**10875-09850 US**

Title of Invention

PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1371	FILED BY	Edward Van Gieson
PATENT CENTER #	61235422	FILING DATE	-
CUSTOMER #	93219	FIRST NAMED INVENTOR	Muthukrishnan Thukkaram
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Edward Van Gieson

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
09850 US - Application Data Sheet.pdf	8	Application Data Sheet	2174 KB
09850 US - Specification-APP.TEXT.docx	32	Application body structured text document	53 KB
Warning: Text decorations have been removed. Bookmarks were found and have been removed.			
09850 US - Drawings.pdf	12	Drawings-only black and white line drawings	883 KB
09850 US - Declaration.pdf	2	Oath or Declaration filed	171 KB

09850 US - Power of Attorney.pdf	3	Power of Attorney	280 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
09850 US - Application Data Sheet.pdf	A10A80187B2C8C05A6B618224A32D012ABCF55BD7449225EB964DBB8BE511CBC10744D7443E7111CAA43582464205F47F4CDE231CAC2A156D2969616E2A300CE
09850 US - Specification-APP.TEXT.docx	5EB4A50334282F050CB22939715FDD6CA15D2BE217381DEB48241820044E9160221B8175617714CF7ADC90320CFAD2C3729573C834A975EC0737193DCBFF4A78
09850 US - Drawings.pdf	99872C240AA5E31294CA46F64369C1FAEE8A7502B3226D984594A4CEB297A910D7EB1D5EEEBB7D08EEB26D4659E8B35CF9EFD19B1ACA017CEFF365B7805E22B7
09850 US - Declaration.pdf	5FD9915EC2FE2FE542D3F37724BC8147D1F781E05CDCEFF8E4D0B326B85F1A6BDA6F3D8EEBCD7292FAB432FC4408EC33AE8A93D393F627BCE88D25485007F9F2
09850 US - Power of Attorney.pdf	6E482C4CF2F8ACE42BE6E0BD8174635EB191B3C200E4EBF079AA12C4F62E676909C9FA7819E702DF53997CA0EC3C345232B141FFEC4401E2B6D417579FEDD6CB

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

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Application Information

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PATENT CENTER #	61235422	AUTHORIZED BY	Edward Van Gieson
CUSTOMER #	93219	FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Muthukrishnan Thukkaram

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1002	E2022ATF45530944	Edward Van Gieson
PRE-AUTHORIZED ACCOUNT	**PRE-AUTHORIZED CATEGORY**	
603148	37 CFR 1.16 (National application filing, search, and examination fees)	

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1111	UTILITY PATENT APPL. SEARCH FEE	700.00	1	700.00
1011	BASIC FILING FEE - UTILITY (PAPER FILING ALSO REQUIRES NON-ELECTRONIC FILING FEE UNDER 1.16(T))	320.00	1	320.00
1311	PATENT APPL. EXAMINATION FEE	800.00	1	800.00
			TOTAL AMOUNT:	**$1,820.00**

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	10875-09850 US
	Application Number	
Title of Invention	PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Muthukrishnan		Thukkaram	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Bangalore	Country of Residence [i]	IN

Mailing Address of Inventor:

Address 1	c/o No.1289/1090E, 18th Cross Road, Sector 3		
Address 2	HSR Layout		
City	Bangalore	**State/Province**	KA
Postal Code	560102	**Country** [i]	IN

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	93219		
Email Address	docketing@patentlawworks.net	Add Email	Remove Email

Application Information:

Title of the Invention	PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION		
Attorney Docket Number	10875-09850 US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	12	**Suggested Figure for Publication (if any)**	

PTO/AIA/14 (01-22)
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Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☒ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	93219		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

PTO/AIA/14 (01-22)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Whatfix Private Limited		
Mailing Address Information For Applicant:			
Address 1	No.1289/1090E, 18th Cross Road, Sector 3		
Address 2	HSR Layout		
City	Bangalore	**State/Province**	KA
Country	IN	Postal Code	560102
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Edward Van Gieson/			Date (YYYY-MM-DD)	2022-11-30
First Name	Edward	Last Name	Van Gieson	Registration Number	44,386

Additional Signature may be generated within this form by selecting the Add button.

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This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION

TECHNICAL FIELD

[0001] The present disclosure is related to determining page information for an application.

BACKGROUND

[0002] A digital adoption platform (DAP) is a type of software that is layered on top of another software, app, or website to help facilitate end user proficiency by helping to guide users through key tasks and provide contextual information as users navigate the user interface of the product. Users are provided with information to help familiarize them and become more proficient. This helps to drive adoption.

[0003] For example, a DAP may generate a help tip. Background information on an example DAP implementation is found in various sources, including U.S. Pat. No. 11,372,661 assigned to Whatfix Private Limited, the contents of which are hereby incorporated by reference. A DAP supports content authoring modules and content playback modules to generate, for example, smart tips as a user navigates elements of a user interface of an underlying software application.

[0004] A DAP supports content creators creating new flows or other guided features to enable higher adoption of client applications. Content Creators of the product can create content, record a flow, and the content is played back the same flow as and when required when end-user clients navigate the client application. This requires the DAP to find the visual UI elements on the application the user is looking at (e.g., finding where the user's cursor is located on a graphical user interface.

[0005] An application may have different pages with different screen element formats. For example, an application may generate graphical user interfaces with pages for different purposes, such as a calendar page, a teleconference page, etc. Also, even for a visual UI for a particular purpose (e.g., document management), there may be a variety of different pages for different features that have variations in the arrangement or display of user interface elements. That is, as a user navigates an application, there may be major changes in the visual UI as well as minor changes in the visual UI. For either case, the DAP needs to know what page the user is looking at to provide the correct smart tip.

[0006] Consequently, a DAP needs to know what page the user is looking at to aid in understanding visual UI elements on the application that the user is looking at. Conventionally, identifying pages on a desktop application relies on Automation API Interfaces for different technologies like SAP-GUI, UIAutomation, Java Access Bridge etc. However, this is a slow process because uniquely identifying the pages is a memory and CPU intensive task. This makes the process unusable on minimum configuration machines. Some of the problems with these approaches include that each technology like WinForm, SAPGui, Java Swings app needs a different library and algorithm to identify the elements. Additionally, automation APIs are slow and are CPU intensive so identifying context takes time in every technology.

SUMMARY

[0007] An apparatus, system, and method for generating page information for an application having a graphical user interface (GUI) utilizes Optical Character Recognition (OCR) to identify words on the page and use the identified words to determine the page. In some implementations, the OCR is performed on one or more selected regions of the page, instead of on the entire page, which reduces CPU demands. In some implementations, pre-processing

before OCR is performed to improve the accuracy of the OCR. In some implementations, this may include resizing to increase a font size and performing an operation to distinguish text from its background. In some implementations, post-processing is performed after OCR is performed. One or more other optimizations may also be performed, such as configuring a language for OCR. A configuration engine may be provided for an administrator to configure one or more aspects of the technique. In one implementation, the configuration may include configuring regions for which OCR is to be performed, configuring the language for which OCR is to be performed, and configuring keywords and logical conditions for mapping detected OCR words to identify pages.

[0008] An exemplary method includes configuring at least one region of the application screen for OCR, where the at least one region encompasses a screen area no greater than 75% of a maximum screen area. OCR is performed of a screen capture image of the at least one region to detect words found in the at least one region. A page is identified based on a match of the detected words to a word map.

[0009] In one implementation, the method further includes performing pre-processing of the screen capture image of the at least one region prior to performing OCR.

[0010] In one implementation, the pre-processing includes performing a resizing to increase a minimum font size.

[0011] In one implementation, the pre-processing includes combining individual screen capture images of each region of the at least one region.

[0012] In one implementation, the pre-processing includes performing at least one operation to distinguish text from a background.

[0013] In one implementation, distinguishing text from a background includes grayscale conversion, inversion, and thresholding.

[0014] In one implementation, configuring the at least one region includes specifying at least one rectangular region of the application.

[0015] In one implementation a language of the OCR is configured.

[0016] In one implementation, post-processing is performed of an output of the OCR. In one implementation, the post processing includes generating an array of words.

[0017] In one implementation, identifying the page includes mapping a page name to the detected words based on one or more logical conditions.

[0018] In one implementation, a page change is identified based on a distance algorithm having a pre-selected threshold of a change in text to define a page change.

[0019] In one implementation, the page identification is provided to a digital adoption platform.

[0020] In one implementation, a page identification system includes a configuration engine to configure at least one region of an application screen of a graphical user interface of an application for Optical Character Recognition (OCR). In one implementation, the at least one region encompasses a screen area no greater than 75% of a maximum screen area. An OCR module performs OCR of a screen capture image of the at least one region to detect words found in the at least one region. A page identification module identifies a page of the application based on a match of the detected words to a word map.

[0021] In one implementation, the page identification system further includes a pre-processing module to perform pre-processing of the at least one region prior to performing OCR.

[0022] In one implementation, the pre-processing module performs a resizing to increase a minimum font size.

[0023] In one implementation, the pre-processing module combines individual screen capture images of each region of the at least one region.

[0024] In one implementation, the pre-processing module performs at least one operation to distinguish text from a background.

[0025] In one implementation, the at least one operation comprises performing grayscale conversion, inversion, and thresholding.

[0026] In one implementation, the page identification system, further includes a post-processing module to perform post-processing of an output of the OCR to clean up the OCR output and generate an array of words.

[0027] In one implementation, the page identification module comprises a mapping module to map a page name to the detected words based on one or more logical conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Fig. 1A is a high-level drawing of a technique to identify pages of an application in accordance with an implementation.

[0029] Fig 1B illustrates an admin user entering configuration settings for page identification in accordance with an implementation.

[0030] Fig. 2 illustrates an example of modules for page identification in accordance with an implementation.

[0031] Fig. 3 is high-level flow chart of a method of page identification in accordance with an implementation.

[0032] Fig. 4 is an interaction diagram illustrating a process of page identification in accordance with an implementation.

[0033] Fig. 5 is a flow chart of a method of page identification in accordance with an implementation.

[0034] Fig. 6 illustrates an example of a user interface screen and two regions of the screen configured for OCR in accordance with an implementation.

[0035] Fig. 7 illustrates an example of a user interface screen and a single region of the screen configured for OCR in accordance with an implementation.

[0036] Fig. 8 illustrates an example of a user interface screen and a single region of the screen configured for OCR in accordance with an implementation.

[0037] Fig. 9 illustrates an example of a user interface screen and a single region of the screen configured for OCR in accordance with an implementation.

[0038] Fig. 10 illustrates an example of a user interface screen and a single region of the screen configured for OCR in accordance with an implementation.

[0039] Figs. 11A and 11B illustrate a general computer environment for deploying the page identification technique in accordance with an implementation.

DETAILED DESCRIPTION

[0040] Fig. 1A is a block diagram of a high-level implementation of a technique for generating page information in accordance with an implementation. A target client application 101 running on the desktop of a client computer 100 generates a graphical user interface 102 that may be displayed on a computer display screen of the client computer 100. The target client application may, for example, generate different application display screens with different names (e.g., a calendar screen, a teleconference screen, etc.). Each of the application screens

corresponds to a page of the application. Detecting which application screen is being presented to the user on their computer may include identifying a page change and identifying the page of the application that is being displayed on the user's computer display screen.

[0041] In an exemplary implementation, a digital adoption platform (DAP) player 104 requires page information to generate smart tips from content providers 108. The DAP is an additional software layer to provide help tips for the target client application.

[0042] A page identification engine 106 generates page information that may include page context to identify what page of a graphical user interface 102 of an application 100 a user is looking at. In some implementations, the page information may include a page name. The page information may be provided to the DAP player 104.

[0043] The page identification engine 106 uses optical character recognition (OCR) to identify page information. In one implementation, to improve the accuracy of the OCR, an OCR pre-processing module 112 is included to perform one or more operations to improve the accuracy of OCR. Additionally, in one implementation an OCR post-processing module 116 is included to improve the accuracy of the OCR.

[0044] In one implementation, to reduce the CPU needs for the OCR, instead of performing OCR on the entire screen, a region configuration module 110 configures one or more regions of a total page screen area for OCR. The total area of the configured regions is less than the total page screen area. For example, in some applications, the words on the page identifying the page tends to be in one or more sections of the page, with many applications having words identifying the page near the top of the screen or along the left side, as two examples. For a given application, the location and size of the region(s) for which OCR is performed may be set to be significantly less than the total screen area.

[0045] Instead of performing OCR on a full image capture screenshot of the entire page, the OCR can be performed on a significantly reduced area (e.g., less than 75% of the maximum size of page). In some examples, OCR is performed on less than 50% of a page. In some examples, OCR is performed on no more than 25% of a page. Reducing the total percentage of the screen for which OCR is to be performed is beneficial for CPU resource constrained platforms. For example, if OCR processing is performed on an entire screen image it can make the process of context identification slow, because the bigger the image, the longer the OCR processing time. For example, if a user navigates through the GUI of the application, the screen content could change quickly. In a DAP implementation, it's important that the proper help tips are provided when the screen content changes. Consequently, the OCR process should preferably be implemented to reduce CPU needs to facilitate a pleasant end user experience in terms of the user navigating the GUI and the page identification keeping up with rapid content changes to provide the appropriate DAP help tip. In some cases, the reduced area of the screen image upon which OCR is performed is no greater than 50% of the total screen image. In some examples, the reduce area of the screen image is no greater than 25% of the total screen image.

[0046] In one implementation, a keyword matching module 118 is configured to determine, from the post-processed OCR results, a set of matching keywords. The page is identified in page identification module 120, which may identify the page context regarding page attributes (e.g., a calendar page, a chat page, a teleconference page, a data storage page, etc.). In one implementation, the current context of an application (e.g., page name) is identified using the group of keywords present on that page (e.g., words that are user interface elements identified from the OCR). In some implementations, a page change detection module 122 detects page changes. For example, a page change can be identified based on detecting changes in keywords.

For example, a selected threshold change in the percentage of keywords may be used to identify a page change. In one implementation an algorithm decides if a particular set or subset of words belongs to a particular application screen. The algorithm may be based on a distance algorithm in which a pre-selected threshold change in the detected word on a page is used to identify a page change. In one implementation, the threshold change in the distance algorithm is set to 50%. When the change in text is at least 50% the algorithm concludes that there is a change in page. The detected words are then used to identify the screen name as provided in the initial configuration.

[0047] Referring to Fig. 1B, in one implementation an administrator configures the page identification engine 106 for a particular target application. A particular target application may, for example, have certain sections of the screen that have keywords uniquely identifying the page from other pages of the same target application. The configuration process may include, for example, the configuration administrator selecting one or more settings. The settings may be entered via API commands, a user interface, etc.

[0048] In some implementations, the configuration process may include, for example, entering settings for configuring regions of the visual UI for which OCR will be performed. In one implementation, the configuration set by the admin user defines a set of bounding regions of the page using a percentage of the whole application. In one implementation, one or more rectangular regions are defined with respect to a starting point on the screen with respect to a percentage of the screen with respect to one corner (e.g., a top left corner as one option, such as specifying an starting point offset in terms of a percentage of the screen from the left edge and the top edge of the screen as one example) and a regional area corresponding to percentage of the screen width and a percentage height of the screen). That is, regions may be defined by an offset

position with the relative percentages of screen width and screen height defining the area of the region with respect to the total screen area (e.g., left 33%, top 0%, width 33%, height 100%). In some implementation, an admit enters the percentages. However, more generally a user interface visualization could be provided to aid in configuring regions to perform OCR.

[0049] For example, for a particular application, some portions of the screen may be more relevant to identifying the page than other sections. For example, in some applications, GUI information uniquely identifying the page may be present in a top band of the screen, a bottom band, a middle band, or other portions of the application. Configuring screen regions for OCR reduces the time required to perform OCR for a given hardware/software platform. It has a lower CPU footprint. As an illustrative example, in some implementations the OCR runs extremely fast and returns words for the configured regions within milliseconds. In some implementations, the admin can input simple coordinate and percentage configuration commands to specify the regions.

[0050] In some implementations, the administrator may also configure the language of the client application (e.g., Spanish, Italian, German, English, Chinese, Japanese, etc.) or otherwise set a condition (such as geographic location) from which the language of the client application can be inferred. For example, many Microsoft® applications support different languages for different regions of the world. An OCR engine performs poorly in terms of performance and accuracy if it must identify the language before loading the appropriate language model for identifying the words. If the language is provided during the initialization of the OCR engine, the correct language model may be pre-loaded by the OCR. The performance is significantly improved. Since the configuration admin is aware of the language of the

application, the language value can be provided to the OCR engine as part of the configuration as shown below:

[0051] In one implementation, the administration may configure page identification criteria, such as selecting logical conditions for when the detection of keywords identifies a page. In some implementations this may include selecting criteria for identifying page changes, such as selecting thresholds for a percentage change in keywords that determines if a page change has occurred.

[0052] In one implementation, the configuration administrator creates a matcher which will uniquely identify the page using selected keywords. For example, the matcher may be implemented as a map of a Page_Name and a Set_Of_Words which needs to be created manually once by the person who knows about the application. In some implementations, the administrator may configure the matcher to identify a page by a particular screen name (e.g., “Chat”).

[0053] A sample matcher example is given below in which pages may be matched to Teams, Calendar, Activity, Chat, Calls, Wiki, Apps, New Meeting, or Task Planner based on matching certain words.

```
const page_map = {
   'Teams': ['Teams', ‘Meeting’],
   'Calendar': ['Calendar'],
   'Activity': ['Feed'],
   'Chat': ['Chat', 'Pinned'],
   'Calls': ['Calls', 'Phone', 'Contacts'],
   'Wiki': ['Wiki', 'Personal', 'Recent'],
```

'Apps': ['Search', 'Apps'],

'New Meeting': ['New meeting', 'Details'],

'Task Planner':['Tasks by Planner']

}

[0054] In one implementation, the map can be created by a configuration administrator looking at the application region and identifying the words on the page which are unique. Some words may be unique to a particular region of a page of the application. In other cases, certain combinations of words may be unique. More generally a mapping structure with logical conditions may be defined to identify logical conditions in which the words detected by OCR uniquely identify a page. The structure is chosen to be a map because it helps in creating a direct one to one mapping of an identifier of the page and the words associated with the page. The map structure helps in taking care of a wide variety of logical operations to conclude if the words belong to a particular page. Some examples of the logical conditions that can be defined include the following examples:

1) The Page is matched if all words are matched;

2) The Page is matched if some words are matched (e.g., a selected minimum number);

3) The Page is matched if all words are matched in the exact sequence as mentioned in the list; and

4) The Page is matched if any of the words are matched.

[0055] More generally, the logical condition could include other logical possibilities, including determining a page is not matched if it matches some words but has one or more words that would disqualify the match.

[0056] Note that a region in which OCR is performed will have a set of found words but not all of these found words need to be used for page matching. Some words do not aid in uniquely identifying page, such as some words used on multiple pages of an application

[0057] It will be understood that additional tools could optionally be used to aid a configuration administrator to analyze pages of an application, identify keywords words, and identify logical conditions to uniquely identify a page.

[0058] While a configuration administrator can create the matcher, more generally it will be understood that software tools could be utilized to aid the administrator to define logical conditions to increase their efficiency at identifying unique words on individual pages and generate logical matching conditions to distinguish between different pages of an application.

[0059] The page once matched, can be used as key in combination with other relevant rules, to show relevant DAP content when the page identification technique is used in a DAP. For example, if the Page is identified as a “New Meeting” Page, that information can be used as a key into other information created for the “New Meeting” Page to identify what section of the New Meeting page the user is looking at and generate the appropriate smart tip via the DAP.

[0060] In some implementations, page change criteria are configured by an admin. For example, sometimes different pages differ slightly regarding the regions in which OCR is performed. In some cases, different pages may differ by only a few words in the regions in which OCR is performed. In one implementation, a threshold is defined in a distance algorithm to mark the state of the page as changed. As an illustrative example, the threshold may be set at 50%, which means that more than 50% of the words must change between the previous results and the current result of the OCR process. More generally, other threshold values may be selected. While using a threshold criteria is one example of identifying a page change, more generally other

approaches could be used. As an example, if other attributes about the application are accessible, these may be used as an additional source of information in making decisions identifying page and identifying page changes.

[0061] In some implementations, the captured smaller regions are combined into a single larger image before applying other pre-processing steps to the image.

[0062] As one example of pre-processing that may be implemented to be configurable is resizing a screenshot to achieve a minimum font size. For example, the font size of some applications has small fonts in some portions of the screen. As an example, many applications have small fonts that by default are less than 14 or 10px/dpi in size. In such cases during OCR processing the accuracy of word recognition is reduced. As an illustrative but non-limiting example, the pre-processing could resize by a factor of 1.5. However, more generally the resizing could be smaller or greater factor (e.g., 1.25, 1.5, 1.75, 2.0, etc.). Resizing the screenshot increases OCR accuracy, but the benefits will depend in part on what the minimum default font size is for a particular application, as well as other factors such as the font type and the language of the application. (e.g., the benefits for resizing a character-based language like Chinese may be different than resizing text written in the English alphabet). In some implementations, an administrator may determine a minimum default font size of an application and configure a resizing factor to improve OCR accuracy during initialization.

[0063] While an administrator could configure the resizing, more generally in some implementations the resizing is automatically adjusted based on feedback from postprocessing. For example, if the post-processed OCR has nonsensical words or other errors, that may be the result of low OCR accuracy, which in turn may be a result of the font size being too small. In some implementations, a loop in the process may include automatically resizing upon detection

of a condition indicative of the types of inaccuracies generated when OCR is performed on a font that is too small.

[0064] The pre-processing prior to OCR may include performing pre-processing to make it easier for the OCR to distinguish text from its background. There are examples of applications in which the text is written as white text on a black background. This can make OCR less accurate. Black text on a white background is better for OCR accuracy. There are similar issues with colored text of a first color on a background of a different color. In one implementation, the pre-processing converts the image to grayscale, and then performs thresholding and binarization. The thresholding is selected to achieve a clear differentiation between the foreground and the background, where the foreground is the portion of the image containing text and the background is the non-text region.

[0065] An example of post-processing after OCR is now described. OCR typically generates a single big sentence with all the found words separated by spaces and tabs to match the actual positions of the words in the image. This big sentence contains misspelled words, unwanted special characters, and connected adjacent letters. This can be cleaned up and converted into an array of words. The array of words can be used for page identification system. Below is an example list of steps involved in the post-processing in one implementation:

1. Remove all special characters and single letter characters, such as commas, dot, slash, apostrophe, etc.
2. Replace all consecutive multiple spaces with a single space.
3. Execute a spell checker. A spell checker can Identify combined letters and separate them out. If the spell checker is not able to accurately separate the words, then the image resize

factor should be increased. In some implementations, this is done automatically when the spell checker is unable to accurately separate words.

4. Convert the sentence into an array of words using space as the separator.

[0066] Various optimizations may be performed on the post-processing. For example, a custom spell checker may be provided to include special words used by a target application. For example, a target client application may use proprietary product names.

[0067] While a static configuration may be used in which an administrator configures settings once in an initialization step, more generally dynamic configuration may also be employed. As one example, at least some attributes of the configuration may be dynamically varied. To the extent the page identification can access additional attributes of the target application and the platform, the configuration may be dynamically adjustable. For example, the demands on the CPU may vary depending on what software application a user is running and the processing power of their CPU. If CPU demand is low, the page identification process might be adapted to perform OCR on a larger percentage of the screen. As another example, if page attributes are available, such as a page title, the configuration may be adapted to account for the presence of additional information from which to perform page identification.

[0068] In some implementations, the processing of OCR is done in a repeating loop until either the DAP player 104 quits or the target client application 101 quits. In some implementations, a configuration administrator sets the time value of the loop to achieve a balance of objectives and provide a good end user experience. As an example, an exemplary loop time is 2000 ms. Reducing the loop time provides an improved user experience up to a certain point, but then diminishing returns set in and CPU needs increase. The CPU needs will also depend on the size of the regions upon which OCR is performed. The loop period should be set

so that the end user gets the latest information about the current page when the user navigates the application or changes context. The periodicity of the repeating loop may be empirically selected based on empirical measurements about the best tradeoffs for different target hardware and software platforms. Additionally, the period may be adjusted based upon the size of the region upon which OCR is performed, to account for differences in CPU needs.

[0069] Fig. 2 illustrates in more detail an example of modules of an identification engine in accordance with an implementation. A configuration engine 200 supports an administrator configuring settings. For example, it may support an administrator configuring regions for OCR in module 201, configuring the OCR language in block 203, setting a control loop value in block 205, configuring resize options in block 206, configuring selected keywords for word mapping in block 209, configuring one or more logical conditions in block 211, and page change threshold configuration in block 213. The extent that access to attributes of the application 101 and the platform of the user's computer are accessible, one or more dynamic configuration options may be supported, such as adapting operation if page title information is available, adapting operation based on available CPU resources, etc.

[0070] An image capture/region capture module 215 captures image screenshots for the configured regions. Module 217 resizes the captured regions to address the issue of small font sizes. Pre-processing module 225 may include a grayscale module 219, invert/thresholding module 221 converts text into black text on a white background, and sub-region combination 223 module combines the regions into one group for subsequent processing. OCR of the combined sub-regions is performed in module 227. OCR post-processing cleanup is performed in module 229.

[0071] In one implementation, page identification engine 237 includes a word mapping module to match words generated from the post-processed OCR to keywords. Page identification logic 233 performs at least one logical test to identify the page based on the words. Page change identification logic 235 determines from changes in detected words if a page change has occurred.

[0072] Fig. 3 is a flow chart of a method in accordance with an implementation. In this example, it's assumed that configuration data was previously set by an administrator. During operation, the process receives configuration data and then performs a sequence of steps in a loop to identify pages and page changes. In block 302, the OCR segment configuration is received that defines the rectangular regions of the visual UI for which OCR is to be performed. In block 304, the OCR language configuration is received. Other optional configuration settings could also be received. Alternatively, default values of other configuration settings could be used. In block 308, a processing loop begins, which in one implementation may continue as long as the target application and the DAP player do not quit. In block 308, regional segment image screenshots are captured in the configured regions. The order of some pre-processing steps may be varied. The pre-processing includes combining captured regions in block 310. In block 312, the combined regions are resized to improve OCR accuracy. In block 314, at least one operation is performed to support OCR of different text styles, such as white letters on a black background. This may include performing a grayscale conversion, inverting and thresholding to generate black text on a white background. In block 316, OCR is performed on the pre-processed captured regions. In block 318, OCR post-processing is performed to cleanup detected characters. In block 320, the page is identified, and page changes may also be identified. A decision is made in decision block 322 whether to continue the loop.

[0073] Fig. 4 illustrates an example of a sequence of interactions between a DAP player, a web process, and an OCR page identification process in accordance with an implementation. As indicated by arrow 401, the play may issue a command to initialize and start a web process. As indicated by arrows 402 and 403, the web process may issue commands to get and send OCR configurations to the OCR page identification and, as illustrated by arrow 404, the web process can start to listen for an OCR segment response. The OCR page identification process goes through a sequence of operations in a loop to generate page identification information and page change information. As indicated by arrow 405, the OCR page identification process initializes an OCR engine process to configure the language. In arrow 406, the process starts the page identification according to the configuration settings. As illustrated by arrow 407, screenshots of the configured regions are captured. As illustrated by arrow 408, the captured screenshot regions are combined. As illustrated by arrow 409, the combined, captured screenshot regions are resized by a resize factor. As illustrated by arrow 410, a grayscale process is then implemented, followed by an inversion operation to aid in distinguishing text from its background. This generates a final image, upon which OCR is performed in arrow 412. OCR post-processing may optionally be employed. As indicated by arrows 413 and 414 a segmentation response is created and sent to the web process. The web process persists the found text in arrow 415 and identifies changes in words from the last found words in arrow 416. A determination is made in arrow 417 if the change in words is greater than a threshold percentage, corresponding to a page change. In arrow 418, page identification is performed by mapping (matching) keywords with respect to a mapping configuration (e.g., keywords and logical conditions defining a page identification).

[0074] Fig. 5 is a flow chart for an alternate implementation. In some implementations, the configuration can be dynamic. For example, the configuration may adapt to any additional

information that is accessible about the platform, the target application, and the manner the user is using the application the DAP. For example, the loop period might be increased for a user who slowly browses each page in order to reduce CPU usage when CPU resources are limited. While a static configuration is one option with OCR performed on all the configured regions, more generally there could be options provided to vary the configured region size based on CPU resources and platform resources. For example, if there are ample CPU and platform resources, the configured region size may be increased for applications in which that might reduce an error rate in page identification. As another example, while a static region configuration may be used, more generally, the region configuration could be adapted if there are detectable attributes for a page, such as a page title, that could be used in combination with OCR detected words to identify a page. For example, if there are detectable page attributes indicative of the page context, it might be possible in some cases to reduce size of the configured regions upon which OCR is performed in order to identify a page.

[0075] In block 502, rules are configured for page identification and page change identification for an application. This may be based on detected keywords alone, or in combination with other detectable page attributes. In block 504, relevant keywords are configured for keyword matching/mapping. In block 506, the language is selected for the application. In block 508, a configuration is made of static or dynamic screen region configuration for the application.

[0076] In block 510, the configured page identification process is initiated and started. In block 512, regions of the GUI screen are selected for processing based on the configuration data, with the total regions less than the total screen area. In block 514, preprocess is performed of screen captured regions, such as resizing, grayscale, and inversion. In block 516, OCR is

performed on the pre-processed regions. In block 518, post-processing of the OCR characters. In block 520, a determination is made if detected words match a particular page of the application. In block 522, the page/page change is reported. A decision is made in decision block 524 whether to continue the loop.

[0077] In one embodiment, the regions on which OCR are to be performed are specified by a configuration administrator using a percentage from the left, a percentage from the top, and a width and a height. This defines a rectangular shaped region and its position with respect to the top left corner of the screen.

[0078] Fig. 6 illustrates an example of UI screen 602 showing an overlay of configured regions for which OCR will be performed. Region 605 is in the top left of the UI screen. Region 610 is in the bottom of the screen. In this example, region 605 encompasses UI help fields with found text Help, topics, training, what's new, about, and activity. Region 605 corresponds to Left=0%, top =0%, width=50%, and height =17%. Region 610 provides information about several features. Region 610 has coordinates left=0%, top=8-%, height=20%, and width=100%. The found text includes make calls, plan a meeting, and join in. In the example of region 610, region 610 includes some words that do not aid in uniquely identifying the page, and thus wouldn't be used in page mapping.

[0079] Fig. 7 illustrates an example of tasks UI page 702. Region 705 is at left=0%, top=0%, width =33%, and height =20%. In this example, the found text is tasks by planner and to do. In this example, the size of region 705 is dramatically small that the total overall screen area.

[0080] Fig. 8 illustrates UI screen 802 for a calendar. Region 805 is at left 0%, top 0%, width 100% and height 25%. It encompasses the portion of the UI screen in which words

identifying the UI screen as a calendar page are found such as calendar, today, September, meet now, work week, etc.

[0081] Fig. 9 illustrates a UI screen 902 for a Virtual Box! Manager. In this example, region 905 encompasses found text associated with the Virtual Box such as input, Virtual Box Manager, Virtual Machine, ACPI Shutdown, About Virtual Box, Cloud Profile Manager, Media Manager, and Add.

[0082] Fig. 10 illustrates a UI screen 1002 for a OneDrive. Region 1005 encompasses found text such as files, new, upload, open, sync, and drive.

[0083] The page identification engine 106 may be implemented as software instructions executing on a user's computer. It may, for example, be implemented to operate with other software on a user's desktop. Referring to Fig. 11A, the software instructions may be stored on a user's computer, which may in turn have conventional hardware components such as a memory 1110, data store 1120, output device 1114 (e.g., a display screen), an input device 1112, a processor 1108, and a communication unit 1104 to communicate with a computer network, such as a LAN, WAN, the internet, etc.

[0084] One of the benefits of the technique is that because it utilizes OCR, it is agnostic to many of the implementation details of the target application. It works with MS automation, API compliant applications, SAP applications, Java applications, applications working inside a remote desktop, and Citrix environments.

[0085] In the above description, for purposes of explanation, numerous specific details are set forth to provide a thorough understanding of the present disclosure. However, the technology described herein can be practiced without these specific details. Further, various systems, devices, and structures are shown in block diagram form to avoid obscuring the

description. For instance, various implementations are described as having particular hardware, software, and user interfaces. However, the present disclosure applies to any type of computing device that can receive data and commands, and to any peripheral devices providing services.

[0086] In some instances, various implementations may be presented herein in terms of algorithms and symbolic representations of operations on data bits within a computer memory. An algorithm is here, and generally, conceived to be a self-consistent set of operations leading to a desired result. The operations are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like New, Upload, Sync, and Open in One Drive.

[0087] To ease description, some elements of the system and/or the methods are referred to using the labels first, second, third, etc. These labels are intended to help to distinguish the elements but do not necessarily imply any particular order or ranking unless indicated otherwise.

[0088] It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussion, it is appreciated that throughout this disclosure, discussions utilizing terms including "processing," "computing," "calculating," "determining," "displaying," or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical

quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0089] Various implementations described herein may relate to an apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general-purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, including, but is not limited to, any type of disk including floppy disks, optical disks, CD ROMs, and magnetic disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, flash memories including USB keys with non-volatile memory or any type of media suitable for storing electronic instructions, each coupled to a computer system bus.

[0090] The technology described herein can take the form of an entirely hardware implementation, an entirely software implementation, or implementations containing both hardware and software elements. For instance, the technology may be implemented in software, which includes, but is not limited to, firmware, resident software, microcode, etc. Furthermore, the technology can take the form of a computer program object accessible from a computer-usable or computer-readable medium providing program code for use by or in connection with a computer or any instruction execution system. For the purposes of this description, a computer-usable or computer readable medium can be any non-transitory storage apparatus that can contain, store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device.

[0091] A data processing system suitable for storing and/or executing program code may include at least one processor coupled directly or indirectly to memory elements through a

system bus. The memory elements can include local memory employed during actual execution of the program code, bulk storage, and cache memories that provide temporary storage of at least some program code in order to reduce the number of times code must be retrieved from bulk storage during execution. Input or I/O devices (including, but not limited to, keyboards, displays, pointing devices, etc.) can be coupled to the system either directly or through intervening I/O controllers.

[0092] Network adapters may also be coupled to the system to enable the data processing system to become coupled to other data processing systems, storage devices, remote printers, etc., through intervening private and/or public networks. Wireless (e.g., Wi-Fi™) transceivers, Ethernet adapters, and Modems, are just a few examples of network adapters. The private and public networks may have any number of configurations and/or topologies. Data may be transmitted between these devices via the networks using a variety of different communication protocols including, for example, various Internet layer, transport layer, or application layer protocols. For example, data may be transmitted via the networks using transmission control protocol / Internet protocol (TCP/IP), user datagram protocol (UDP), transmission control protocol (TCP), hypertext transfer protocol (HTTP), secure hypertext transfer protocol (HTTPS), dynamic adaptive streaming over HTTP (DASH), real-time streaming protocol (RTSP), real-time transport protocol (RTP) and the real-time transport control protocol (RTCP), voice over Internet protocol (VOIP), file transfer protocol (FTP), WebSocket (WS), wireless access protocol (WAP), various messaging protocols (SMS, MMS, XMS, IMAP, SMTP, POP, WebDAV, etc.), or other known protocols.

[0093] Finally, the structure, algorithms, and/or interfaces presented herein are not inherently related to any particular computer or other apparatus. Various general-purpose

systems may be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method blocks. The required structure for a variety of these systems will appear from the description above. In addition, the specification is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the specification as described herein.

[0094] The foregoing description has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the specification to the precise form disclosed. Many modifications and variations are possible in light of the above teaching. As will be understood by those familiar with the art, the specification may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. Likewise, the particular naming and division of the modules, routines, features, attributes, methodologies, and other aspects are not mandatory or significant, and the mechanisms that implement the specification or its features may have different names, divisions and/or formats.

[0095] Furthermore, the modules, routines, features, attributes, methodologies, and other aspects of the disclosure can be implemented as software, hardware, firmware, or any combination of the foregoing. Also, wherever a component, an example of which is a module, of the specification is implemented as software, the component can be implemented as a standalone program, as part of a larger program, as a plurality of separate programs, as a statically or dynamically linked library, as a kernel loadable module, as a device driver, and/or in every and any other way known now or in the future. Additionally, the disclosure is in no way limited to implementation in any specific programming language, or for any specific operating system or environment.

WHAT IS CLAIMED IS:

1. A method of identifying page information for a graphical user interface (GUI) of an application, comprising:

configuring at least one region of the application screen for Optical Character Recognition (OCR), wherein the at least one region encompasses a screen area no greater than 75% of a maximum screen area;

performing OCR of a screen capture image of the at least one region to detect words found in the at least one region; and

identifying a page based on a match of the detected words to a word map.

2. The method of claim 1, further comprising performing pre-processing of the screen capture image of the at least one region prior to performing OCR.

3. The method of claim 2, wherein the pre-processing comprises performing a resizing to increase a minimum font size.

4. The method of claim 2, wherein the pre-processing comprises combining individual screen capture images of each region of the at least one region.

5. The method of claim 2, wherein the pre-processing comprises performing at least one operation to distinguish text from a background.

6. The method of claim 5, comprising performing grayscale conversion, inversion, and thresholding to distinguish text from its background.

7. The method of claim 1, wherein configuring the at least one region specifying at least one rectangular region of the application.

8. The method of claim 1, further comprising configuring a language of the OCR.

9. The method of claim 1, further comprising performing post-processing of an output of the OCR, the post processing including generating an array of words.

10. The method of claim 1, wherein identifying the page comprises mapping a page name to the detected words based on one or more logical conditions.

11. The method of claim 1, further comprising identifying a page change based on a distance algorithm having a pre-selected threshold of a change in text defining a page change.

12. The method of claim 1, further comprising providing the page identification to a digital adoption platform.

13. A page identification system, comprising:

a configuration engine to configure at least one region of an application screen of a graphical user interface of an application for Optical Character Recognition (OCR), wherein the at least one region encompasses a screen area no greater than 75% of a maximum screen area;

an OCR module to perform OCR of a screen capture image of the at least one region to detect words found in the at least one region; and

a page identification module to identify a page of the application based on a match of the detected words to a word map.

14. The system of claim 13, further comprising a pre-processing module to perform pre-processing of the at least one region prior to performing OCR.

15. The page identification system of claim 14, wherein the pre-processing module performs a resizing to increase a minimum font size.

16. The page identification system of claim 14, wherein the pre-processing module combines individual screen capture images of each region of the at least one region.

17. The page identification system of claim 14, wherein the pre-processing module performs at least one operation to distinguish text from a background.

18. The page identification system of claim 17, wherein the at least one operation comprises performing grayscale conversion, inversion, and thresholding.

19. The page identification system of claim 13, further comprising a post-processing module to perform post-processing of an output of the OCR including cleaning up the OCR output and generating an array of words.

20. The page identification system of claim 13, wherein the page identification module comprises a mapping module to map a page name to the detected words based on one or more logical conditions.

ABSTRACT

A page identification technique is configurable to select regions of a screen for optical character recognition. The size of the regions may be selected to reduce the CPU resources needed to identify a page. Pre-processing and post-processing may be performed to improve the accuracy of the optical character recognition. A word mapping algorithm may include logical condition to determine a page name.

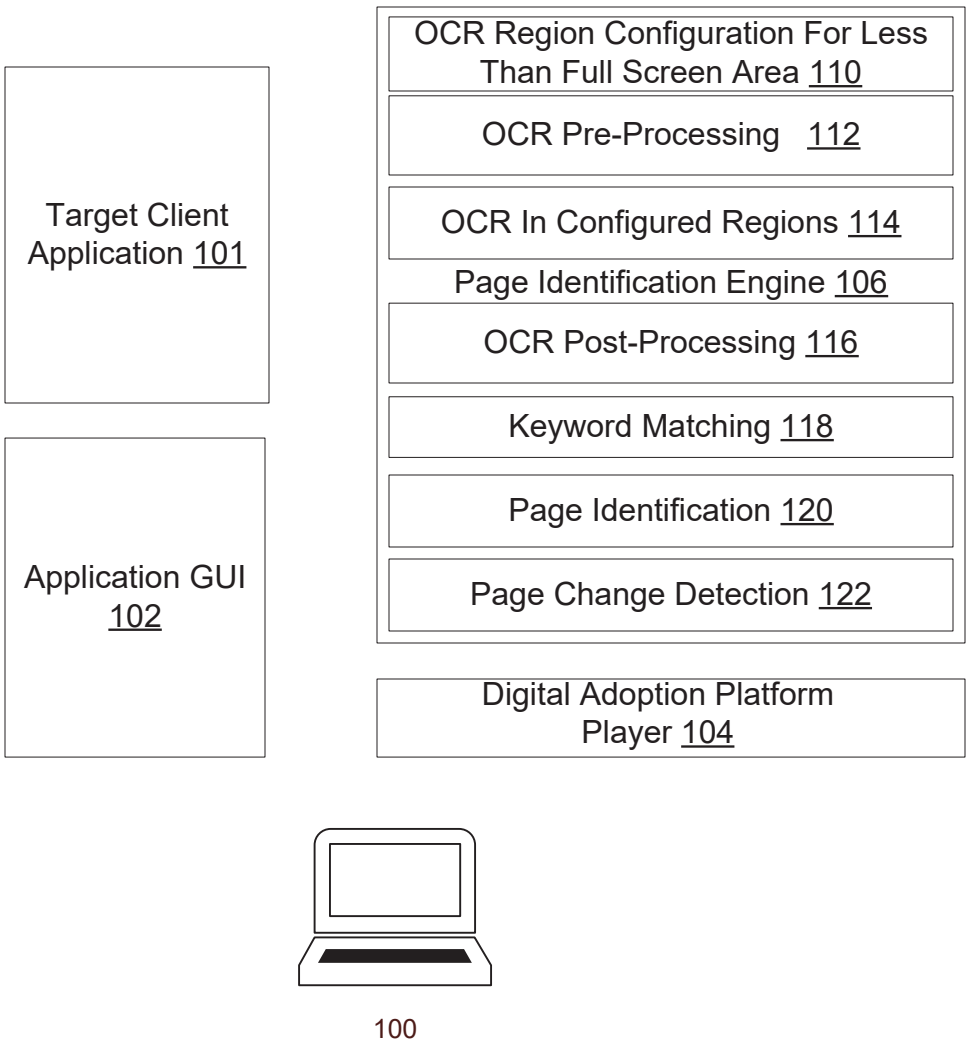
Target Client Application 101
Application GUI 102
OCR Region Configuration For Less Than Full Screen Area 110
OCR Pre-Processing 112
OCR In Configured Regions 114
Page Identification Engine 106
OCR Post-Processing 116
Keyword Matching 118
Page Identification 120
Page Change Detection 122
Digital Adoption Platform Player 104
100

Fig. 1A

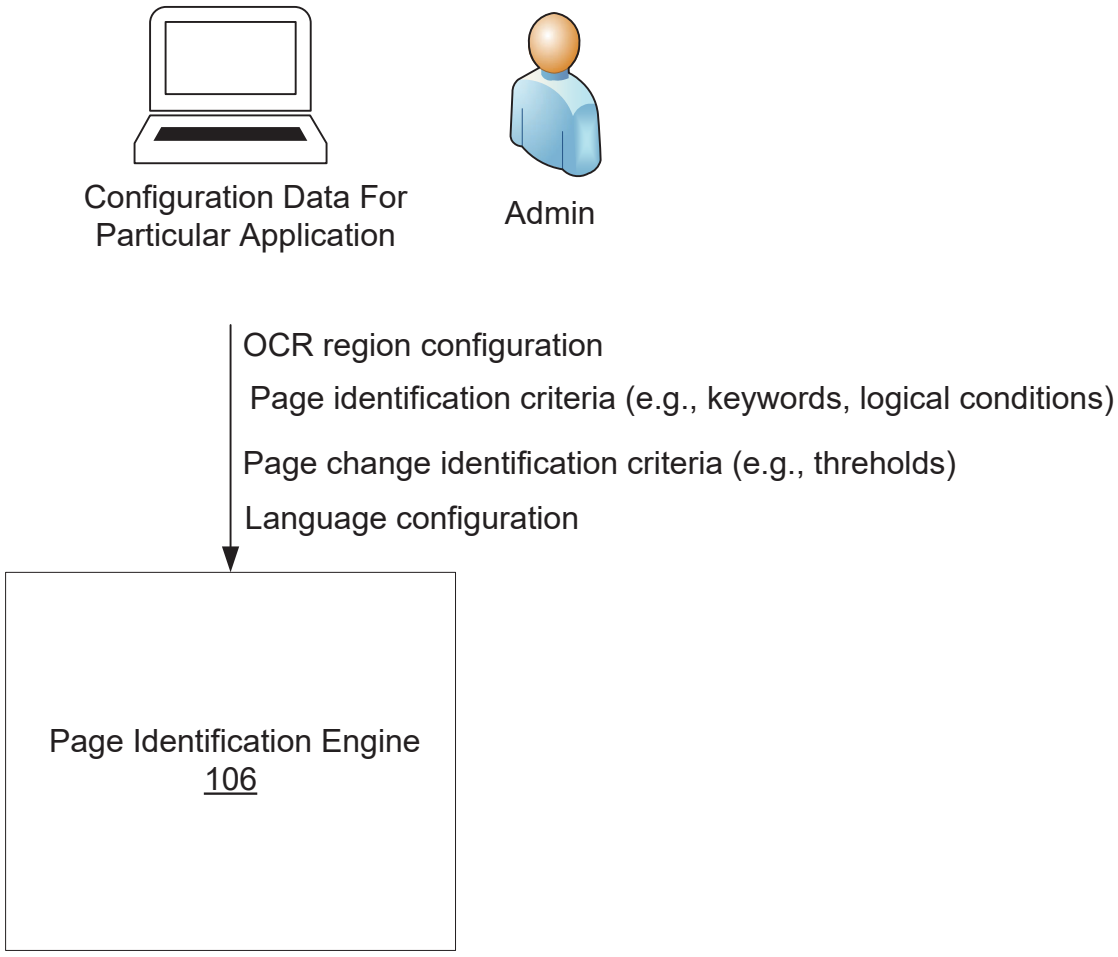
Configuration Data For Particular Application
Admin
OCR region configuration
Page identification criteria (e.g., keywords, logical conditions)
Page change identification criteria (e.g., threholds)
Language configuration
Page Identification Engine
106

Fig. 1B

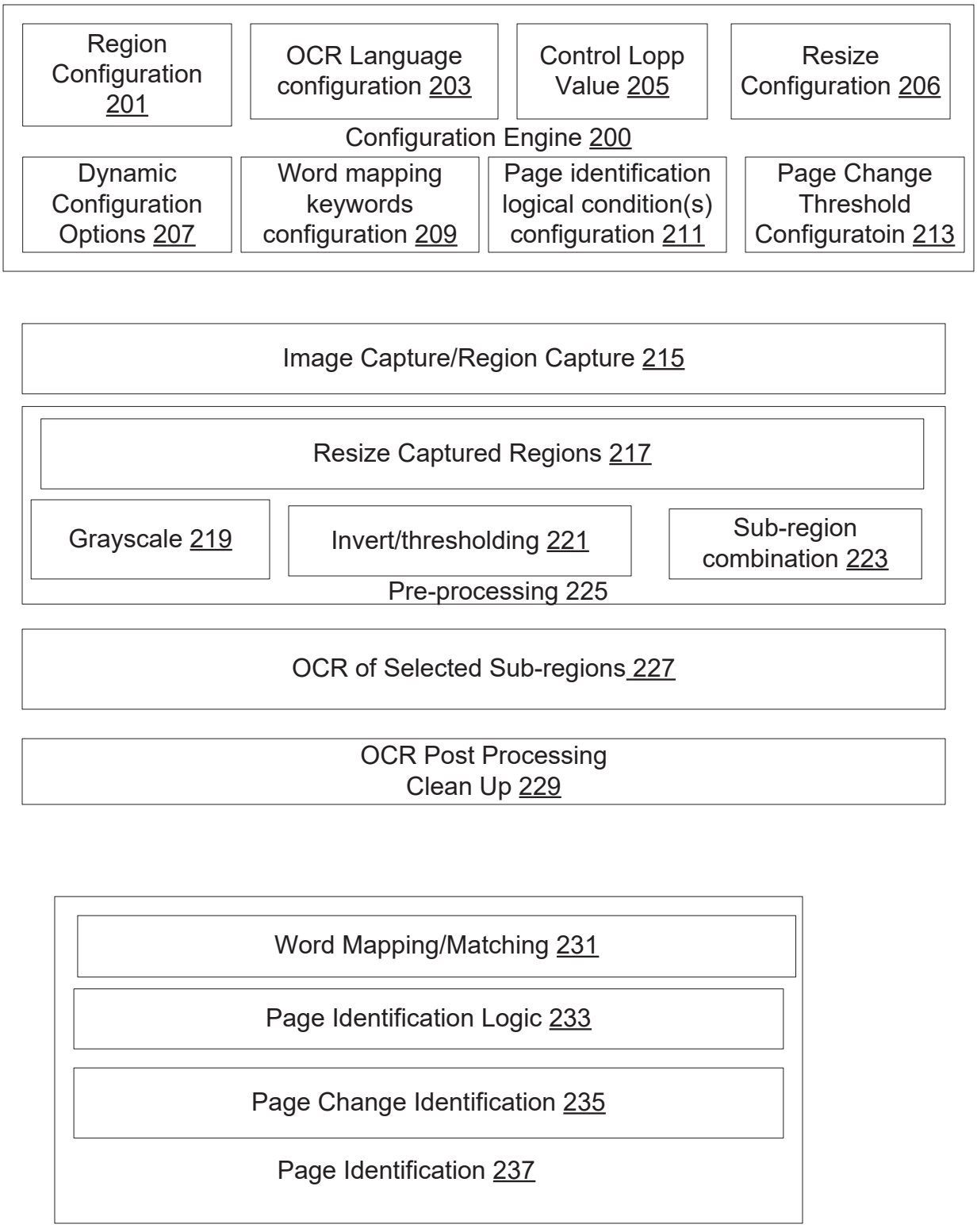
Region Configuration 201
OCR Language configuration 203
Control Lopp Value 205
Resize Configuration 206
Configuration Engine 200
Dynamic Configuration Options 207
Word mapping keywords configuration 209
Page identification logical condition(s) configuration 211
Page Change Threshold Configuratoin 213
Image Capture/Region Capture 215
Resize Captured Regions 217
Grayscale 219
Invert/thresholding 221
Sub-region combination 223
Pre-processing 225
OCR of Selected Sub-regions 227
OCR Post Processing Clean Up 229
Word Mapping/Matching 231
Page Identification Logic 233
Page Change Identification 235
Page Identification 237

Fig. 2

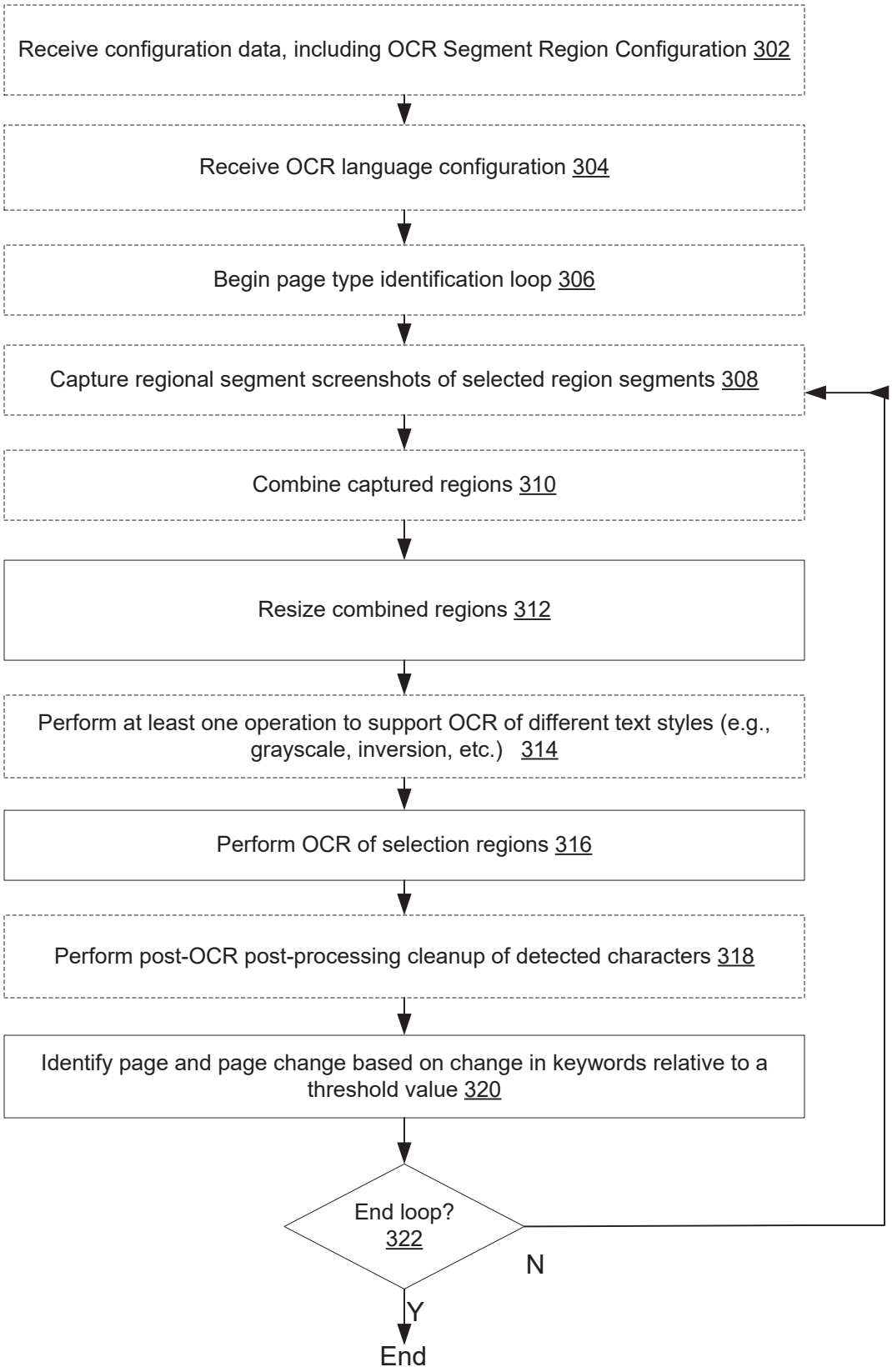
Receive configuration data, including OCR Segment Region Configuration 302
Receive OCR language configuration 304
Begin page type identification loop 306
Capture regional segment screenshots of selected region segments 308
Combine captured regions 310
Resize combined regions 312
Perform at least one operation to support OCR of different text styles (e.g., grayscale, inversion, etc.) 314
Perform OCR of selection regions 316
Perform post-OCR post-processing cleanup of detected characters 318
Identify page and page change based on change in keywords relative to a threshold value 320
End loop? 322
N
Y
End

Fig. 3

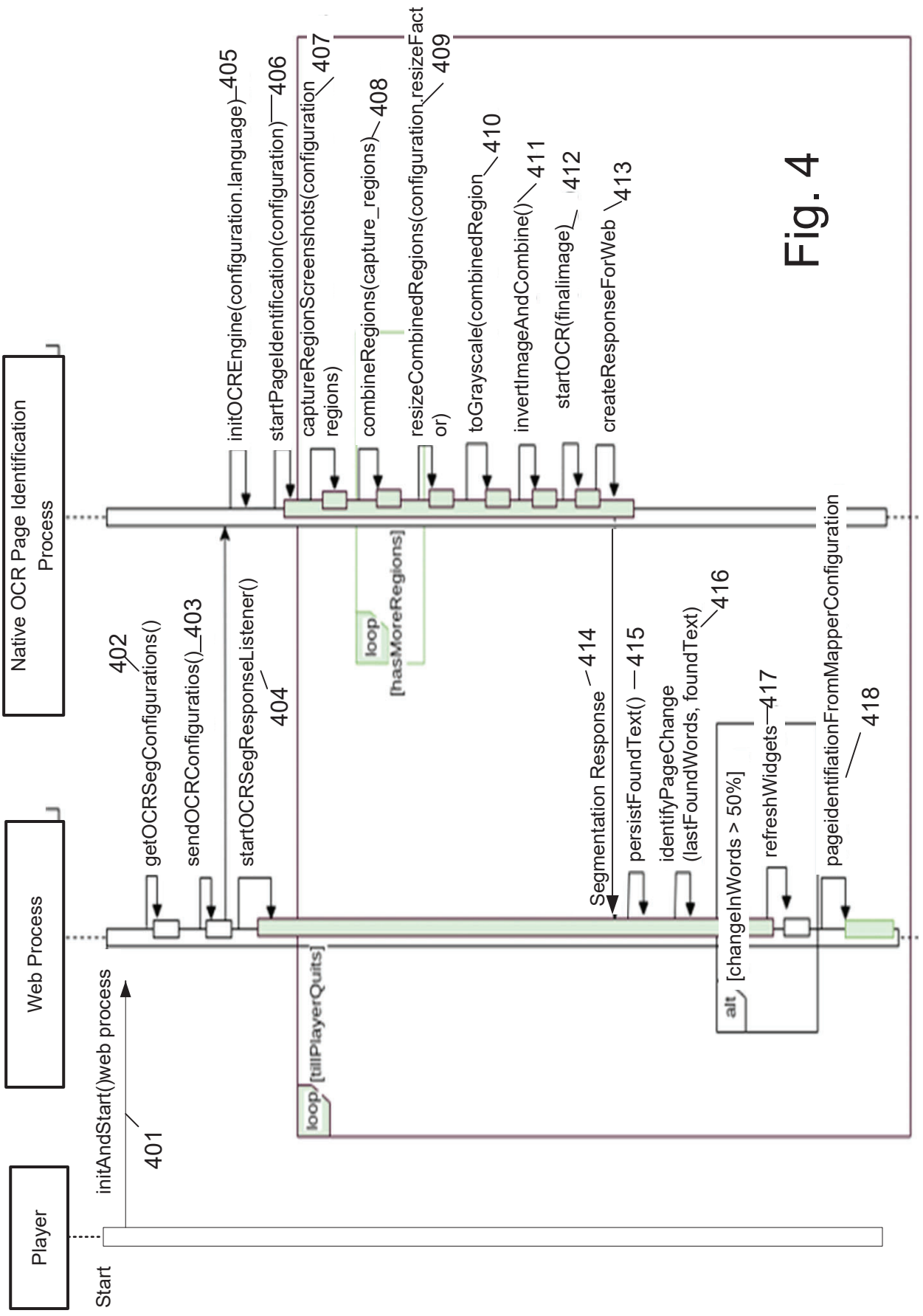
Player
Web Process
Native OCR Page Identification Process
Start
initAndStart()web process
401
getOCRSegConfigurations()
402
sendOCRConfiguratios()
403
startOCRSegResponseListener()
404
initOCREngine(configuration.language)
405
startPageIdentification(configuration)
406
captureRegionScreenshots(configuration regions)
407
combineRegions(capture_regions)
408
resizeCombinedRegions(configuration,resizeFactor)
409
toGrayscale(combinedRegion
410
invertImageAndCombine()
411
startOCR(finalimage)
412
createResponseForWeb
413
Segmentation Response
414
persistFoundText()
415
identifyPageChange (lastFoundWords, foundText)
416
refreshWidgets
417
pageidentifiationFromMapperConfiguration
418
loop [tillPlayerQuits]
loop [hasMoreRegions]
alt [changeInWords > 50%]

Fig. 4

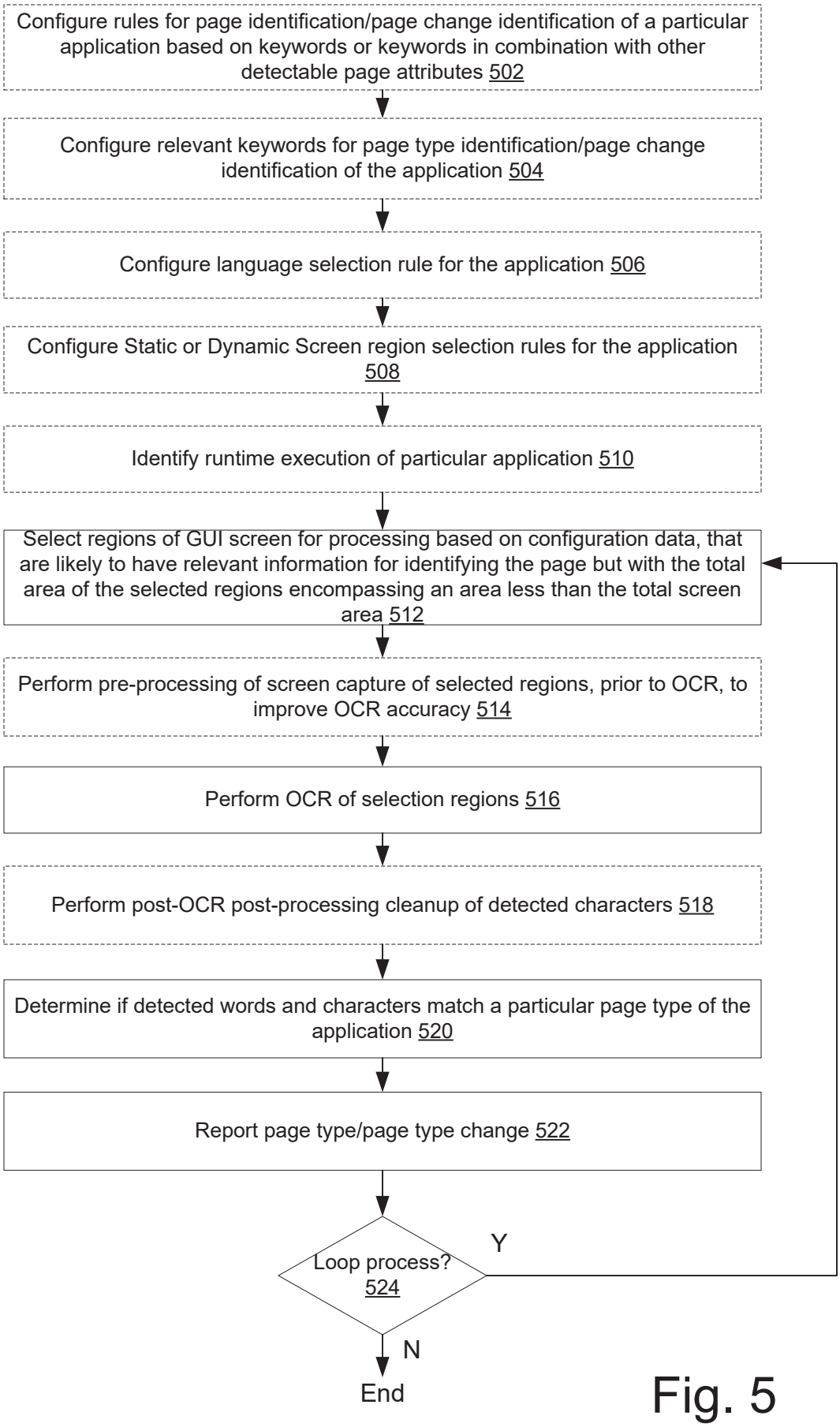
Configure rules for page identification/page change identification of a particular application based on keywords or keywords in combination with other detectable page attributes 502
Configure relevant keywords for page type identification/page change identification of the application 504
Configure language selection rule for the application 506
Configure Static or Dynamic Screen region selection rules for the application 508
Identify runtime execution of particular application 510
Select regions of GUI screen for processing based on configuration data, that are likely to have relevant information for identifying the page but with the total area of the selected regions encompassing an area less than the total screen area 512
Perform pre-processing of screen capture of selected regions, prior to OCR, to improve OCR accuracy 514
Perform OCR of selection regions 516
Perform post-OCR post-processing cleanup of detected characters 518
Determine if detected words and characters match a particular page type of the application 520
Report page type/page type change 522
Loop process? 524
Y
N
End

Fig. 5


Search
Help
Topics
Training
What's new
About
quickowhatfix
Search help
Left=0%, Top=0%, Width=50%, Height=17%
Found Text = Topics, Training, What's new, About, Help, Activity
Brainstorm with breakout rooms
Bring together smaller groups of participants within a meeting for lively discussions or brainstorming sessions.
Create breakout rooms
Breakout rooms troubleshooting
Left=0%, Top=80%, Height=20%, Width=100%
Found Text = Makes calls Plan a meeting Join in
Make calls
Calls are a quick way to connect in Teams, now with a new look and feel.
What's new in calls
Plan a meeting
See how to schedule a Teams meeting and invite people, so it's on their calendars.
Schedule a meeting
Join in!
What are the ways you can join a Teams meeting? And which are best?
Join a meeting
Activity
Chat
Teams
Calendar
Calls
Files
Apps
Help
605
602
610

Fig. 6

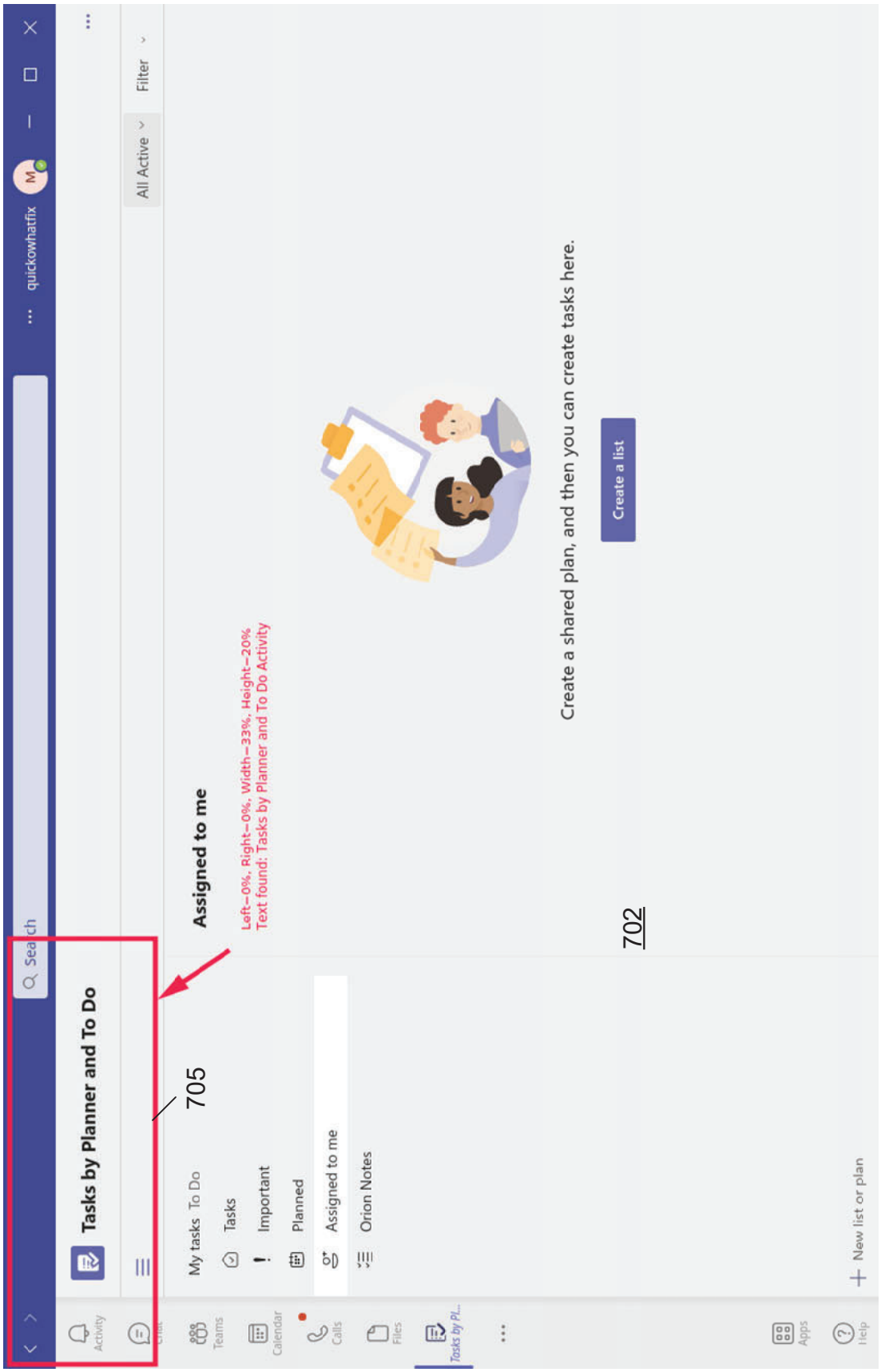
Tasks by Planner and To Do
Search
quickowhatfix
All Active
Filter
My tasks To Do
Tasks
Important
Planned
Assigned to me
Orion Notes
New list or plan
Assigned to me
Left=0%, Right=0%, Width=33%, Height=20%
Text found: Tasks by Planner and To Do Activity
Create a shared plan, and then you can create tasks here.
Create a list
705
702
Activity
Chat
Teams
Calendar
Calls
Files
Tasks by Pl...
Apps
Help

Fig. 7

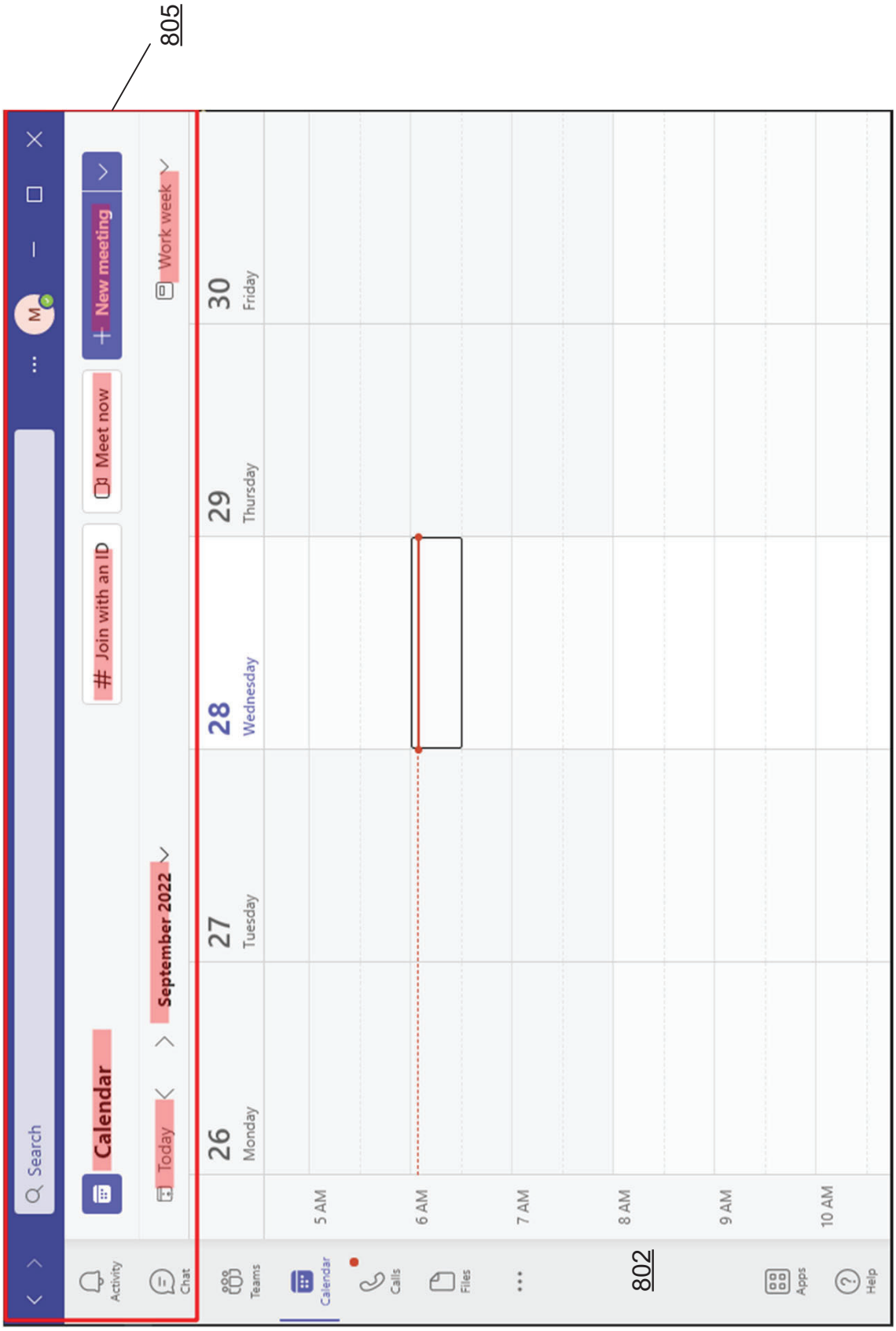
805
Search
Calendar
Today
September 2022
Join with an ID
Meet now
New meeting
Work week
26 Monday
27 Tuesday
28 Wednesday
29 Thursday
30 Friday
5 AM
6 AM
7 AM
8 AM
9 AM
10 AM
Activity
Chat
Teams
Calendar
Calls
Files
Apps
Help
802

Fig. 8

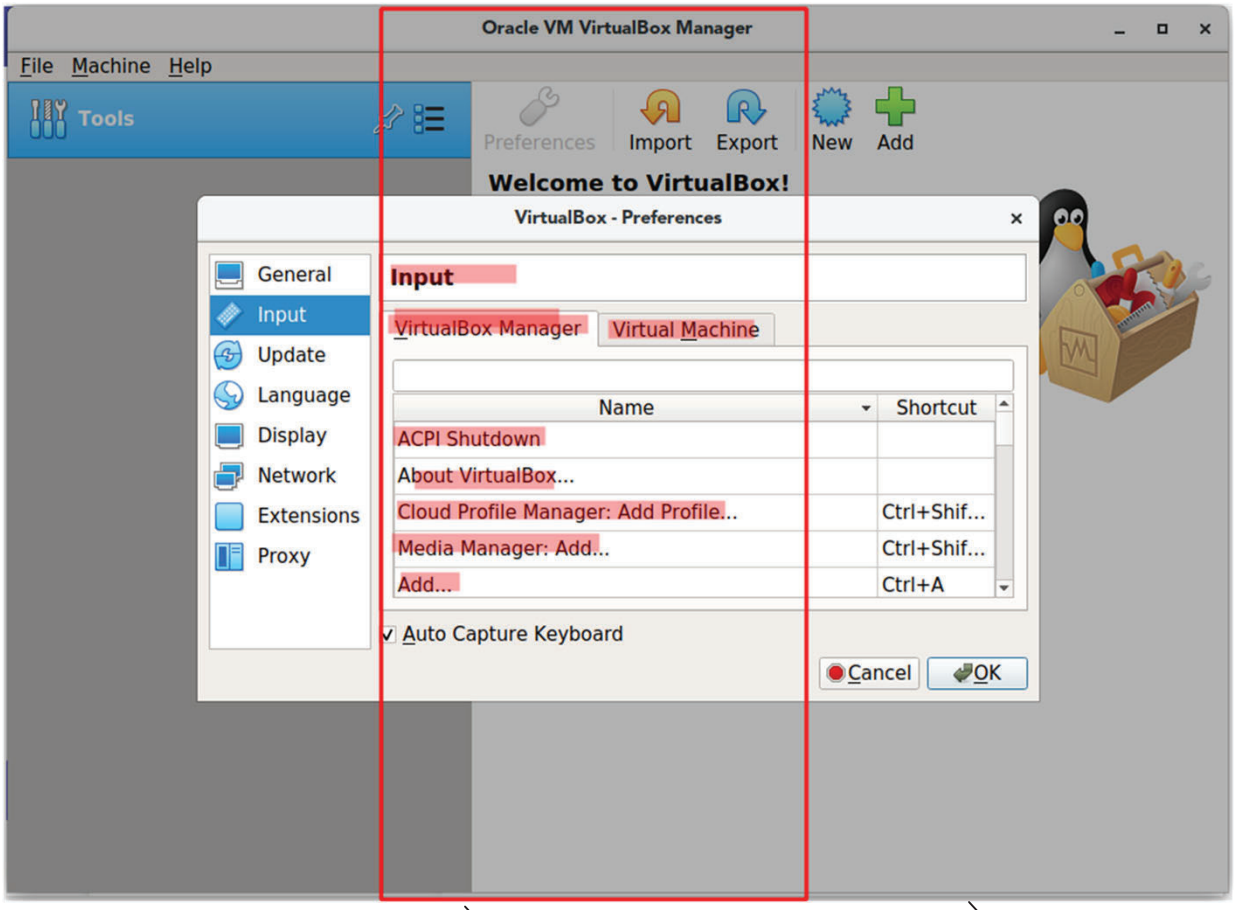
Oracle VM VirtualBox Manager
File Machine Help
Tools
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
VirtualBox - Preferences
General
Input
Update
Language
Display
Network
Extensions
Proxy
Input
VirtualBox Manager
Virtual Machine
Name
Shortcut
ACPI Shutdown
About VirtualBox...
Cloud Profile Manager: Add Profile...
Ctrl+Shif...
Media Manager: Add...
Ctrl+Shif...
Add...
Ctrl+A
Auto Capture Keyboard
Cancel
OK
905
902

Fig. 9

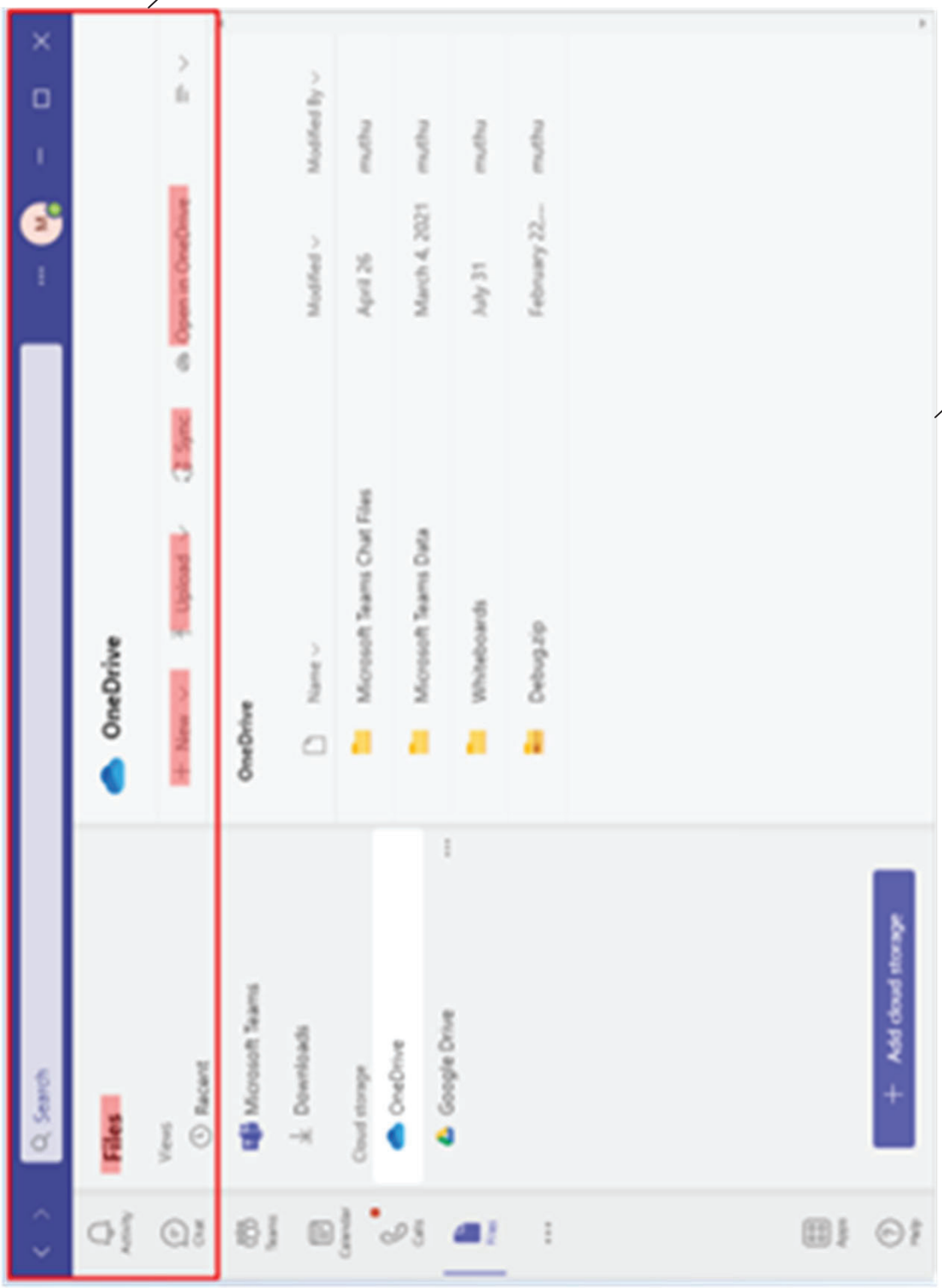
1005
1002
Search
Files
Views
Recent
Microsoft Teams
Downloads
Cloud storage
OneDrive
Google Drive
Add cloud storage
OneDrive
New
Upload
Sync
Open in OneDrive
Name
Modified
Modified By
Microsoft Teams Chat Files
Microsoft Teams Data
Whiteboards
Debug.zip
April 26
March 4, 2021
July 31
muthu

Fig. 10

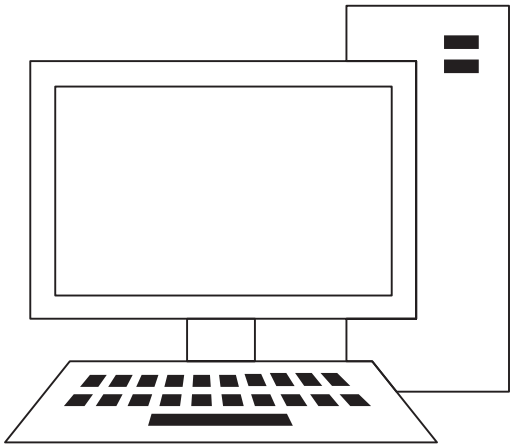

Figure 11A

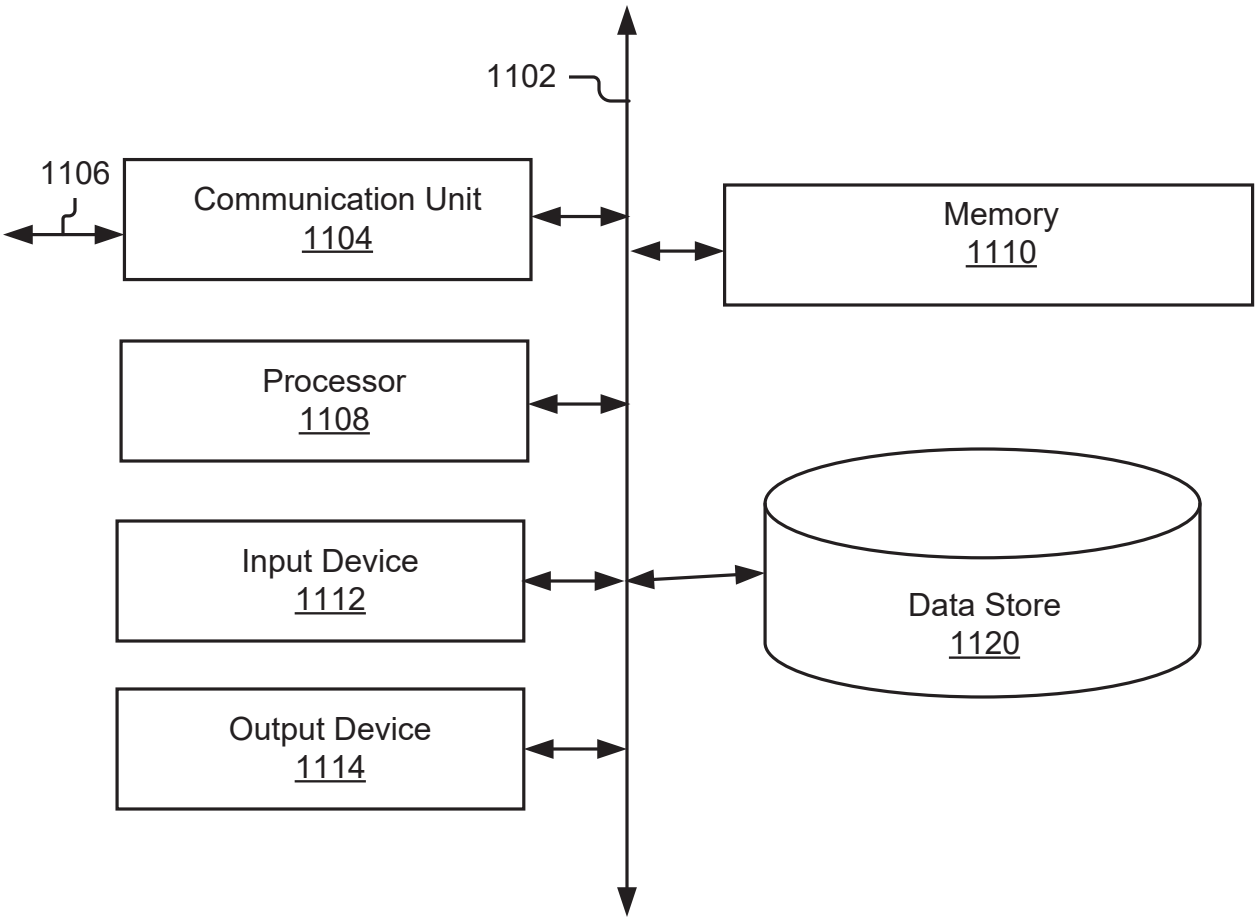

Figure 11B

PTO/AIA/01 (06-12)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [x] The attached application, or
- [ ] United States application or PCT international application number _____

filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Muthukrishnan Thukkaram Date (Optional): 11/29/2022

Signature: / DocuSigned by: Muthukrishnan Thukkaram 67F5CF2CC3AA4F7... /

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	
First Named Inventor	Muthukrishnan Thukkaram
Title	PROCESSING TECHNIQUES FOR FAST AND ACCURATE IDENTIFICATION OF APPLICATION SCREENS USING OPTICAL CHARACTER RECOGNITION
Art Unit	
Examiner Name	
Attorney Docket Number	10875-09850 US

SIGNATURE of Applicant or Patent Practitioner

Signature	/Edward Van Gieson/	Date (Optional)	
Name	Edward Van Gieson	Registration Number	44,386
Title (if Applicant is a juristic entity)	Attorney of Record		
Applicant Name (if Applicant is a juristic entity)	Whatfix Private Limited		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Document Description: Power of Attorney

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

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OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

WHATFIX PRIVATE LIMITED

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	/ DocuSigned by: Khadim Batti F1E6D4F3518942C... /	Date (Optional)	11/29/2022
Name	Khadim Hussain Ismail Batti		
Title	CEO		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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