# PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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# PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

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|---|---|---|
| Date of mailing *(day/month/year)* 20 JUN 2016 | | |
| Applicant's or agent's file reference BABA003403WO | **FOR FURTHER ACTION** See paragraph 2 below | |
| International application No. PCT/US2016/024069 | International filing date *(day/month/year)* 24 March 2016 | Priority date *(day/month/year)* 25 March 2015 |
| International Patent Classification (IPC) or both national classification and IPC<br>IPC(8) - G06F 17/27; G06K 9/00; G06K 9/12; G06K 9/18; G06K 9/34; G06K 9/46; G06K 9/48 (2016.01)<br>CPC - G06K 9/00; G06K 9/00422; G06K 9/18; G06K 9/222; G06K 9/4661; G06K 9/6256 (2016.01) | | |
| Applicant ALIBABA GROUP HOLDING LIMITED | | |

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

| Name and mailing address of the ISA/ | Date of completion of this opinion | Authorized officer |
|---|---|---|
| Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450, Alexandria, VA 22313-1450<br>Facsimile No. 571-273-8300 | 17 May 2016 | Blaine R. Copenheaver<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

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**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:
   - [x] the international application in the language in which it was filed.
   - [ ] a translation of the international application into ________________ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. [ ] This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).

3. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
   - a. [ ] forming part of the international application as filed:
     - [ ] in the form of an Annex C/ST.25 text file.
     - [ ] on paper or in the form of an image file.
   - b. [ ] furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
   - c. [ ] furnished subsequent to the international filing date for the purposes of international search only:
     - [ ] in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
     - [ ] on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. [ ] In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

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**Box No. V** **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 2-4, 6, 7, 9-11, 14-16, 18, 19 | YES |
| | Claims | 1, 5, 8, 12, 13, 17 | NO |
| Inventive step (IS) | Claims | None | YES |
| | Claims | 1-19 | NO |
| Industrial applicability (IA) | Claims | 1-19 | YES |
| | Claims | None | NO |

2. Citations and explanations:

Claims 1, 5, 8, 12, 13, and 17 lack novelty under PCT Article 33(2) as being anticipated by Kellerman et al. (hereinafter Kellerman).

Regarding Claim 1, Kellerman discloses a method of generating a text line classifier [abstract] , the method comprising:
generating text line samples using a present terminal system font reservoir; ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16])
extracting features from the text line samples and pre-stored marked-up samples; ("Similarly, the features used by the preclassifier 14 are selected both to allow efficient extraction of the features and to allow preclassification of the region of interest text with a neural network of limited complexity." [para 19]) and
training models using the extracted features to generate a text line classifier for recognizing text regions. ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image. For example, where the digital image represents an envelope, the regions of interest might include an address block on the envelope and the return address block on the envelope. Alternatively, smaller regions of interest, such as individual lines or words of text can be utilized as regions of interest by the preclassification system 160." [para 29])

Regarding Claim 5, Kellerman discloses the method of claim 1, wherein the training models comprises: generating models corresponding to types of the text line samples based on the extracted features; ("For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]) and
assigning weights to the models based on the marked up samples to generate a text line classifier. ("Since the classifiers 16-18 are optimized for text from their respective source classes, the classifiers 16-18 can segment and classify the text within the region of interest with heightened accuracy and efficiency, reducing the overall processing time of the system." [para 19])

Regarding Claim 8, Kellerman discloses an apparatus for generating a text line classifier [abstract] , the apparatus comprising:
a processor; (See Figure 1 "they can be implemented as computer programs on a common processor." [para 18]) and
a non-transitory computer-readable medium coupled to the processor, the non-transitory computer-readable medium having computer-readable instructions stored thereon to be executed by the processor, the instructions comprising: (See Figure 5 "he drives and their associated computer-readable media provide nonvolatile storage of data, data structures, and computer-executable instructions for the computer system 300." [para 46])
a generating module configured to generate text line samples using a present terminal system font reservoir; ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16])
an extracting module configured to extract features from the text line samples and pre-stored marked-up samples; ("Similarly, the features used by the preclassifier 14 are selected both to allow efficient extraction of the features and to allow preclassification of the region of interest text with a neural network of limited complexity." [para 19]) and
a training module configured to train models using the extracted features to generate a text line classifier for recognizing text regions. ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image. For example, where the digital image represents an envelope, the regions of interest might include an address block on the envelope and the return address block on the envelope. Alternatively, smaller regions of interest, such as individual lines or words of text can be utilized as regions of interest by the preclassification system 160." [para 29])

Regarding Claim 12, Kellerman discloses the apparatus of claim 8, wherein the training module is configured to generate models corresponding to types of the text line samples based on the extracted features ("For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]) and to assign weights to the models based on the marked up samples to generate a text line classifier. ("Since the classifiers 16-18 are optimized for text from their respective source classes, the classifiers 16-18 can segment and classify the text within the region of interest with heightened accuracy and efficiency, reducing the overall processing time of the system." [para 19])

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**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**
Continuation of:

Regarding Claim 13, Kellerman discloses a non-transitory computer readable storage medium having embedded therein program instructions, when executed by one or more processors of a device (See Figure 5 "he drives and their associated computer-readable media provide nonvolatile storage of data, data structures, and computer-executable instructions for the computer system 300." [para 46]), causes the device to execute a process for generating a text line classifier, the process comprising: generating text line samples using a present terminal system font reservoir; ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16])
extracting features from the text line samples and pre-stored marked-up samples; ("Similarly, the features used by the preclassifier 14 are selected both to allow efficient extraction of the features and to allow preclassification of the region of interest text with a neural network of limited complexity." [para 19]) and
training models using the extracted features to generate a text line classifier for recognizing text regions. ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image. For example, where the digital image represents an envelope, the regions of interest might include an address block on the envelope and the return address block on the envelope. Alternatively, smaller regions of interest, such as individual lines or words of text can be utilized as regions of interest by the preclassification system 160." [para 29])

Regarding Claim 17, Kellerman discloses the non-transitory computer readable storage medium of claim 13, wherein the training models comprises: generating models corresponding to types of the text line samples based on the extracted features; ("For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]) and assigning weights to the models based on the marked up samples to generate a text line classifier. ("Since the classifiers 16-18 are optimized for text from their respective source classes, the classifiers 16-18 can segment and classify the text within the region of interest with heightened accuracy and efficiency, reducing the overall processing time of the system." [para 19])

Claims 2, 9, and 14 lack an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Vincent et al. (hereinafter Vincent).

Regarding Claim 2, Kellerman discloses the method of claim 1, further comprising: generating a score using the generated text line classifier for the detection result; (See Figure 2 [para 21-26] which describes using a classifier to generate a score) determining that the image is a text region if the score is greater than a pre-determined threshold; ("In the exemplary system, the class with the highest associated probability is selected, so long as the probability exceeds a predetermined threshold value." [para 27])
Kellerman fails to explicitly disclose detecting an image to be recognized to obtain a detection result; and determining that the image is a non-text region if the score is less than the pre-determined threshold.
Vincent in the field of text identification and recognition in images [para 06] teaches detecting an image to be recognized to obtain a detection result; ("Different training sets of text and non-text patters can be used when training the classifier to detect text in different types of images." [para 55]) and determining that the image is a non-text region if the score is less than the pre-determined threshold. ("Identified characters can be further processed, for example, to eliminate nonsense results generated by the character recognition program in an attempt to identify text from non-text features in a candidate text region." [para 41])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Vincent for the purpose of eliminating nonsense results [Vincent para 41]

Regarding Claim 9, Kellerman discloses the apparatus of claim 8, further comprising: aa recognizing module configured to generate a score using the generated text line classifier for the detection result (See Figure 2 [para 21-26] which describes using a classifier to generate a score), wherein the recognition module determines that the image is a text region if the score is greater than a pre-determined threshold; ("In the exemplary system, the class with the highest associated probability is selected, so long as the probability exceeds a predetermined threshold value." [para 27])
Kellerman fails to explicitly disclose a detecting module configured to detect an image to be recognized to obtain a detection result;and wherein the recognition module determines that the image is a non-text region if the score is less than the pre-determined threshold.
Vincent teaches a detecting module configured to detect an image to be recognized to obtain a detection result; ("Different training sets of text and non-text patters can be used when training the classifier to detect text in different types of images." [para 55]) and wherein the recognition module determines that the image is a non-text region if the score is less than the pre-determined threshold. ("Identified characters can be further processed, for example, to eliminate nonsense results generated by the character recognition program in an attempt to identify text from non-text features in a candidate text region." [para 41])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Vincent for the purpose of eliminating nonsense results [Vincent para 41]

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**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**
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Regarding Claim 14, Kellerman discloses the non-transitory computer readable storage medium of claim 13, wherein the process further comprises: generating a score using the generated text line classifier for the detection result; (See Figure 2 [para 21-26] which describes using a classifier to generate a score)
determining that the image is a text region if the score is greater than a pre-determined threshold; ("In the exemplary system, the class with the highest associated probability is selected, so long as the probability exceeds a predetermined threshold value." [para 27])
Kellerman fails to explicitly disclose detecting an image to be recognized to obtain a detection result; and determining that the image is a non-text region if the score is less than the pre-determined threshold.
Vincent teaches detecting an image to be recognized to obtain a detection result; ("Different training sets of text and non-text patters can be used when training the classifier to detect text in different types of images." [para 55]) and determining that the image is a non-text region if the score is less than the pre-determined threshold. ("Identified characters can be further processed, for example, to eliminate nonsense results generated by the character recognition program in an attempt to identify text from non-text features in a candidate text region." [para 41])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Vincent for the purpose of eliminating nonsense results [Vincent para 41]

Claims 3, 4, 10, 11, 15, and 16 lack an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Tachikawa et al. (hereinafter Tachikawa).

Regarding Claim 3, Kellerman discloses the method of claim 1, wherein the generating text line samples comprises: generating character samples using the present terminal system font reservoir; ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]) and
processing the character samples to generate text line samples of different types, wherein a text line sample comprises character samples of: a same size; ("These image features can include features associated with the size, shape, and pixel density of the region, as well as the size, shape, and pixel density of subregions defined within the region of interest." [para 42]) and
a same font, ("Each output class of the preclassifier represents a particular type of text having characteristics related to an associated source. For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script font" [para 16]) and
wherein a text line sample has a percentage of commonly used characters greater than a pre-determined threshold. ("Each classifier 16-18 is associated with one of the plurality of sources classes and is optimized to identify text having the characteristics of its associated source class." [para 18])
Kellerman fails to explicitly disclose a same rotation angle;
Tachikawa in the field of character recognition using rotation angle [col 2: 28-45] teaches a same rotation angle; ( "Then, the rotation angle discriminator 31 decides which one of the first through third recognition distances is the smallest. The smaller the recognition distance is between the actual character and the candidate character, the greater the probability is that the candidate character is the actual character." [col 13: 33-46])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using a rotation angle to discriminate the character [Tachikawa col 13: 33-46]

Regarding Claim 4, Kellerman discloses the method of claim 1, wherein the extracting features from the text line samples and pre-stored marked-up samples comprises: obtaining continuous regions of the text line samples and the marked-up samples; ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image [para 29]) and
extracting features of the continuous regions. ("The feature extractor 164 extracts a plurality of feature values, corresponding to a feature set for the preclassification system 150, from each region of interest in the scanned text." [para 30])
Kellerman fails to explicitly disclose extracting, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature;
Tachikawa teaches extracting, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature; (See Figure 4 [col 5: 3-46] which describes extracting the histogram feature, including orientation and rotation)
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using an orientation histogram to extract a feature [Tachikawa col 5: 3-46]

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**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**
Continuation of:

Regarding Claim 10, Kellerman discloses the apparatus of claim 8, wherein the generating module is configured to generate character samples using the present terminal system font reservoir and configured to process the character samples to generate text line samples of different types ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]), and wherein a text line sample comprises character samples of:
a same size; ("These image features can include features associated with the size, shape, and pixel density of the region, as well as the size, shape, and pixel density of subregions defined within the region of interest." [para 42]) and
a same font, ("Each output class of the preclassifier represents a particular type of text having characteristics related to an associated source. For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script font" [para 16]) and wherein a text line sample has a percentage of commonly used characters greater than a pre-determined threshold. ("Each classifier 16-18 is associated with one of the plurality of sources classes and is optimized to identify text having the characteristics of its associated source class." [para 18])
Kellerman fails to explicitly disclose a same rotation angle;
Tachikawa teaches a same rotation angle; ( "Then, the rotation angle discriminator 31 decides which one of the first through third recognition distances is the smallest. The smaller the recognition distance is between the actual character and the candidate character, the greater the probability is that the candidate character is the actual character." [col 13: 33-46])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using a rotation angle to discriminate the character [Tachikawa col 13: 33-46]

Regarding Claim 11, Kellerman discloses the apparatus of claim 8, wherein the extracting module comprises: a second extracting module configured to obtain continuous regions of the text line samples and the marked-up samples ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image [para 29]) and to extract features of the continuous regions. ("The feature extractor 164 extracts a plurality of feature values, corresponding to a feature set for the preclassification system 150, from each region of interest in the scanned text." [para 30])
Kellerman fails to explicitly disclose a first extracting module configured to extract, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature;
Tachikawa teaches a first extracting module configured to extract, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature; (See Figure 4 [col 5: 3-46] which describes extracting the histogram feature, including orientation and rotation)
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using an orientation histogram to extract a feature [Tachikawa col 5: 3-46]

Regarding Claim 15, Kellerman discloses the non-transitory computer readable storage medium of claim 13, wherein the generating text line samples comprises: generating character samples using the present terminal system font reservoir; ("Typically, each classifier 176, 186, and 196 will have been trained on a series of training samples belonging to the source class prior to operation of the system." [para 40]; see also "For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script fonts." [para 16]) and
processing the character samples to generate text line samples of different types, wherein a text line sample comprises character samples of:
a same size; ("These image features can include features associated with the size, shape, and pixel density of the region, as well as the size, shape, and pixel density of subregions defined within the region of interest." [para 42]) and
a same font, ("Each output class of the preclassifier represents a particular type of text having characteristics related to an associated source. For example, the source classes can include a class for handwritten text, a class for hand printed text, a class for machine printed text, and a class for machine script, a class for italics, etc. Alternatively, the classes can represent different machine script font" [para 16]) and
wherein a text line sample has a percentage of commonly used characters greater than a pre-determined threshold. ("Each classifier 16-18 is associated with one of the plurality of sources classes and is optimized to identify text having the characteristics of its associated source class." [para 18])
Kellerman fails to explicitly disclose a same rotation angle;
Tachikawa teaches a same rotation angle; ( "Then, the rotation angle discriminator 31 decides which one of the first through third recognition distances is the smallest. The smaller the recognition distance is between the actual character and the candidate character, the greater the probability is that the candidate character is the actual character." [col 13: 33-46])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using a orientation histogram to extract a feature [Tachikawa col 5: 3-46]

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**Supplemental Box**

In case **the space in any of the preceding boxes is not sufficient.**
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Regarding Claim 16, Kellerman discloses the non-transitory computer readable storage medium of claim 13, wherein the extracting features from the text line samples and pre-stored marked-up samples comprises: obtaining continuous regions of the text line samples and the marked-up samples; ("The preclassification system 160 includes a global preprocessing component 162 that identifies and segments one or more regions of interest on a digital image [para 29]) and extracting features of the continuous regions. ("The feature extractor 164 extracts a plurality of feature values, corresponding to a feature set for the preclassification system 150, from each region of interest in the scanned text." [para 30])
Kellerman fails to explicitly disclose extracting, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature;
Tachikawa teaches extracting, from images corresponding to the text line samples, one or more of a gradient orientation histogram feature, a gradient magnitude histogram feature, a pixel histogram feature, and a pixel histogram change feature; (See Figure 4 [col 5: 3-46] which describes extracting the histogram feature, including orientation and rotation)
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Tachikawa for the purpose of using an orientation histogram to extract a feature [Tachikawa col 5: 3-46]

Claim 6 lacks an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Tachikawa et al. (hereinafter Tachikawa) and Baheti et al. (hereinafter Baheti).

Regarding Claim 6, Kellerman fails to explicitly disclose the method of claim 4, wherein the obtaining continuous regions of the marked-up samples comprises: obtaining continuous regions using a first estimation algorithm, the first estimation algorithm comprising a maximal stable extremal region (MSER) algorithm and an algorithm based upon the MSER algorithm.
Baheti in the field of automatically identify regions of OCR [para 11] teaches obtaining continuous regions using a first estimation algorithm, the first estimation algorithm comprising a maximal stable extremal region (MSER) algorithm and an algorithm based upon the MSER algorithm. (See Figure 3A "After performing the act 311, in act 312 in operation 310 (FIG. 3A), the one or more processors 409 in mobile device 401 check if certain predetermined constraints [algorithm] for identifying regions, e.g. MSER are satisfied" [para 44])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Baheti for the purpose of reduce comparisons in identifying regions of interest [Baheti para 33]

Claim 7 lacks an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Tachikawa et al. (hereinafter Tachikawa) and Su.

Regarding Claim 7, Kellerman fails to explicitly disclose the method of claim 4, wherein the extracting features of the continuous regions further comprises: utilizing a second estimation algorithm to obtain stroke width features for the continuous region, wherein the second estimation algorithm comprises a stroke width transform (SWT) algorithm and a stroke feature transform (SFT) algorithm.
Su in the field of improved character recognition [col 2: 3-4] teaches utilizing a second estimation algorithm to obtain stroke width features for the continuous region, wherein the second estimation algorithm comprises a stroke width transform (SWT) algorithm and a stroke feature transform (SFT) algorithm. (See Figures 12A-12G [col 7: 13-68] which describes using stroke width and stroke feature transformation algorithms)
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Su for the purpose of increasing reliability in the system [Su col 4: 50-59]

Claim 18 lacks an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Baheti et al. (hereinafter Baheti).

Regarding Claim 18, Kellerman fails to explicitly disclose the non-transitory computer readable storage medium of claim 13, wherein the obtaining continuous regions of the marked-up samples comprises: obtaining continuous regions by a first estimation algorithm, the first estimation algorithm comprising a maximal stable extremal region (MSER) algorithm and an algorithm based upon the MSER algorithm.
Baheti teaches obtaining continuous regions by a first estimation algorithm, the first estimation algorithm comprising a maximal stable extremal region (MSER) algorithm and an algorithm based upon the MSER algorithm. (See Figure 3A "fter performing the act 311, in act 312 in operation 310 (FIG. 3A), the one or more processors 409 in mobile device 401 check if certain predetermined constraints [algorithm] for identifying regions, e.g. MSER are satisfied" [para 44])
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Baheti for the purpose of reduce comparisons in identifying regions of interest [Baheti para 33]

Claim 19 lacks an inventive step under PCT Article 33(3) as being obvious over Kellerman et al. (hereinafter Kellerman) in view of Su.

Regarding Claim 19, Kellerman fails to explicitly disclose the non-transitory computer readable storage medium of claim 13, wherein the extracting features of the continuous regions comprises: utilizing a second estimation algorithm to obtain stroke width features for the continuous region, wherein the second estimation algorithm comprises a stroke width transform (SWT) algorithm and a stroke feature transform (SFT) algorithm
Su teaches utilizing a second estimation algorithm to obtain stroke width features for the continuous region, wherein the second estimation algorithm comprises a stroke width transform (SWT) algorithm and a stroke feature transform (SFT) algorithm. (See Figures 12A-12G [col 7: 13-68] which describes using stroke width and stroke feature transformation algorithms)
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kellerman with the teaching of Su for the purpose of of increasing reliability in the system [Su col 4: 50-59]

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**Supplemental Box**

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Claims 1-19 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.