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A STUDY ON MOUNT EXTRACTION TECHNIQUE FOR HUMAN PALM SYMBOL DETECTION

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***Abstract*— This paper is listening carefully on reading of an algorithm to segment the human palm into a number of considerable regions. Segmentation of the palm is essential for usual spot recognition, pattern alike, and object detection by the computer. Consequence quality of the algorithm is that, it does not include human being contribution all over the process. The fields like criminology, fingerprint detection, security, medicinal science, and palmistry require suspicious study of dissimilar sections of palm. at this instant days, every one of these fields are considered, except still present are a number of steps in all places person giving is needed. The inhabited algorithm removes the dependability of human being in every one on top of mentioned processes.**

***Keywords*— Digital Image Processing; Segmentation; Mark detection; Model matching; Health Palmistry; Mounts and symbols in human being Palm**

I. INTRODUCTION

Segmentation is a digital image processing and examination arrangement which divides the spatial region, on which the photograph is defined, into "important" parts or regions. This important part may be a whole item or may well be a part of it. Mark exposure is a method to locate a specific mark in the precise figure or part of that outline.

Model similar is a figure processing method in which two descriptions are compared pixel by pixel and comparable between two descriptions is determined. There are a number of areas anywhere learn of unrelated regions of palm is made. Criminology requires a measure of facial manifestation of human being palm to be measured very carefully. This includes find out of finger prints, patterns as well as signs there in creature being palm. Finger publish identical is moreover implemented for security reason. Similar to finger print identical, palm matching is moreover well conventional security measure.

Medical science studies the palm for dissimilar shade of disparate region to acquire carry in winding up creation. Disparate colors seen at unrelated regions in palm are based on blood circulation at that region as well as happening of illness in human being body. By observing these colors carefully remedial science has derived a number of conclusions, based on which remedial practitioners get principal plan in relative to the health of patient.

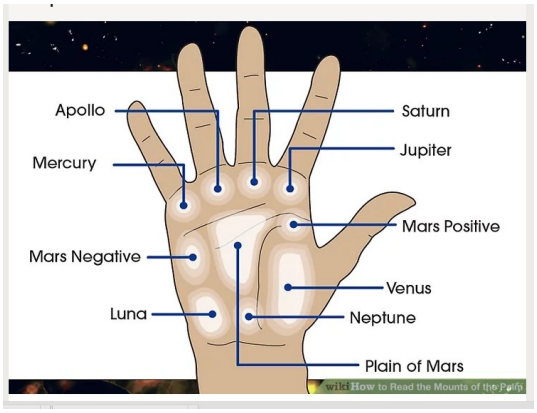


Figure S1: Mounts in individual palm

Palmistry is also single field anywhere learn of disparate regions of palm is inclusive to make out substantial and psychological activities of human being. In the palmistry, the palm is divided into eight central regions called "mounts". Learn of colors of these mounts and certain symbols fashion on the mounts contains a large consequence for the expert palmist. The mounts are the areas in the palm. At the starting point of every finger the area is called mount. This region is developed thicker than other regions of palm. One should think about that coaching manual work will have the conclusion of binding the hand among a rougher and thicker enhancement of crust, however it does not lower or shrink the mounts.

As shown in figure S1, the eight mounts in human being palm namely, Jupiter, Saturn, Sun, Mercury, Luna, Venus, Upper Mars, and Lower Mars. One should message with the purpose of these names are not related in any judgment with astrological palmistry.

Figure S2 display a variety of signs which could be established in creature being palm on definite mounts.

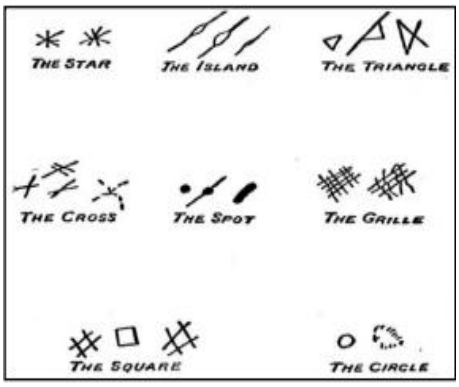


Figure S2: Symbols which could be found on mounts

An algorithm is considered and applies for segmentation of human being palm in such a come secure to that each of the prominent than bring up mount is separated. Later than untying each mount the urbanized model searches each mount for unambiguous health marker symbol on relevant mount. Pattern matching techniques are used in the process of mark acknowledgment.

II. WORK INVOLVEMENT

An algorithm for mount disappearance is upcoming at this point. The main goal of this algorithm is to segment the human being palm in eight breaks up mounts and to stay them as split up descriptions. Later than applying this algorithm to both of the palms, prototype gets total fifteen images; that is, eight mounts of right palm, and eight mounts from left palm. The algorithm is implemented using ASP.Net with C# as scripting idiom.

III. THE ALGORITHM FOR MOUNT WITHDRAWAL

To understanding the algorithm for mount pulling out, the skeleton of palm is to be untried very carefully. Figure S3 has a big consequence in the bearing of be aware of the reason behind this algorithm. The palm shown in figure S3 is the front side image of scanned palm. The points from 1 to 10 have challenging consequence which is mentioned in table S1.

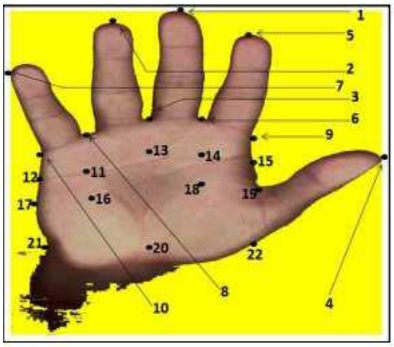


Figure 3: Points of substance for Mount Extraction

Table S1: Enlightenment of the numbers in figure S3 by the algorithm

Number of Point in figure 3	Interpretation in algorithm
1	Top of the tallest finger
2	Top of the ring finger
3	Left base of the tallest finger (Right base of the ring finger)
4	Top of the Thumb (Rightmost point in the image)
5	Top of the index finger
6	Left base of the index finger (Right base of the tallest finger)
7	Top of the smallest finger
8	Left base of the ring finger (Right base of the smallest finger)
9	Right base of the index finger
10	Left base of the smallest finger

Testimonial: this algorithm assumes that the palm is scanned by security common space concerning the fingers as shown in figure S3. Therefore, the space between directions of any two fingers is smallest 200 pixels.

Algorithm

Input: the cropped illustration of scanned precise palm input of this algorithm, to generate by algorithm in the model for extract a portion of a given image using color privilege.

Steps:

1. For scan line y=0, find the value of first x synchronize whose RGB module value is not equal to (255, 255, 0); this point say (x_tallest,0) will give point number aa1.
2. For each scan line y starting from y=0 and x=0 to the x = x_tallest - 200, find the value of first x bring together whose RGB component value is not equal to (255, 255, 0); this point say (x_ring,y_ring) will give point number aa2
3. For each scan line y opening from y = y_ring and x= x_ring + (x_tallest – x_ring)/2 to the x = x_tallest, find the value of first x coordinate whose RGB section value is not equal to (255, 255, 0); this point say (x_baseLT, y_baseLT) will give point number aa3
4. For each scan line y preliminary from y = 0 and x = image_width, find the first y-coordinate whose RGB component value is not equal to (255, 255, 0); this point say (image_width, y_rightmost) will give point number aa4.
5. For each scan line y starting from y = 0 and x = x_tallest + 200 to y < y_rightmost, find the first pixel whose RGB component value is not equal to (255, 255, 0); this point say (x_ring, y_ring) will give point number aa5
6. For each scan line y starting from y = y_ring and x = x_tallest + (x_ring - x_tallest)/2 to y = image_height/2 and x = x_tallest, find the first pixel whose RGB component value is not equal to (255, 255, 0); this pixel say (x_baseLI, y_baseLI) will give point number aa6.
7. For x = 0 in each scan line y starting from y = 0, find the first y coordinate whose RGB component value is not equal to (255, 255, 0); this point say (0, y_smallest) will give point number aa7.
8. For each scan line y starting from y = y_ring and x = x_ring/2 to y = image_height/2 and x = x_ring, find the first pixel whose RGB component value is not equal to (255, 255, 0); this point say (x_baseLR, y_baseLR) will give point number aa8.
9. For scan line y = y_baseLT + (y_baseLR – y_baseLT) / 2 and x = x_baseLI to x = image_width, find first x coordinate whose RGB component value is not equal to (255, 255, 0); this point say (x_baseRI, y_baseLT + (y_baseLR – y_baseLT) / 2) will give point number aa9.
10. For scan line y = y_baseLR + (y_baseLR – y_baseLT) / 2 and x = x_baseLR to x = 0, find first x coordinage whose RGB component value is not equal to (255, 255, 0); this point say (x_baseLS, y_baseLS) will give point number aa10.
11. Plot a pixel whose x-coordinate value = x_baseLR and y-coordinate value = y_baseLR + x_baseLT – x_baseLR. This pixel will give bottom right end point of the polygon region of mount of Mercury. Label this pixel as point number aa11. The same point will act as a bottom left end point of the mount of Sun, and the top right end point of the polygon region of the mount of mount of Upper Mars.
12. For scan line y = y-coordinate of point number aa11 + (y_baseLS - y_baseLR), and x = x_baseLR to x = 0, find the first point whose RGB component value is equal to (255, 255, 0), this pixel will give bottom left end point of the polygon region of mount of Mercury. Label this pixel as point number aa12. The same point will act as a top left end point of the polygon region of mount of Upper Mars.
13. Plot a pixel whose x-coordinate value = x_baseLT and y-coordinate value = y_baseLT + x_baseLI – x_baseLT. This pixel will give bottom right end point of the polygon region of mount of Sun. Label this pixel as point number aa13. The same point will act as a bottom left end point of the polygon region of the mount of Saturn.
14. Plot a pixel whose x-coordinate value = x_baseLI and y-coordinate value = y_baseLI + x_baseLI – x_baseLT. This pixel will give bottom right end point of the polygon region of mount of Saturn. Label this pixel as point number aa14. The same point will act as a bottom left end point of the polygon region of the mount of Jupiter.
15. For scan line y = y-coordinate of point number aa14 + (y_baseLT + (y_baseLR – y_baseLT) / 2 – y_baseLI), and x = x_baseLI to x = image width, find the first point whose RGB component value is equal to (255, 255, 0), this pixel will give bottom right end point of the polygon region of mount of Jupiter. Label this pixel as point number aa15. The same point will act as a top left end point of the polygon region of the mount of Lower Mars
16. Plot a pixel whose x-coordinate value = x_baseLR and y-coordinate value = y_baseLT + 2*(y-coordinate value of point number aa12 – y_baseLT) + (y-coordinate value of point number aa12 – y-coordinate value of point number aa11). This pixel will give the bottom right end point of the polygon region of mount of Upper Mars. Label the pixel as point number aa16. The same point will act as a top right end point of the polygon region of mount of Moon.
17. For scan line y = y-coordinate value of point number aa16 and x = x-coordinate value of point number aa16 to x= 0, find the first pixel whose RGB component value is equal to (255, 255, 0). This pixel will give left bottom end point of the polygon region of mount of Upper Mars. Label this pixel as point number aa17. The same point

will act as a top left end point of the polygon region of mount of Moon.

18. Plot a pixel whose x-coordinate value = x_baseLI and y-coordinate value = y_baseLI + 2*(x_baseLI – x_baseLT). This point will act as a bottom left end point of the polygon region of mount of Lower Mars. Label this pixel as point number a18. The same point will act as a top left end point of the polygon region of mount of Venus.
19. Plot a pixel whose x-coordinate value = x_baseLI + (x_baseLI – x_baseLT) and y-coordinate value = y_baseLI + 2*(x_baseLI – x_baseLT). This point will give bottom right end point of the polygon region of mount of Lower Mars. Label this pixel as point number aa19. The same point will act as a top right end point of the mount of Venus
20. Plot a pixel whose x-coordinate value = x_baseLR + (2*(x_baseLI – x_baseLR)/3) and y-coordinate value = [y_baseLI + 2*(x_baseLI – x_baseLT) + (x_baseLI – x_baseLR)]. This point is estimated midpoint of the lower margins of mount of Moon and mount of Venus. This pixel is considered as bottom right end point of the polygon region of mount of Moon and bottom left end point of the polygon region of mount of Venus. Label this pixel as point number aa20.
21. For the scan line y = y-coordinate of the point number aa20 and x = x-coordinate of the point number aa20 to x = 0, find the first pixel whose RGB component value is equal to (255, 255, 0). This point will serve as left bottom end point of the polygon region of mount of Moon. Label this pixel as point number aa21.
22. For the scan line y = y-coordinate of the point number aa20 and x = x-coordinate of the point number aa20 to x = image width, find the first pixel whose RGB component value is equal to (255, 255, 0). This point will serve as right bottom end point of the polygon region of mount of Venus. Label this pixel as point number aa22.
23. Crop the regions of polygons by considering four end points from the input image of palm and separate all eight mounts after clustering four points using following logic:

    (i) Think about Point Number aa6, aa9, aa15, aa14 as Mount of Jupiter
    (ii) Think about Point Number aa3,aa 6, aa14, aa13 as Mount of Saturn
    (iii) Think about Point Number aa8, aa3, aa13, aa11 as Mount of Sun
    (iv) Think about Point Number aa10,aa 8, aa11,aa 12 as Mount of Mercury
    (v) Think about Point Number aa12, aa11, aa16, aa17 as Mount of Upper Mars
    (vi) Think about Point Number aa14, aa15, aa19, aa18 as Mount of Lower Mars
    (vii) Think about Point Number aa17, aa16, aa20,aa 21 as Mount of Moon
    (viii) Think about Point Number aa18, aa19, aa22, aa20 as Mount of Venus

IV RESULTS

The ladder mentioned in on top of algorithm is for right palm. To use this algorithm for left palm the values are mirrored. That is, the misplaced foot of tallest finger will furnish right base of tallest finger. After changeable the values of points, one can carry out this algorithm for left palm. The algorithm is implemented in ASP.Net with C# for together left and accurate palms. The outcome after ultimate of the algorithm is shown in figures S4 and S5.

In the figure S4, the regions of mounts in left palm are painted by polygons in the region of each mount in the substantial image

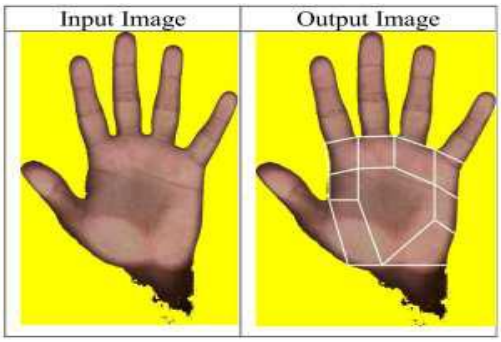


Figure S4: End result of Mount Extraction Algorithm for Left Palm

Figure S5 End Result of mount extraction algorithm for right palm

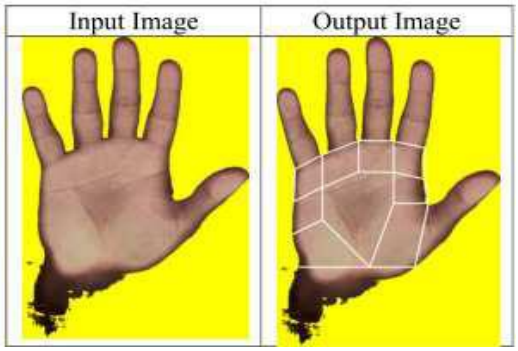


Figure S5: End result of Mount Extraction Algorithm on Right palm

one time all mounts are extracted, the model searches the generous circumstance display symbols in human palm.

V SPOT DETECTION

The figure earliest extracts the eight mounts in human being palm by using on top of algorithm. Every of the eight mounts are cropped and saved as a break up picture. Thus, after executing this algorithm, the figure has eight analogous imagery of mounts for each palm. Accordingly, for collectively the palms sixteen images are obtained. For every individual image mark result process is approved out by using

model related. There are total eight symbols create in the human palm as shown figure S2, which can point out about physical condition. Credentials of these eight symbols in the area of mounts if they are present are the main goal of mark appreciation for the demonstration.

VI. THE SYSTEM OF MARK DETECTION later than executing the on top of algorithm, the manifestation has eight images; one for each mount. The consequent judgment (stepladder) shows the mark detection practice.

(i) For every significant stipulation marker symbol a model is prepared and stored as gray level image. The form for each mark is in use to estimate with the images obtained for each escalates.

(ii) The image of each mount is twisted into gray scale. There are two reasons behind converting mount picture and prototype into gray scale. (a) Gray scale image occupies less celebration than complete color image and (b) disparate users may have dissimilar colors of palm. If the image is not transformed into grayscale, then model resultant algorithm will match color of each pixel and if match is not fashion in spite regularity of the sign, just because of divergence of colors among the prototype and mount image, the result will be inaccurate.

(iii) The pattern identical algorithm is executed in the demonstration of each mount to identify the mark matching with example mark.

(iv) The secret codes which are having at least 89 % rapport with the pattern mark are measured as recognized symbols. To highlight these signs, rectangles are drawn around them.

VII. OUTCOME OF SYMBOL DISCOVERY

Figure S6 shows effect of the method to identify the mark named cross for the mount of Jupiter. In figure S6 in the right side, some pixels are of backdrop pixels, having yellow color. These pixels do not involve the consequential image, for the reason that the backdrop is altered into soft yellow color which cannot have any patterns similar to cross, star, grill, etc. in it. Additionally, the form does not suppose any pixel whose RGB color rate is (255, 255, 0) i.e. yellow color means backdrop yellow. Therefore if mount color exploration is also integrated in the cryptogram, the outcome will not be unnatural by this noise

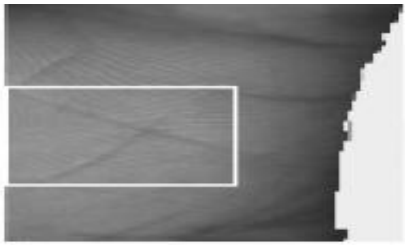
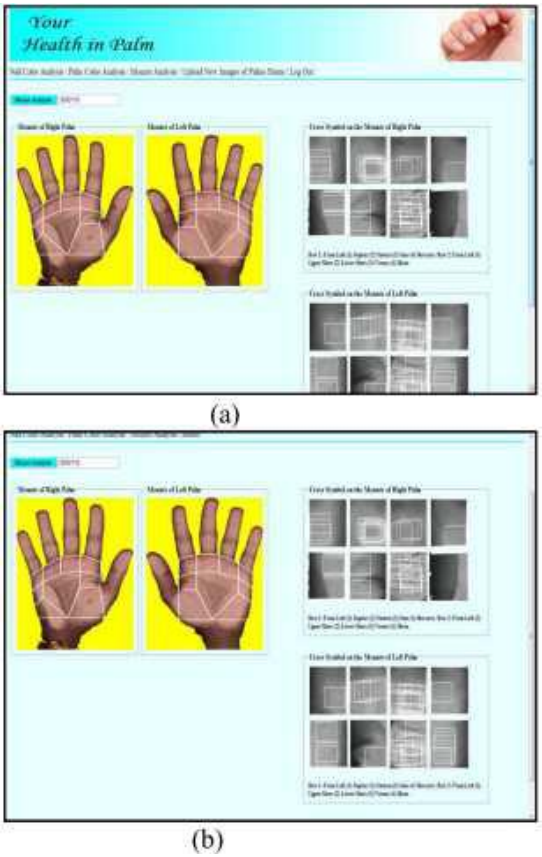


Figure S6: End Result of mark recognition on mount of Jupiter of left palm

Figure S7 shows consequential side of mount investigation. The left area of page contains the images of left and right palms. In both metaphors mounts are decorated by sketch restrictions.

On the right side of the page present are sixteen images; one image per mount. In these sixteen Images, if the preferred mark is detected; it is decorated by sketch rectangle around it.



(a)

(b)

Figure S7 (a) and (b): Result of Mount Analysis

VIII CONCLUSION

The algorithm for mount up departure by means of segmentation procedure is planned at this point. The algorithm is exceptionally valuable in the far removed from fields alike to biometric protection, healthcare, beneficial palmistry, character appreciation, and model matching.

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