



Touchless Fingerprint Capture

Anjali Pankan

Matriculation Number: 11016821



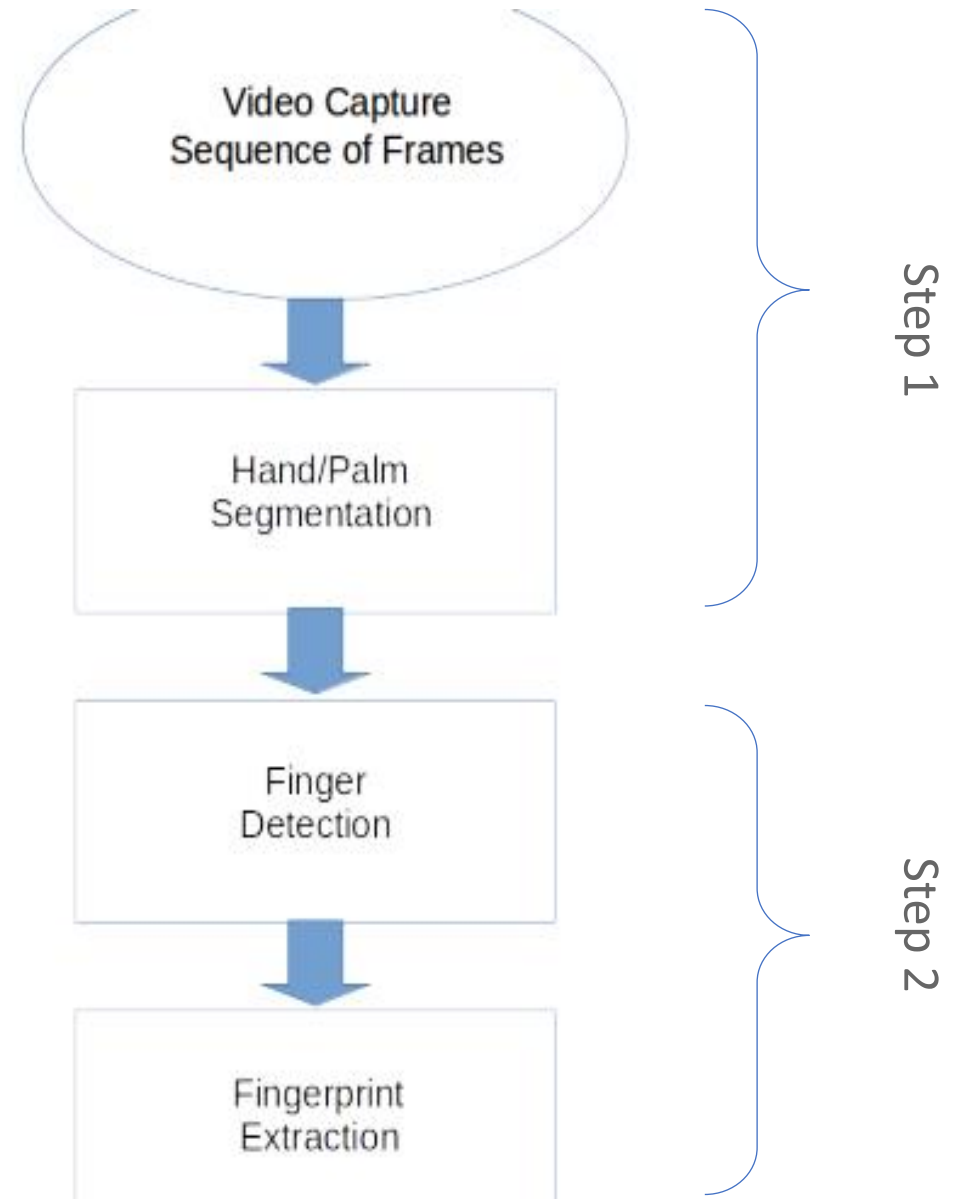


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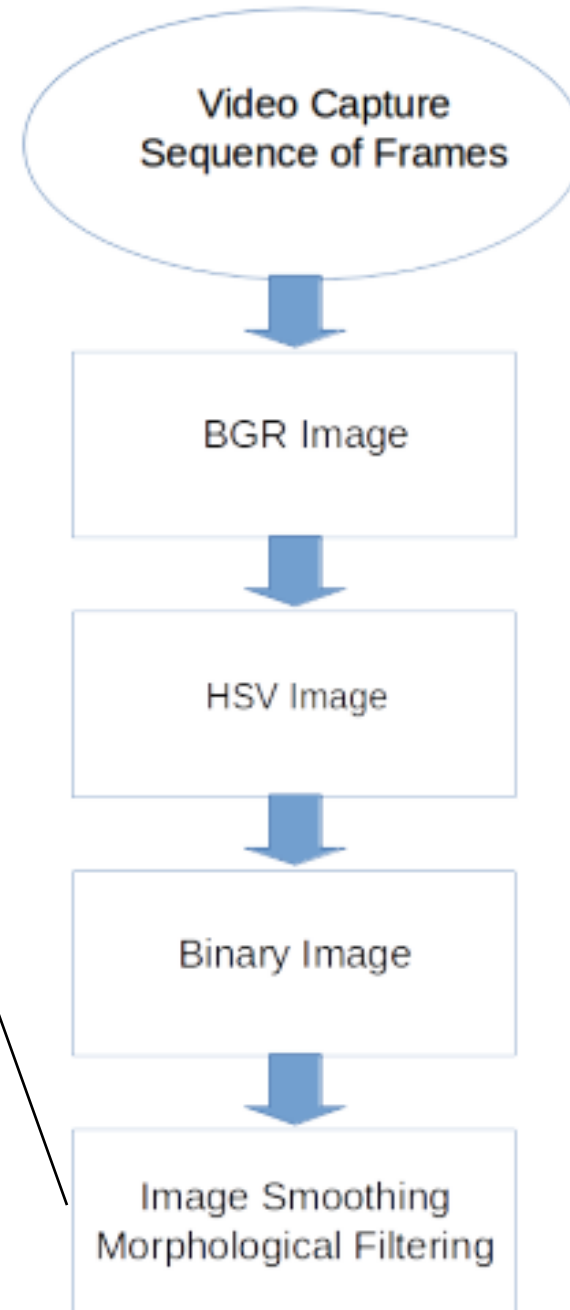


Block Diagram



HAND/PALM SEGMENTATION

- Smooth the frame using the median filter.
- Morphological opening and closing

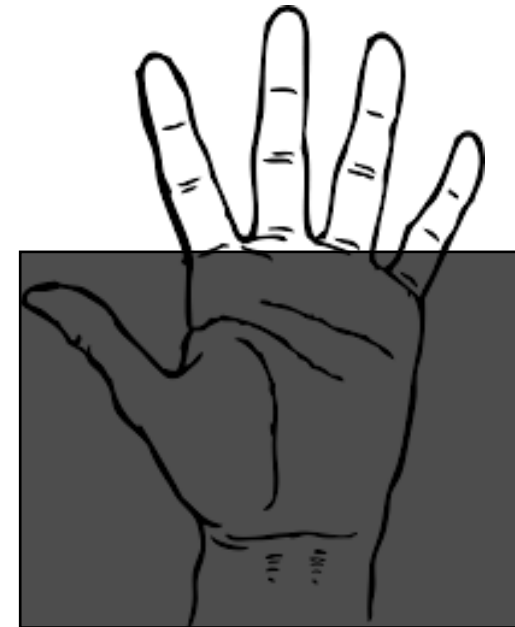
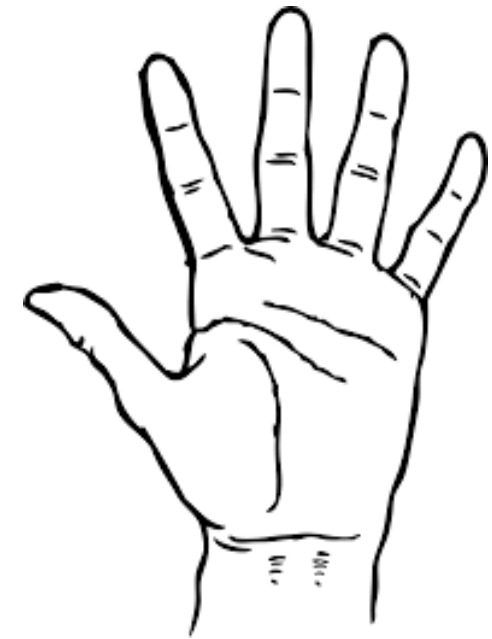


1. Palm Removal Section

FINGER DETECTION AND FINGERPRINT EXTRACTION

Algorithm 1 Palm section removal

Input: *inImage* ▷ Input binary image
Output: *outImage* ▷ Output binary image
outImage \leftarrow *inImage.clone()*
rows \leftarrow *inImage.rows*
maxContours \leftarrow 0
index \leftarrow *inImage.rows*
for *i* = *rows*; *i* > 0; *i* -- **do**
 draw black line at row *i* of *inImage*
 contourCount \leftarrow find contours of *inImage*
 if *contourCount* greater than *maxContours* **then**
 maxContours \leftarrow *contourCount*
 index \leftarrow *i*
 end if
end for
for *j* = *rows*; *j* > *index*; *j* -- **do**
 draw black line at row *j* of *outImage*
end for



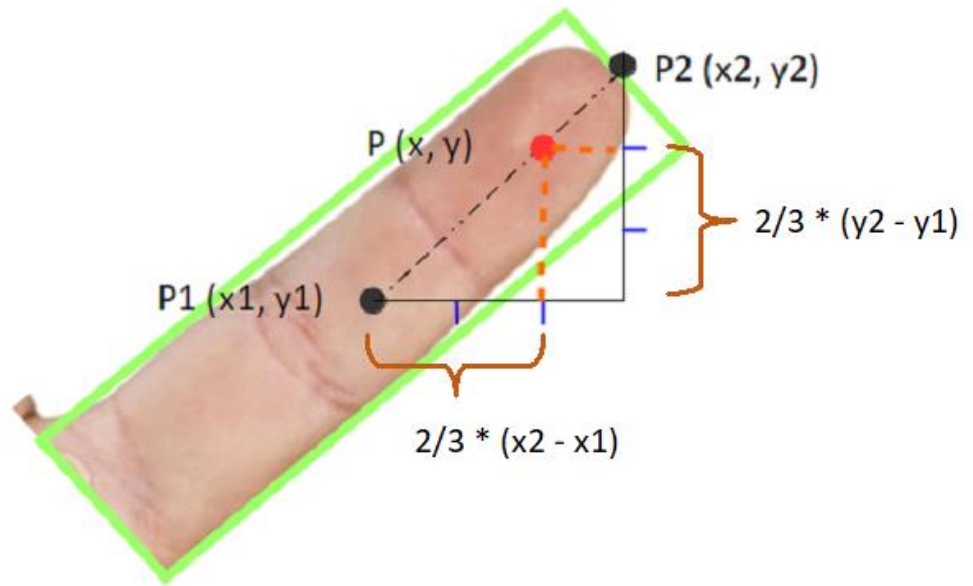
RESULT

Palm Removal Section



2. Fingerprint Extraction

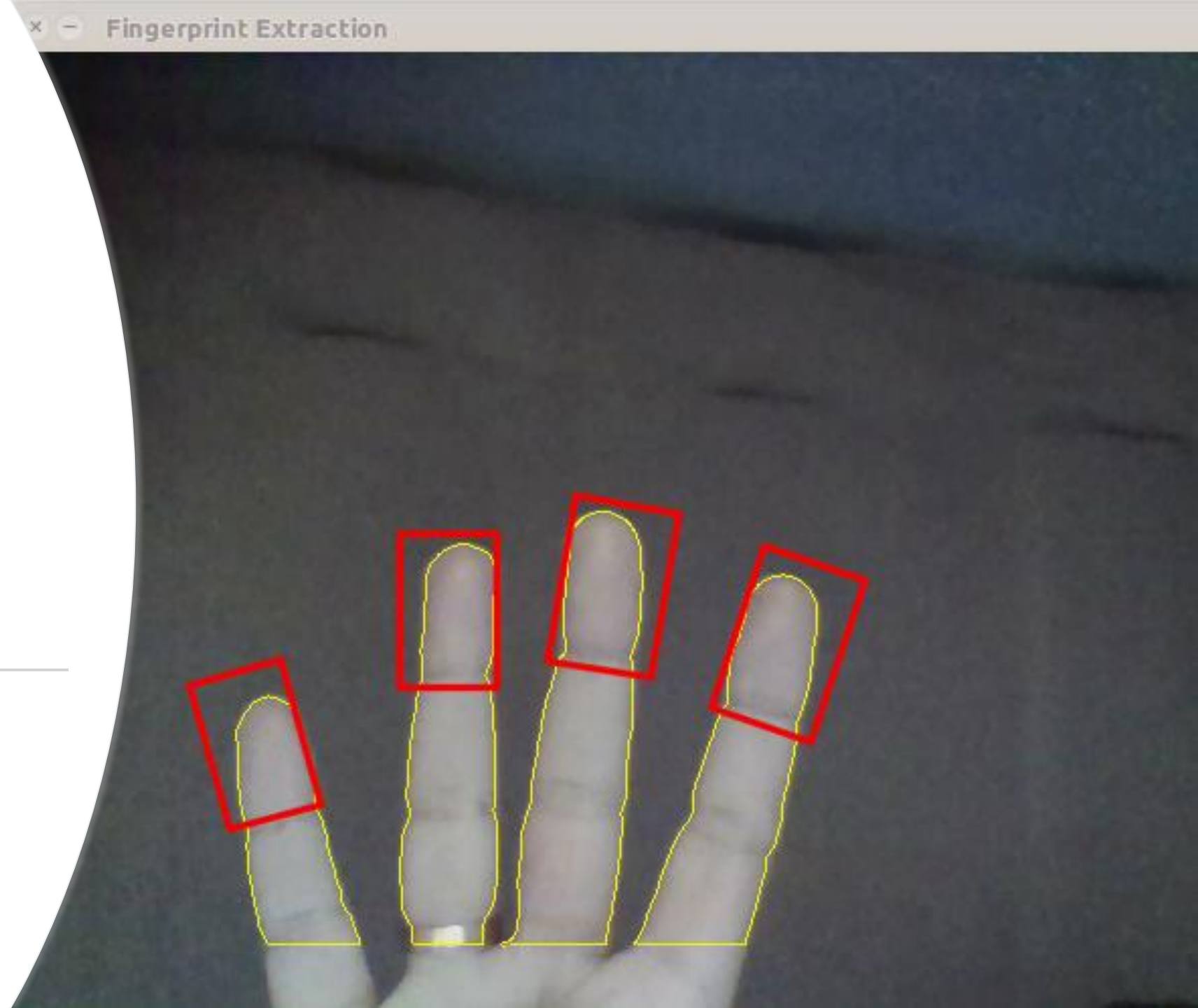
FINGER DETECTION AND FINGERPRINT EXTRACTION



$$x = x1 + \frac{2}{3} \times (x2 - x1)$$
$$y = y1 + \frac{2}{3} \times (y2 - y1)$$

RESULT

Fingerprint Extraction





THANK YOU !