Hand Gesture Recognition of Person in an Image

Group-15

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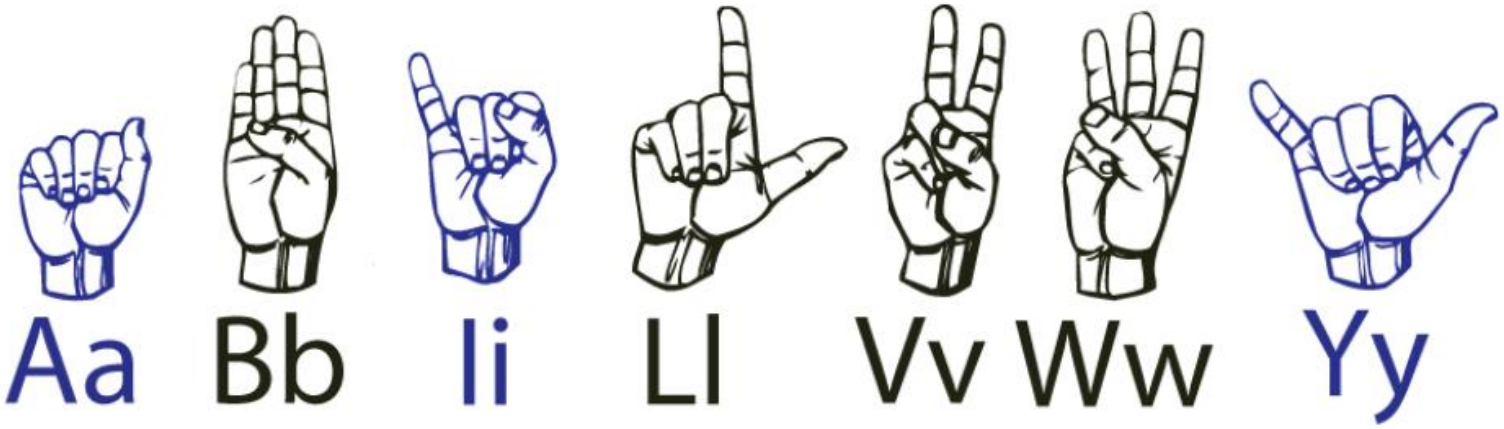
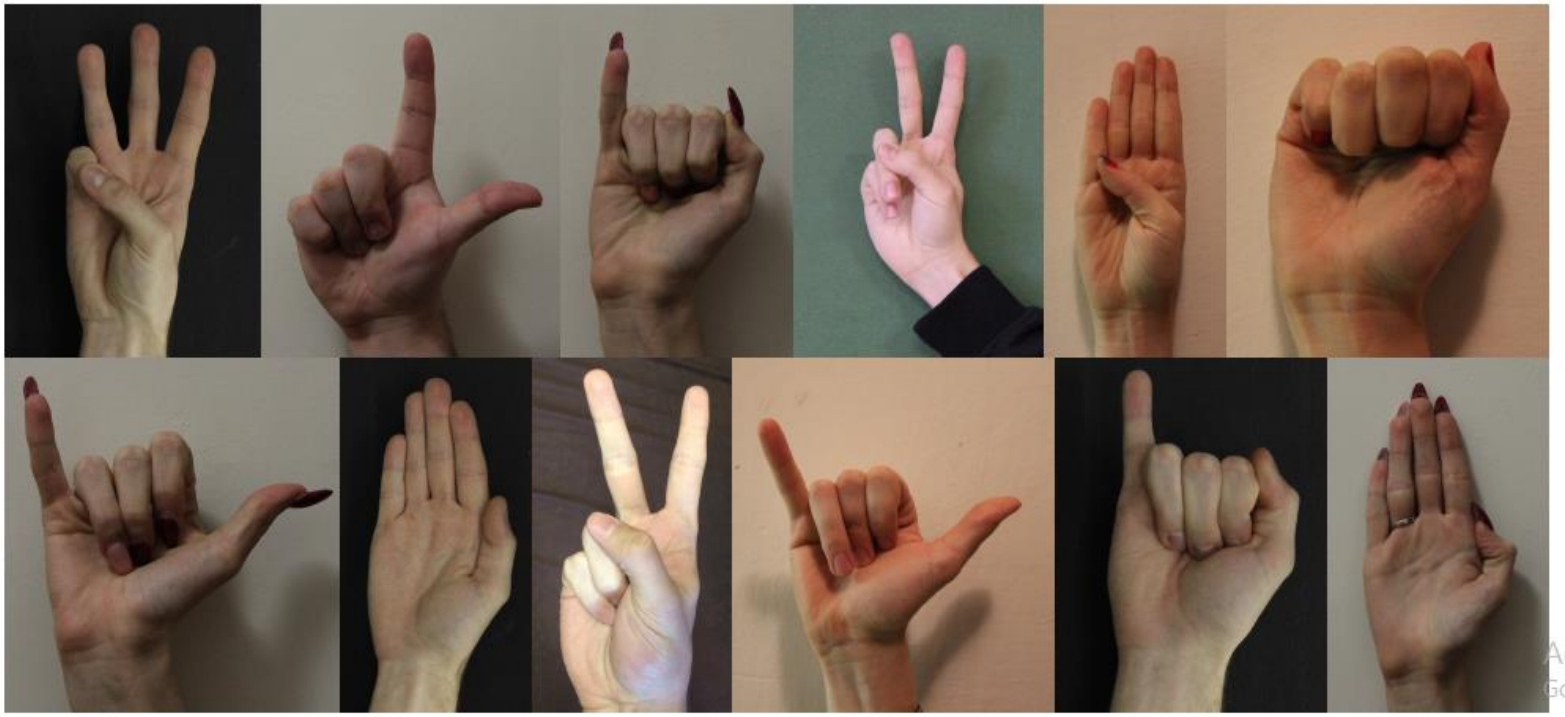
- ***Our aim is to find the character shown in the input image***
- ***Input - Handheld images which are taken from the live webcam***
- ***Output - Segmented Image and Designed Character***
- ***7 different characters (A,B,I,L,V,W,Y) are distinguished which are represented using Standard American Sign language .***

Corresponding Gestures associated with Letters



Standard American Sign Language

Database Preview



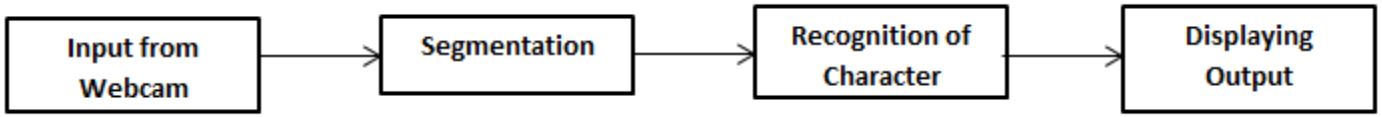
Database:

- *Total number of images- 59*
- *8 complete sets (of all 7 gestures)*
- *Pictures with both dark and light background.*
- ***The images in the database are trained to find threshold values used in the code.***

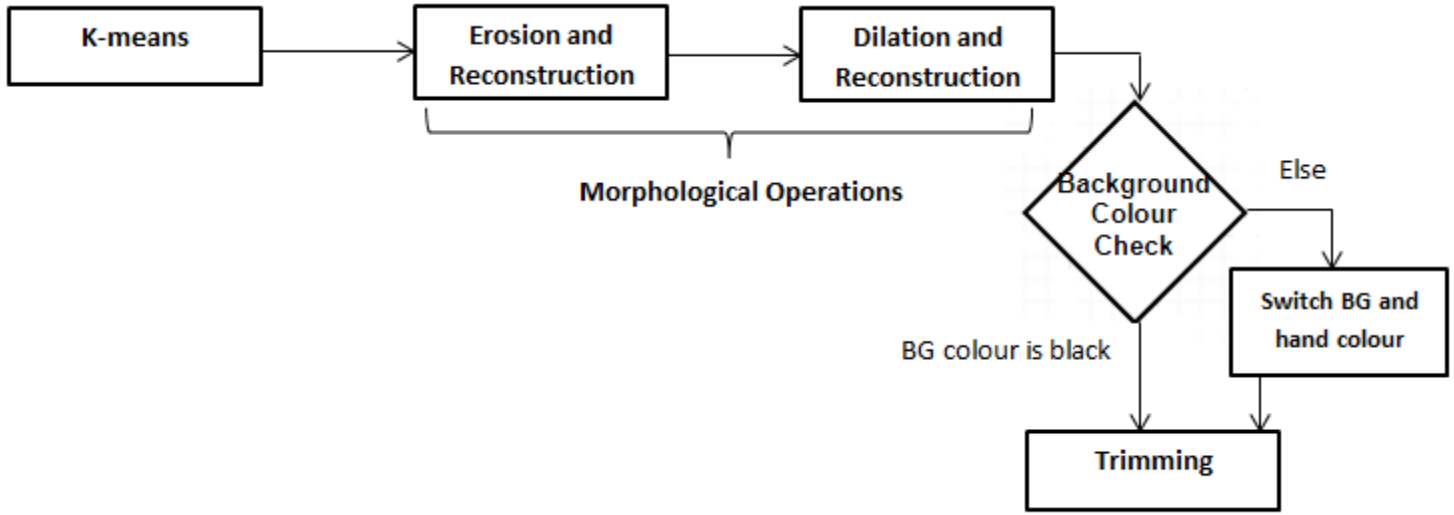
Main Steps:

- *Segmentation of Input Image*
- *Recognition of the character*

Block Diagram



Segmentation



Segmentation

k-means:

- *The input RGB image is converted to binary image.*

Morphological Operations performed:

- *Opening*
- *Closing*

Ensuring Black background and White hand (Background Check)

Trimming

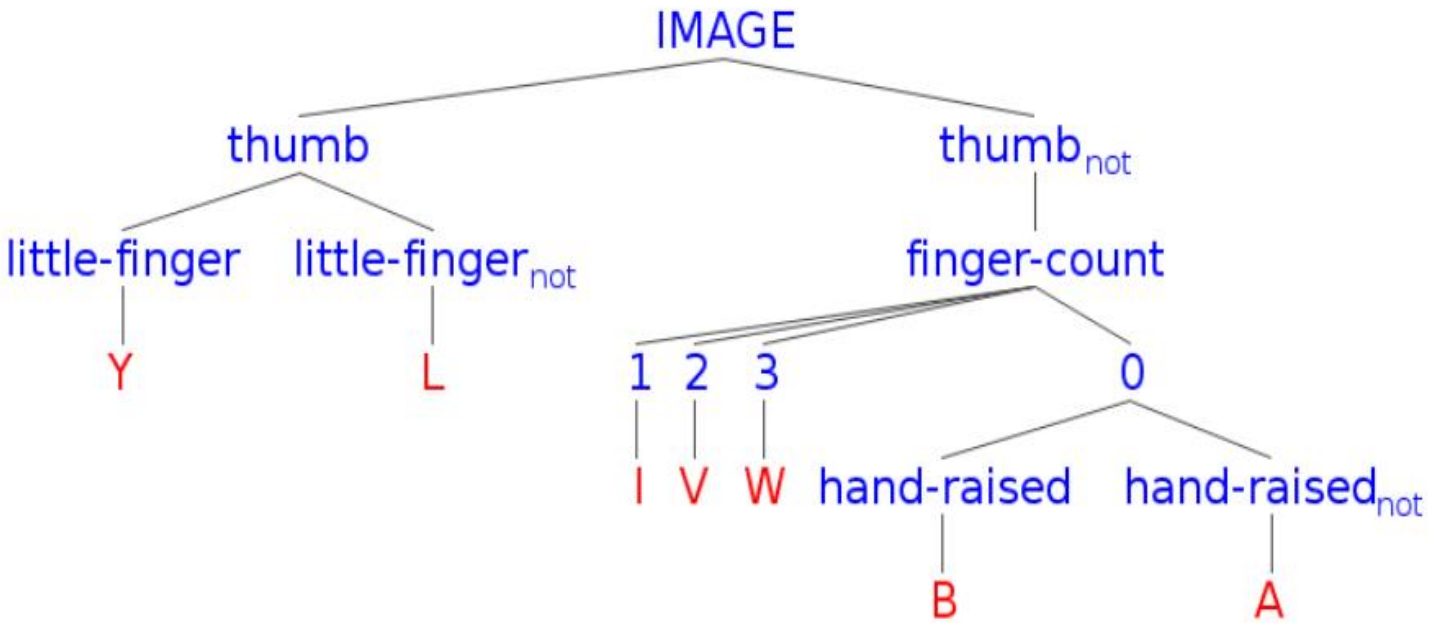
Results after Segmentation

Input Image

Segmented Image

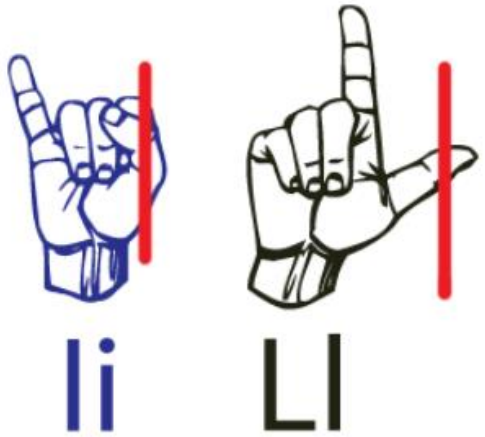
After Performing Morphological operations

Recognizing Tree



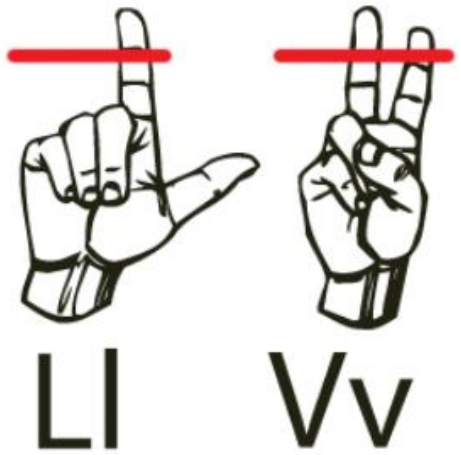
Detection of Thumb

- *Detect if segmented image has thumb raised.*
- *Thumb will be detected for: L,Y*
- *Thumb wont be detected for: A,B,I,V,W*
- *Taking the right most part of segmented image and by using the threshold value We are detecting if there is a thumb.*



Detection of Fingers

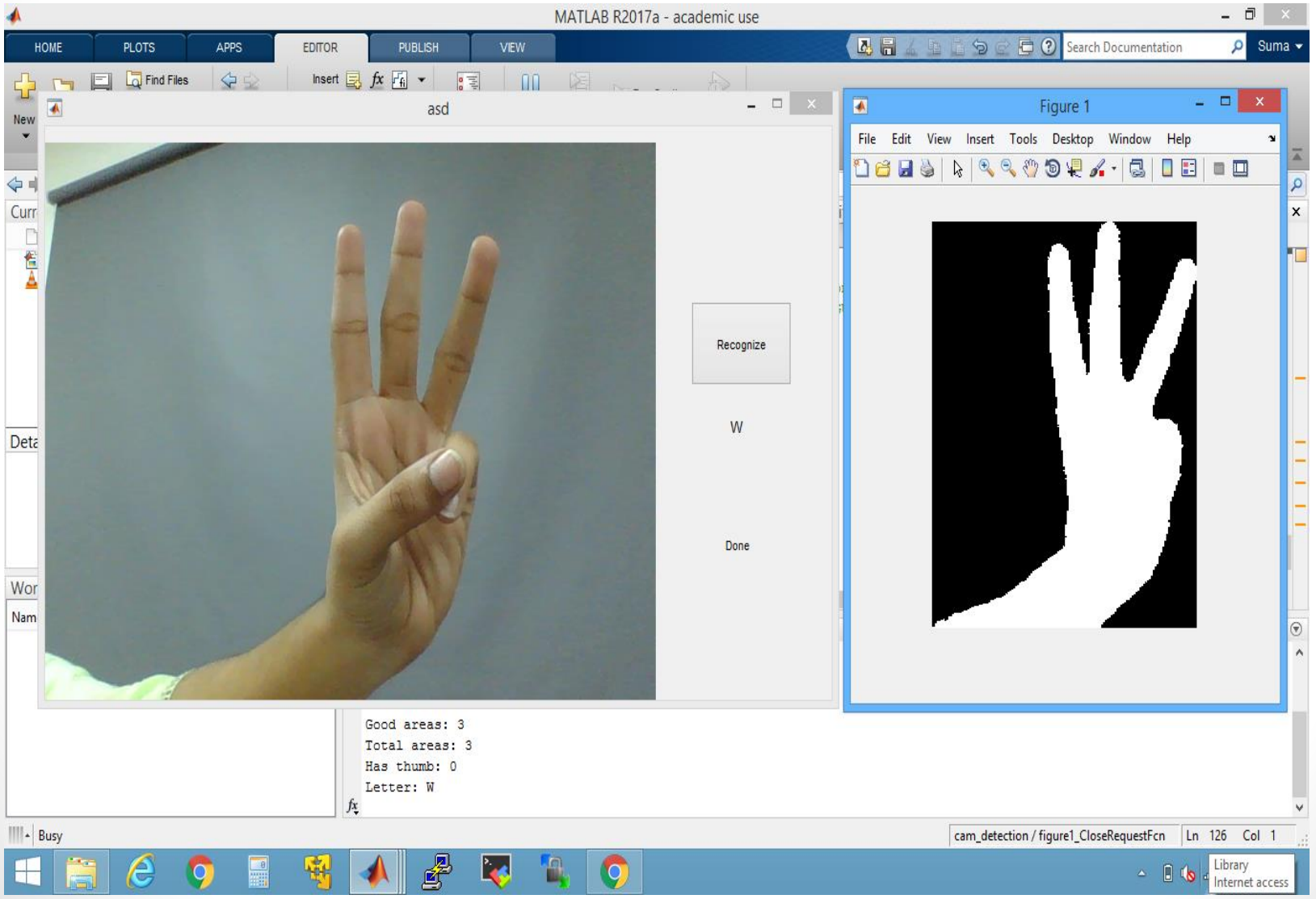
- *Detecting number of fingers raised in the segmented image.*
- *Numbers of fingers raised for letters A,B,I,L,V,W,Y will be 0,0,1,1,2,3,1 respectively excluding the thumb.*
- *Taking the upper part (specific row) of segmented image and by using the threshold value we determine number of fingers raised.*

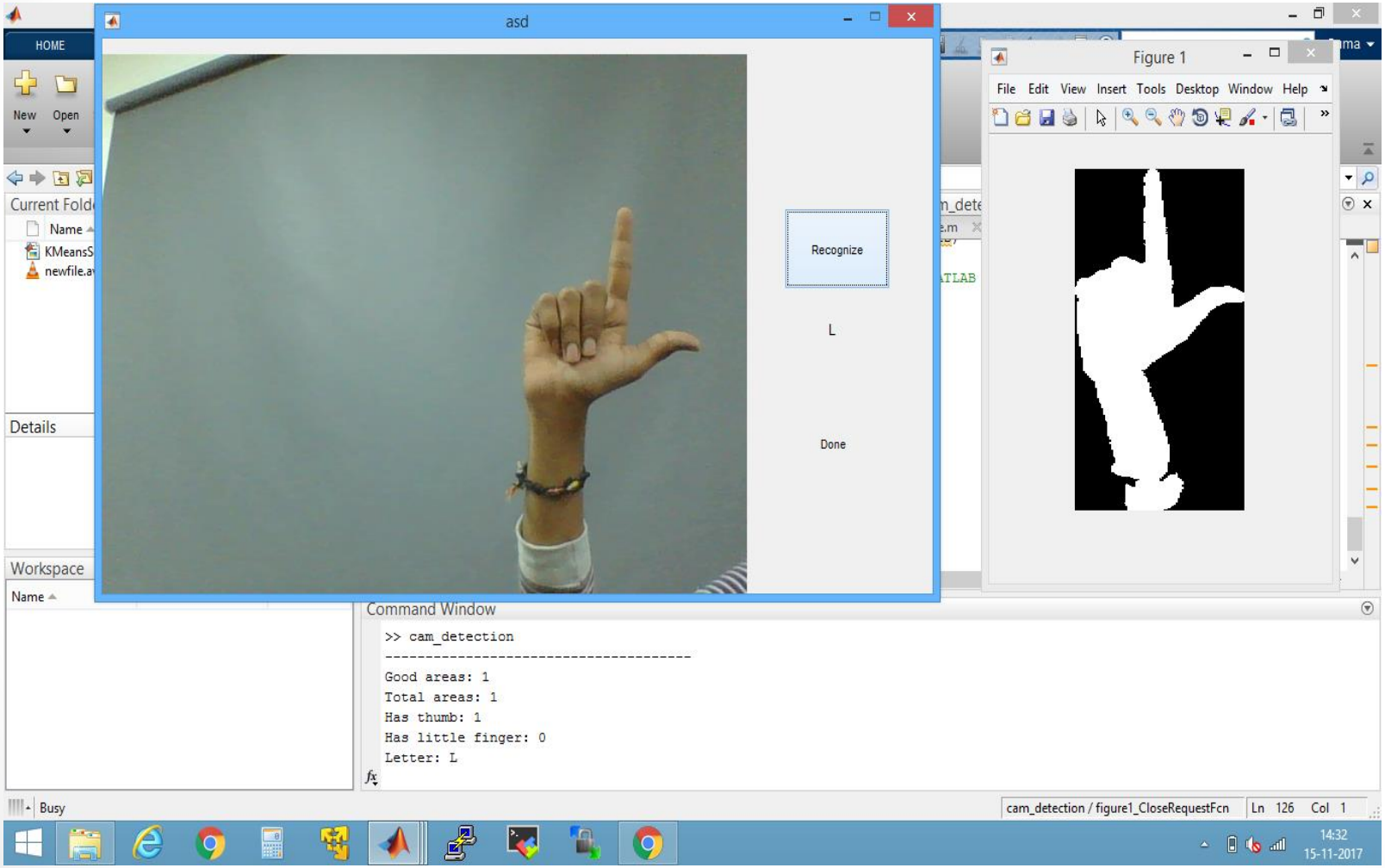


Distinguishing between A and B

- *Checking whether the hand is raised.*
- *Taking the width/height ratio of segmented image and by assuming some threshold we determine if it is A or B.*

Results Obtained




asd
Recognize
L
Done
Figure 1
File Edit View Insert Tools Desktop Window Help
HOME
New
Open
Current Fold
Name
KMeansS
newfile.a
Details
Workspace
Name
Command Window
>> cam_detection
Good areas: 1
Total areas: 1
Has thumb: 1
Has little finger: 0
Letter: L
Busy
cam_detection / figure1_CloseRequestFcn
Ln 126 Col 1
14:32
15-11-2017

Further Improvements

- *This project can be extended for detecting all the 26 letters in the English alphabet.*
- *And even for the numbers(0-9) in the number system using hands.*
- *The other changes that can be made are detecting the gesture when there is more background noise.*