PROJECT

Gesture Translator - application for recognizing sign language gestures using the Raspberry Pi

Gesture
Translator

HELLO THERE!

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About us :

Dream team! We met on the train in January 2018. Both Python lovers and decided „let’s take part in Anita's Moonshot Codeathon” ☺

MOTIVATION

{1}

We wanted to create a useful application supporting people with disabilities.

The choice : deaf people.

According to statistics, through the communication barrier, they often have problems with sorting out the everyday affairs (for example: shopping in stores, dealing with different matters in offices, banks or doctors' offices).

GOALS

{2 Creating not complicated and cheap device especially for deaf people to communicate with hearing people.}

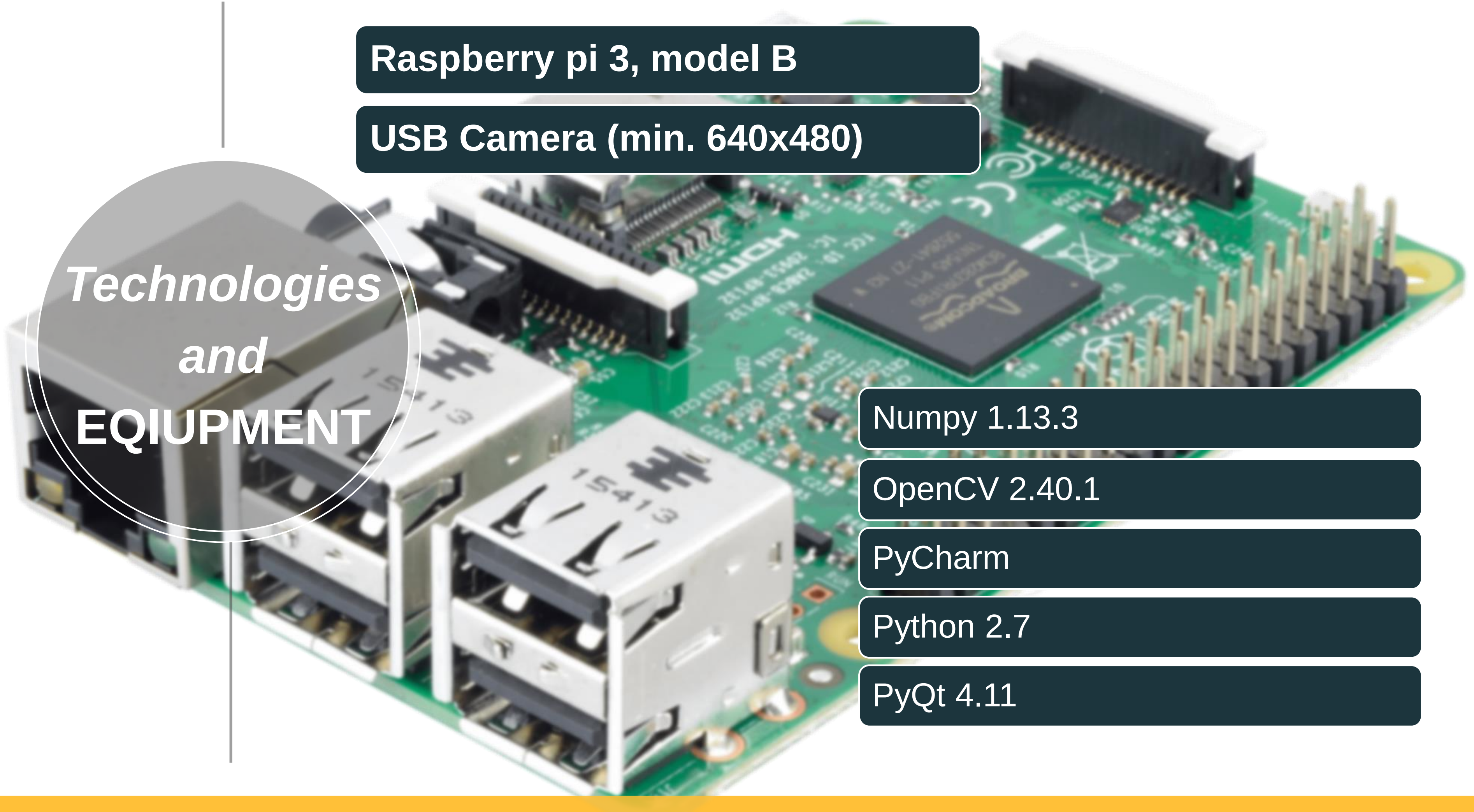
IDEA

{3}

Designing an application which recognizes sign language gestures using the Raspberry Pi ,

image processing technology and the OpenCV library.

Technologies and EQIUPMENT



- Raspberry pi 3, model B
- USB Camera (min. 640x480)

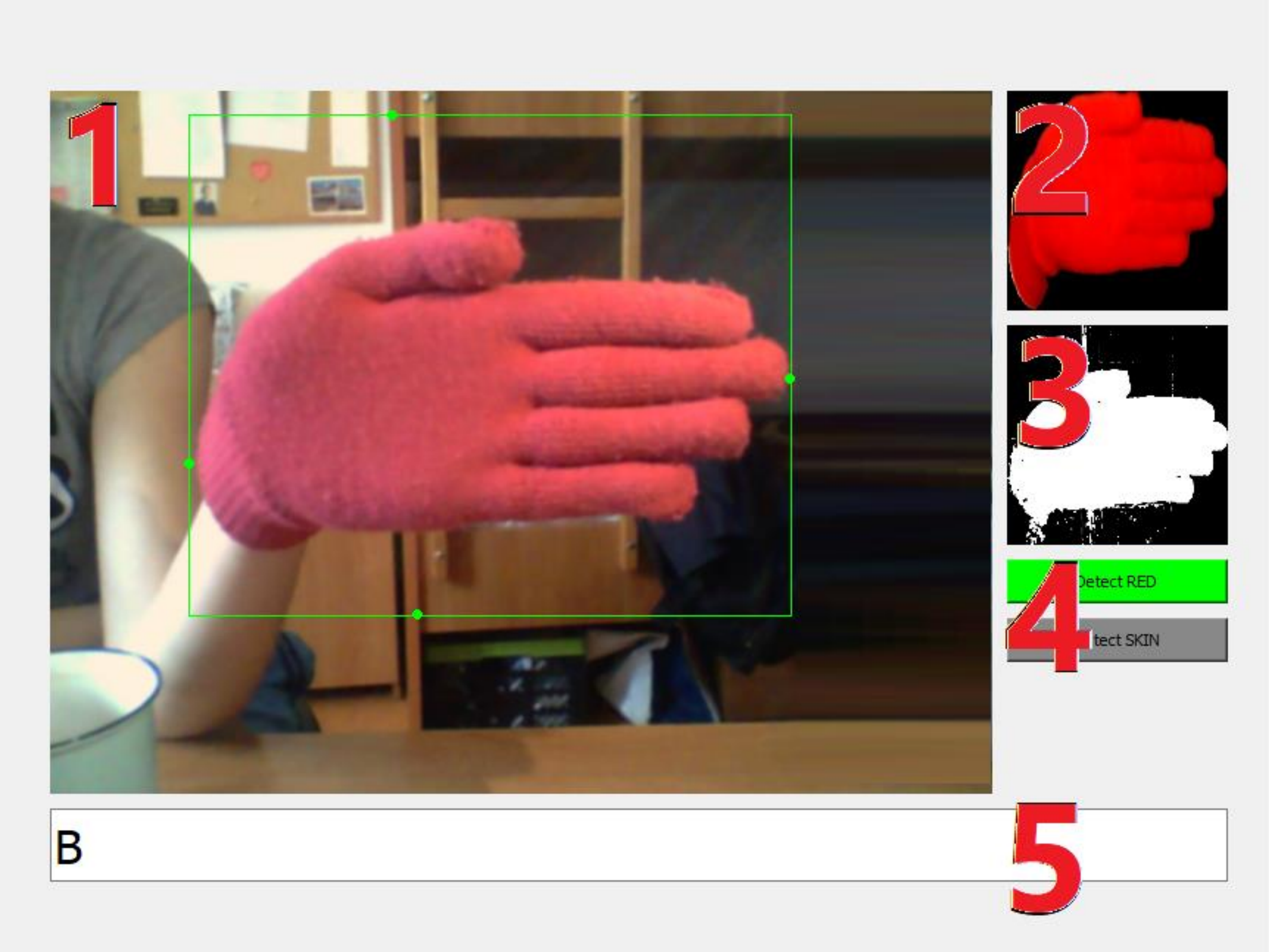
- Numpy 1.13.3
- OpenCV 2.40.1
- PyCharm
- Python 2.7
- PyQt 4.11

3 reasons to be Simple, intuitive interface

1 Gesture Translator is an accessible app, TURN ON and USE

2 only one window = clear interface

3 There are no complicated functions - only two buttons for choosing detection mode : RED and SKIN.



B

What the application window included?

1. Real-time view from the camera
2. Detected gesture, taken from the database
3. Section of the detected image with the binary mask
4. Buttons for selecting the detection method
5. Result in text form

How it works? (technical)

Pre-processing of the picture:

- vertical image reflection
- gaussian blur with a 5x5 mask

Generating an image mask :

- conversion of the image color scale to HSV
- creation of masks for the indicated thresholds
- merging masks to create a multi-threshold mask

Detection of image contours

- applying a method from the OpenCV library to find the main contours of the image

Contour selection

- selection the contour with the largest area

Getting the classification gesture and area of interest

- Getting the size of the largest contour
- contour removal from the image of the main hand area and mask
- creating an image from the area of interest
- application of the SVM classifier for the detected image
- loading a gesture and letters based on classification