

Computer Vision CSE 365

**Course Project**

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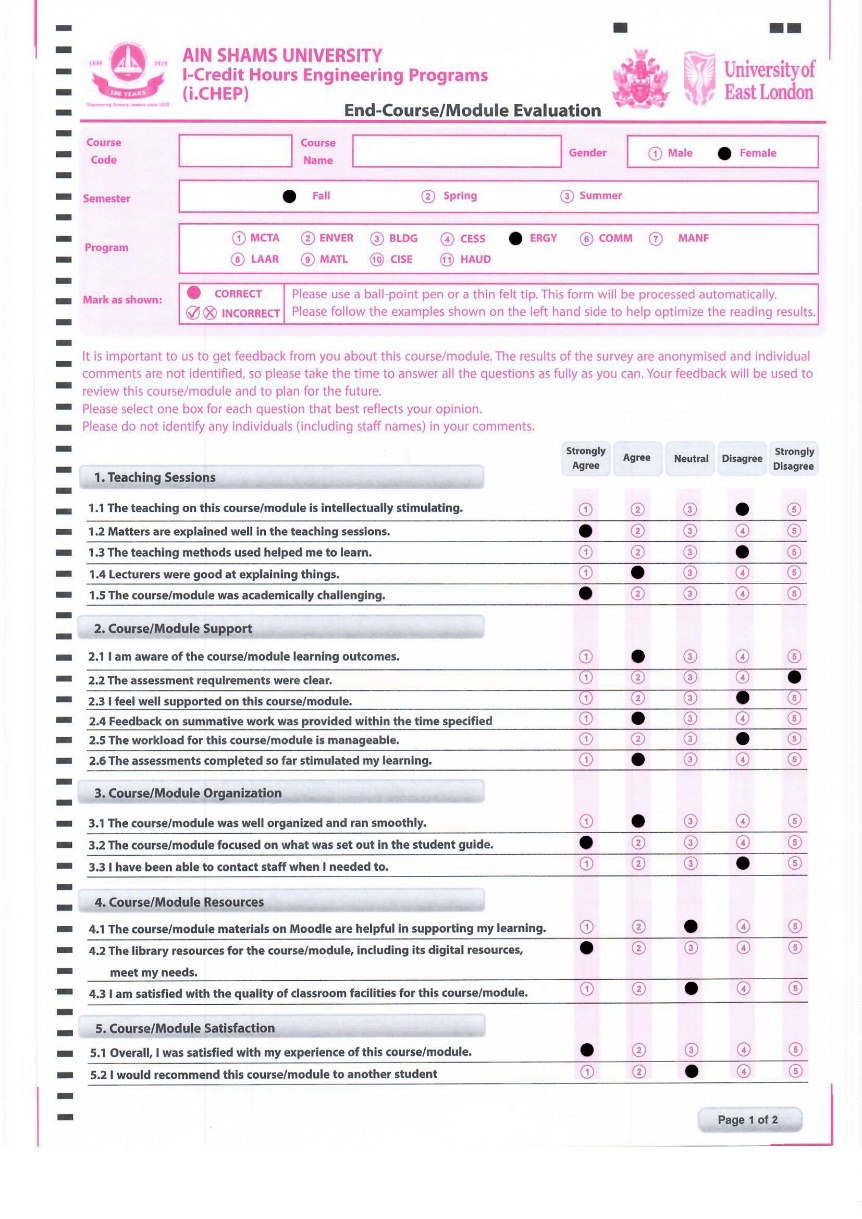
**Nour E-din Osama16p3043**

# Introduction

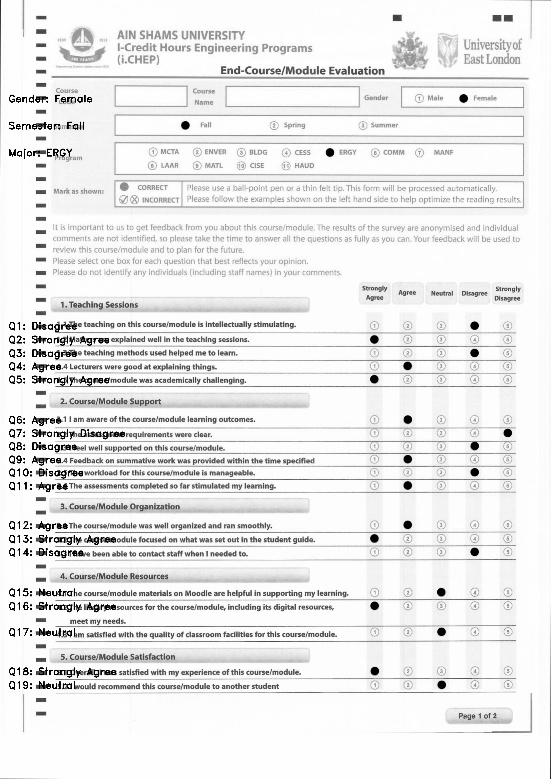
This report explains the program that requested as the final project of the computer vision course to read bubble sheet survey papers and outputs the answer.

The project is written in python and uses only the opencv library.

The following figure shows the sample that was supposed to be read by the program.

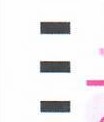
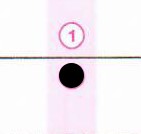


And the following is the output image from our program



# Description of Algorithm

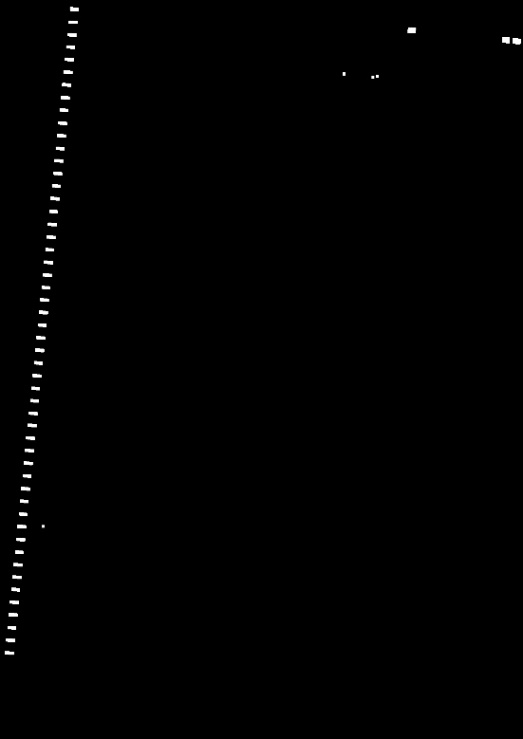
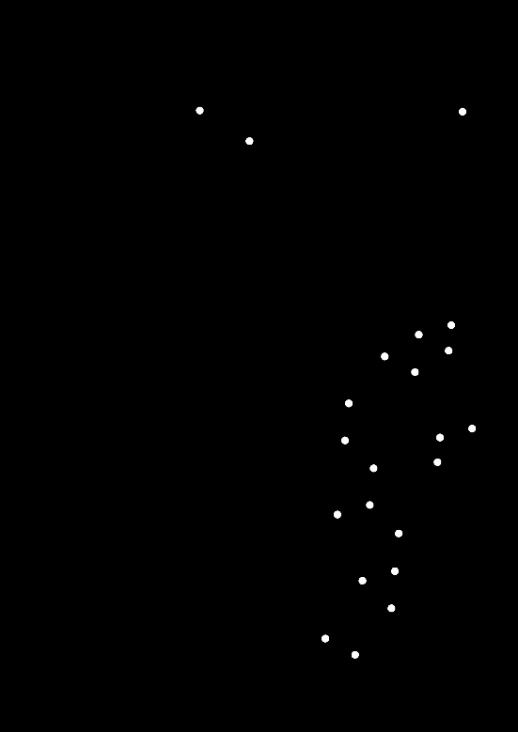
The following are the brief step used to extract the answers from the images.

1. First, the program creates 2 images one with the circles alone and one with the black squares alone and one with black circles alone.  
   

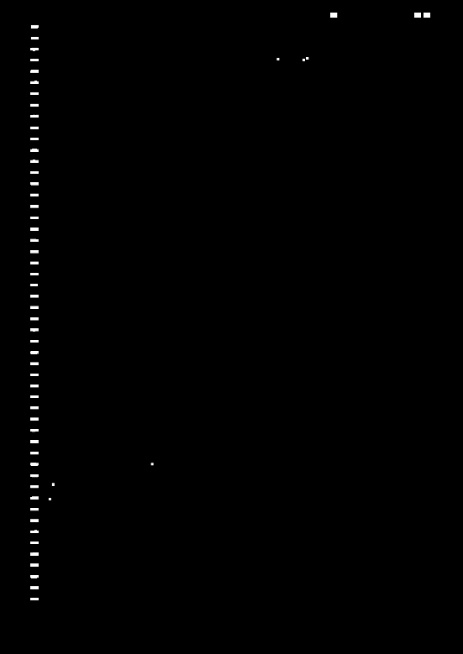
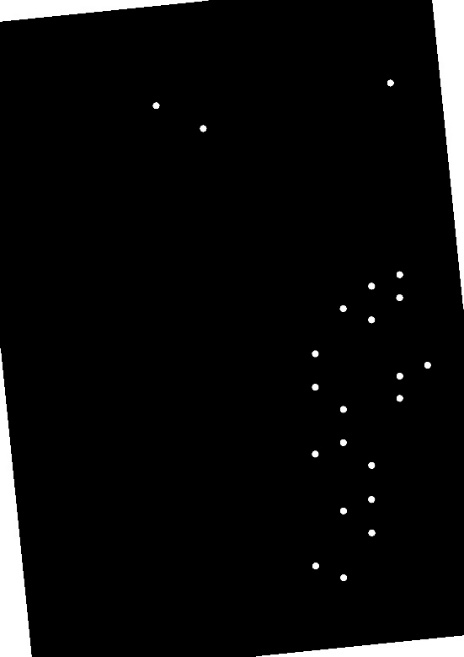
vertical squares

horizontal squares

Circle



1. Then the program first guesses the orientation using the slope of the line passing through the vertical squares and rotates the original image by this angle. This is follows by repeating step 1 again on the original image after rotations.



1. The program then records the position of the centroid of each circle relative to the horizontal and vertical squares.
2. Now the program loops through all prerecorded relative position of possible questions and their possible answers and selects the most likely choices and outputs them.  
   