

Image Processing Project

Hand Gesture Control

Department: Computer and System Engineering

Team Name: Hand Of The King

Team No: 29

Team members:

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Github repository: <https://github.com/BassemMounir/Hand-Of-The-King>

Project Idea:

Desktop application to recognize hand gestures through a webcam, map them to user defined keyboard shortcuts, and use them to control any application. For example: VLC , playing games, scrolling, etc...

Algorithm Details:

- 1- Using opencv's built-in *BackgroundSubtractorMOG2* model, capture the background from ROI (Region of Interest) and subtract it from following frames.
- 2- Using Convex Hull of the Contour and its Defects, we calculate the angle between each candidate finger tip and neighboring defects, to decide whether it is a finger or not.
- 3- We try to get an approximate palm center and find the hand position with respect to ROI's center.
- 4- Combining finger count and different hand positions to create 21 different gestures.
- 5- We map each gesture to user defined keys or shortcuts (up to 2 keys at a time).

Features:

- 1- Map gestures to any custom shortcut .
- 2- Create new or load existing profiles for shortcuts.
- 3- When the user clicks go the programs minimizes to tray. Then from the tray icon you can Show, Hide, or Exit the program.
- 4- You can delete all profiles and restore only the default .

How to use:

- 1- Go to <https://github.com/BassemMounir/Hand-Of-The-King> and follow installation instructions.
- 2- Run the application and go to *Key Binding* tab, choose your preferred profile or create your own by filling the textboxes with keys or shortcuts in the format “key1 + key2” then press *Save*.
- 3- Then go to *Camera Settings* tab, step aside and choose a stable and suitable background, press *Capture* then *Go*.
- 4- Now switch focus to the app you want to control and start.
- 5- At any point you can stop, recapture the background, change the threshold, save or load profiles.
- 6- For more info you can watch the demo
<https://www.youtube.com/watch?v=haRkKLDiGCw&feature=youtu.be>

Supported Key bindings:

A single key or a 2 key combination in the format “key_1 + key_2”.