ACM-W 5th National Hackathon - 2020

# Contactless Writing

## Technocrats

# Team Introduction

TEAM TECHNOCRATS

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# Problem Statement

17. Gesture Recognition for Human Computer Interaction

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- Alternative way of effectively interacting with the system by using hand gestures for input and controls
- Simulate the functions of the keyboard alphabets, cursor and common controls like switching slides, etc using hand gesture images
- Help users interact with the computer from a considerable distance without using any device like a mouse or keyboard
- Eliminate or at least decrease the hardware requirement for effective human-computer interaction


# Domains of Impact

Gesture controlled interaction has a plethora of professional, recreational and supportive applications

- In the prevailing pandemic situation, it prevents contact with surfaces, for example, billing stations and manufacturing warehouses
- It facilitates interaction with a computer from a considerable distance, for, example, changing slides while taking a presentation
- No need for extra hardware and mimics real actions, heavy machinery operations and game playing
- Support for deaf and mute people

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# Implementation Plan

- Plan of Action
- Technology Stack
- Current Status
- Next Steps

# Plan of Action

**STEP 1**

Detect key points in the image and the template gesture dataset

**STEP 2**

Create descriptors from these keypoints

**STEP 3**

Match descriptors between the user image and dataset

**STEP 4**

Keep only the good key points from the matches

**STEP 5**

Match gesture from these key points

**STEP 6**

Perform the corresponding action like print, change slide, etc

# Technology Stack

| Framework, Package or tool | Components used | Purpose |
|---|---|---|
| Python 3.9 | • Interpreter<br>• Related modules | Primary language of development of the solution |
| OpenCV | • SIFT<br>• FLANN | • To obtain the key points and descriptors<br>• To perform fast feature matching |
| Numpy | Arrays and vectors | Vectorization and image representation |

# Current Status

# Next Steps

- Speech acknowledgment for accepted or rejected control request using gestures
- Text input and control from gestures
- Cursor control using gestures

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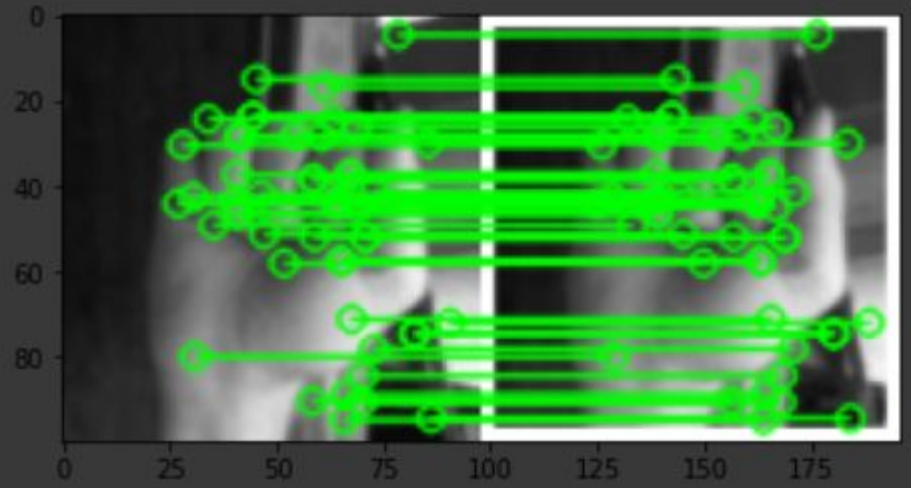
# Demo

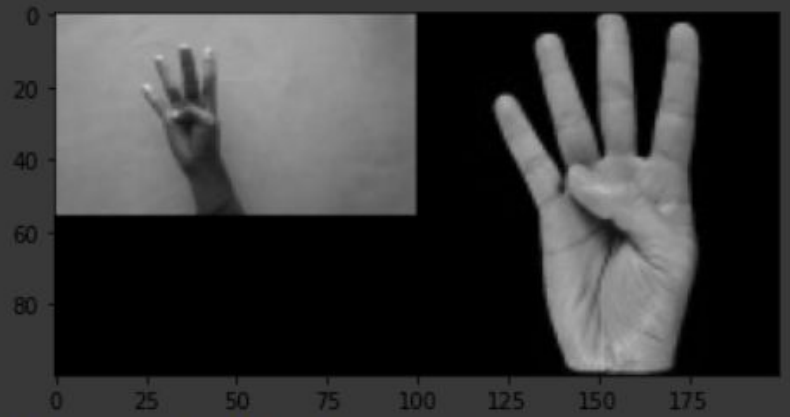
Code and results obtained so far




['a/a_1.jpg', 'a/a_1.jpg']

MATCH!!!!

```
Not enough matches are found - 0/20
```




```
['b/b_1.jpg', 'b/b_100.jpg']

NO MATCH



TESTING

*****CONSOLIDATED TESTING REPORT******
Testcase  0 :  PASSED: MATCH
Testcase  1 :  FAILED: NO MATCH
```

# Thank You

Any Questions?