NLP & Motion Gesture based Virtual Mouse

Problem Statement:

The project is based on real time tracking of human face for controlling the mouse cursor. This project aims to come up with the system that will eliminate the need of touch to mouse pad to control the cursor. The system will use facial movements as triggers for cursor movement on the screen. The user's real time video for the mouse movement is captured using a webcam. The mouse clicks are done in two ways namely 1) Natural Language Processing (NLP) 2) Eye based.

In NLP based the mouse clicks are done through voice commands made by the user. The commands passed could be for a click, right click, left click, double click, scroll up and scroll down. Python's Speech Recognition modules along with few other built-in packages are been used to create the project. Under eye-based mouse control, the cursor movements done are same as in the case of NLP based. The mouse button clicks are done through blink of an eye.

Requirement Specification:

Software Requirement:

- Operating System: Windows 10, macOS
- Coding Language: Python3
- Frame-Work: Python Dash Frame-Work
- Software used: Spyder 5.0

Hardware Requirement:

- System processor: i5
- Hard-disk: 500 GB
- Processor speed: 1.2 GHz
- RAM: 4 to 8 GB
- Monitor: 12" LED
- Microphone: Internal or External
- Webcam: Internal or External

Module Description:

1) **Camera:** In this project, the camera is used to capture/record the head movements done by the user. Any of the internal or external camera can be used for the purpose. The head movements done by the user is been analyzed and with the help of this input mouse cursor movements are performed.

2) **Microphone:** In this project, the microphone is used to capture/record the voice commands given by the user. Any of the internal or external can be used for the purpose. The voice commands given by the user is analyzed and with the help of this input mouse click operations are been performed such as click, right click, left click, double click.

3) **Mouse Event:** In this project, the mouse events are been performed by capturing/recording the images with the help of the camera. We even make use of microphone to capture/record the voice commands from the user. Combining both these processes we are able to perform the required mouse event.
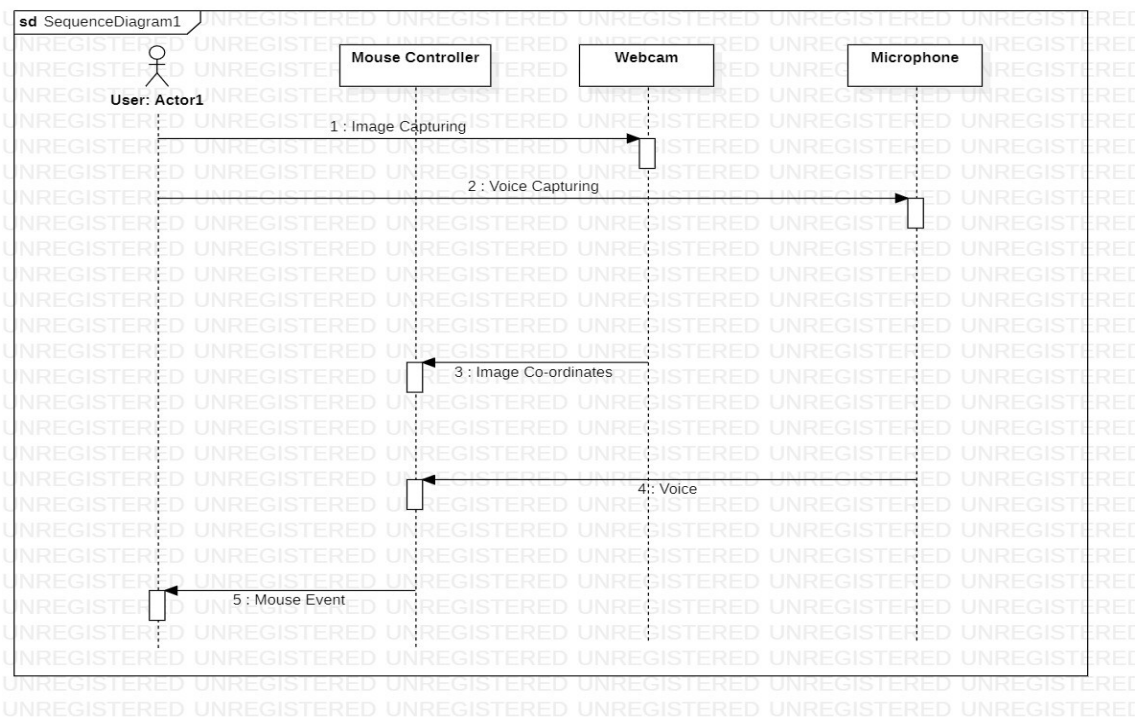
Architecture Diagram:
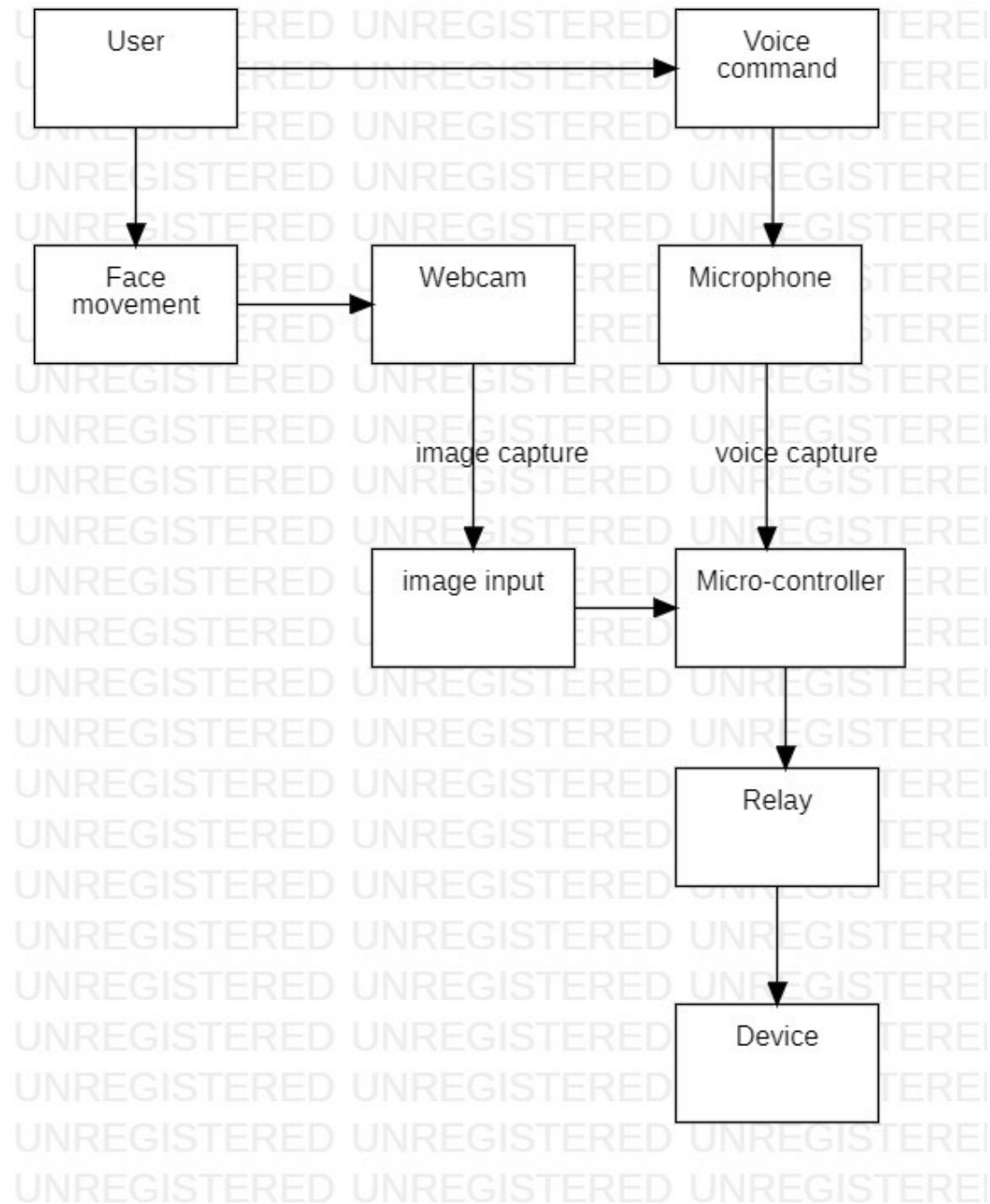
Design Diagrams:

Activity Diagram:
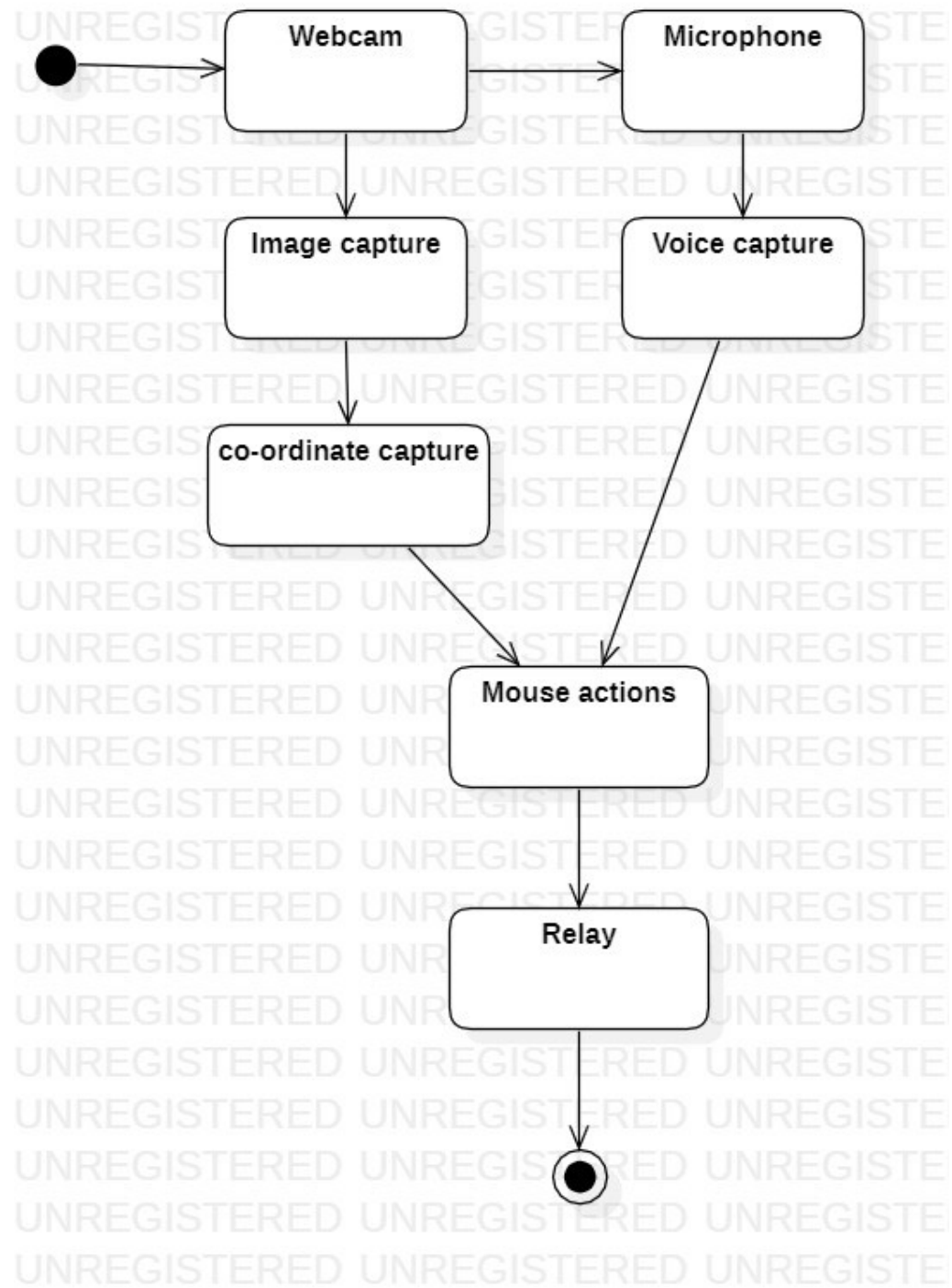
Sequence Diagram:

Use-Case Diagram: