

# Multimedia Interface SS 2022

## *Hand Tracking and Blackboard*

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### **The general topic**

The program that we are presenting is an interface that allows the user to use all the features of a digital blackboard with only hand gestures.

What we propose is an application that can recognize and record the movements of users' hands who can then write, draw, and manage a menu without the use of the keyboard, mouse or other external devices.

### **The interface**

The interface essentially present itself as a box that fill part of the screen, where what is displayed is all that the camera chosen for booting can frame.

The user can also use a menu to

- change pencil color
- change pencil size
- select eraser
- clean all the blackboard

The system recognizes one hand as the main hand with which the user can draw and another secondary hand can be used for the menu.

### **Software and hardware**

The project is developed using python as a programming language.

For the tracking of hand movements, from the hardware point of view the camera of a device is used.

On the software implementation side, some pre-existing libraries are used:

- PYQt5: to develop the interface.
- CV2: to take image inputs and convert them to different formats.
- MediaPipe: to the hands detecting.
- Shapely: to work with geometric shapes to control the position of the hands in order to detect the different gestures.
- Pil: to copy and paste images on others images.

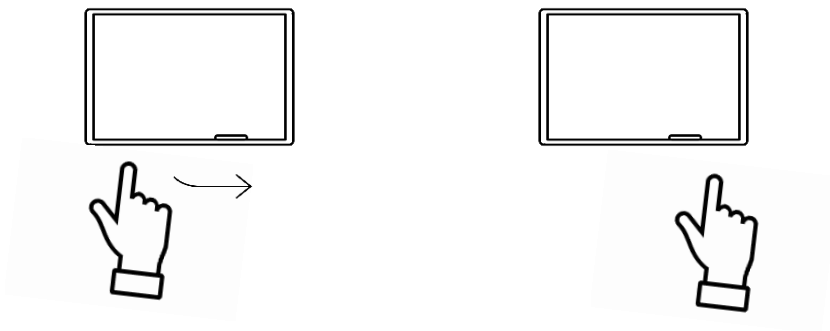
## Features

The application works only through tracking the movement of the hand.

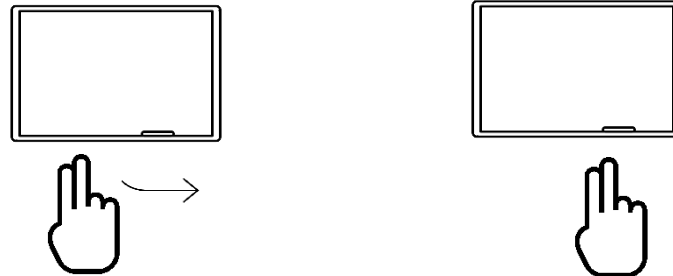
The interface shows the lines drawn by the user's fingers.

It can recognize the movements and carry out the action corresponding to the predefined gesture:

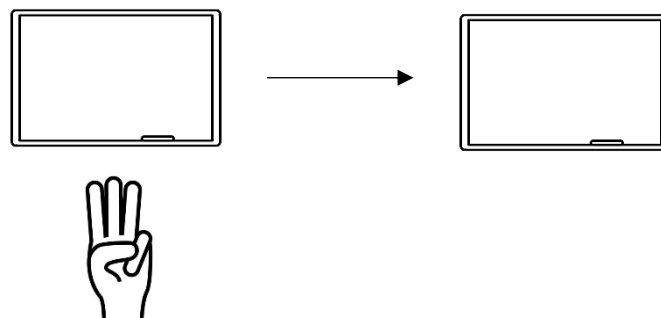
 Draw



 Stop drawing



 Undo



☰ Menu

○ Open



eraser
color
thickness
delete all
exit

○ Browse



eraser
color
thickness
delete all
exit



eraser
color
thickness
delete all
exit

○ Click

eraser
color
thickness
delete all
exit

