INSTALLATION GUIDE

CSE 396 - Group 2

August 2020

1 Requirements

In order to run Ball Bouncer without a problem you need either Linux or Windows OS which has at least two available USB ports, minimum 4th generation i5 processor and the computer should have installed and able to run the OpenCV 4.x.x versions without a problem. Also in order to run the mobile application you need a smart phone which has minimum Android 9(pie) OS.

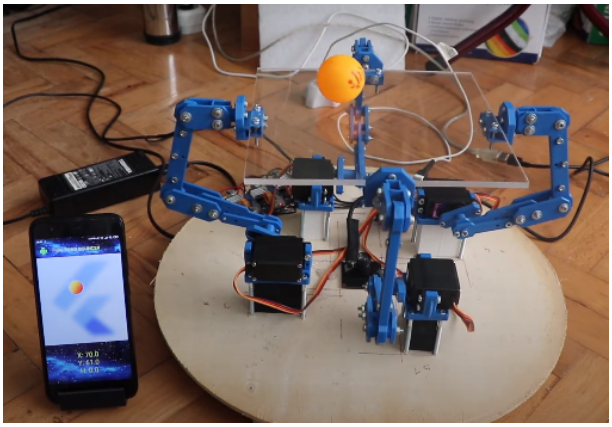

Figure 1: An image of our system

2 Connecting the system to computer

You need to connect two USB ports from system to computer in order to install required drivers automatically. Serial port communication addresses may be required in the future so setting them up will be helpful to us in first stage. For Windows you can set it through the task manager and for Linux you can set it with sudo setserial -g /dev/ttyUSB[0123] command. The last cable that needs to be connected to electrical outlet which provides the power of system with an adapter.

3 Setting up the software:

You need to open the "ballbouncer.cpp" source code with any text editor and find that code piece:

```
//------------------------------------------------------------------//
#if defined (_WIN32) || defined(_WIN64)
#include <io.h>
#define SERIAL_PORT "COM4"
#endif
#ifdef __linux__
#include <unistd.h>
#define SERIAL_PORT "/dev/ttyUSB0"
#endif

#define CAMERA_ID  0        // CameraID

int mode = BOUNCER;
//------------------------------------------------------------------//
```

In this section, depending on the type of OS, the port communication numbers that we set up in earlier stages needs to be replaced in the code. If there are only one camera is connected to system then the CAMERA_ID preprocessor macro needs to be set up to zero. If there are another camera is connected we may need to change that macro as one.

Lastly, the system will run as default ball bouncing mode. If desired the "mode" integer variable can be changed like: NORMAL BOUNCER, SQUARE CROSS macros. You can also do this when runnning the program with command line parameters as normal, bouncer, cross, square etc.

In Linux systems you can build the program with executing make command. Before running program, for Linux systems you need a root privilege with "sudo su" because we'll be reaching to system ports. After getting root privilege you can run the program as ./ballbouncer and drop the orange ping pong ball into the system. In order to build the system in Windows you can use Visual Studio. You can either create new project or import the project that already available in files. Also before building the project you need to set those settings in this link: https://www.deciphertechnic.com/install-opencv-with-visual-studio/ After that the project will be built without any problems.

4 Installing the mobile app and connecting to the system

You need to copy the file named with app-release.apk to an Android device. In order to complete installation you need to follow unsigned application installation stages. In the next stage you need to switch off the cellular data of device and connect BALLBOUNCER network wih Wi-Fi. For password you need to enter “12345678” and connect the Access point on the system.

After that you can open the app “mobile_app” that we’ve installed. When the system starts up, you will be able to follow the x, y and h informations of the ball in real time through this application

5 Settings that may need to be made in the system(Important)

PID values in pidServoX_config and pidServoY_config files may need to be set up in its context according to processing power for per second. Also when the system is running depending on the light situation you may need to set HighH LowS and LowW variables on Thresholded Image screen. By doing this you will need to find a specific setting that ball itself will be completely white and the other parts will be black.