**Smart Intrusion Detection System – Setup Guide**

This guide will help you set up the Smart Intrusion Detection System, which uses AI and IoT technology to detect intrusions, verify identities, and notify the owner in case of suspicious activity.

1. **Components and Tools Required**

**Hardware :**

* RaspberryPi
* Arduino
* Ultrasonic Sensor
* Connection wires
* Webcam
* Power Supply
* Laptop or any device capable of running face recognition ML models.

The IoT kit provided by Xtrans Solution provides you the raspberry pi and Arduino models along with necessary sensors for the project.

**Software :**

* Python(3.10 or 3.11)
* Other python libraries(will be mentioned in installation)
* Twilio account
* VS Code on laptop and RaspberryPi OS on raspberryPi

1. **Setting up the code provided in Zip file**

* Copy and paste the RaspberryPICode folder to the Raspberry pi , while the ServerSideCode folder should be sent to the device where the server and face recognition will run, here a laptop.
* In a empty folder in the laptop, create a python virtual environment and activate it, i.e, open terminal :

*python -m venv env*

*env\Scripts\activate*

This should activate your environment, where you should install following libraries using pip..

*pip install face\_recognition opencv-python flask*

Ensure you have Cmake installed in your system before installing above libraries.

Open twilio.com and create your twilio account for free, get your trial phone number for free usage(should get new trial number after 60 days), save your Account\_SID and Auth\_token , set it as an environment variable, which will be accessed through os.get(variable) command in the code , without giving away actual credentials.

Paste the server side code into your folder, add images of person who has access into faces directory, run the file ..

*python server\_with\_facerec.py*

The server on the laptop should be running, waiting for trigger from raspberryPi.

* In the raspberryPiCode folder in Raspberry Pi OS, run the main.py file, after ensuring the PIN for sensors are correct, as it may vary from different kits.

The ultrasonic sensor should start detection to a certain limit, and when motion is detected (through decrease of the range of detection, can be adjusted in code), the file would send a trigger to laptop , which would turn on the camera and run face recognition, which on recognition of faces should do nothing, while on detecting unknown faces, would sent an alert text message to the given phone number through twilio.