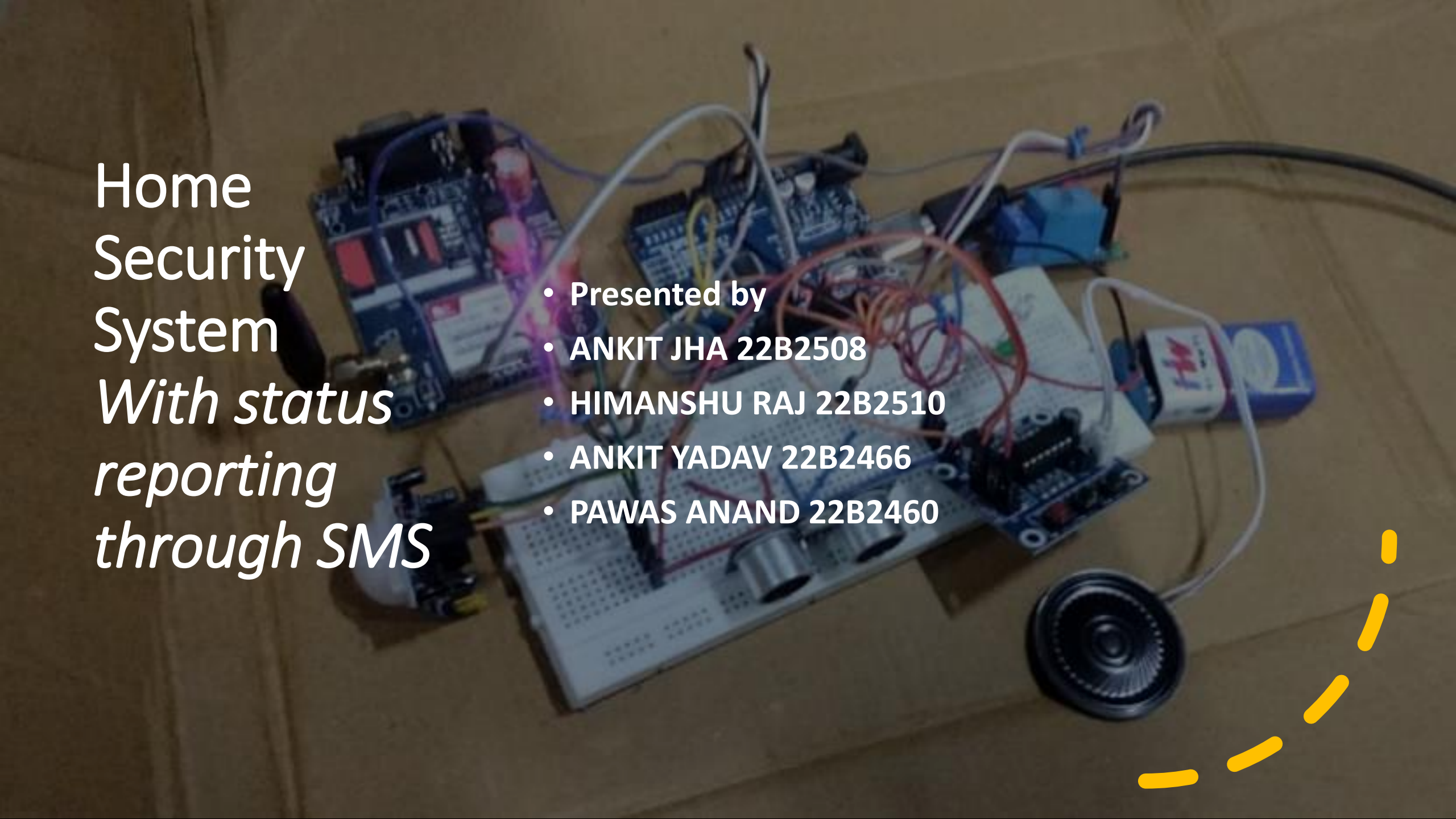
Home Security System

With status reporting through SMS



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OBJECTIVES:

- Detect motion using either of the sensors, **PIR (Passive Infrared)** sensor and **Ultrasonic sensor**
- Trigger **LEDs**(depict home appliances) via a **Relay Module 1-channel** upon motion detection
- Activate an Integrated Services Digital **(ISD1820)** module enhancing security system to alert residents to potential security breaches
- Send SMS using Global System for Mobile Communication **(GSM) module SIM 900A, 2dB Antenna gain** about the instrusion, enabling real time status reporting through SMS & notification

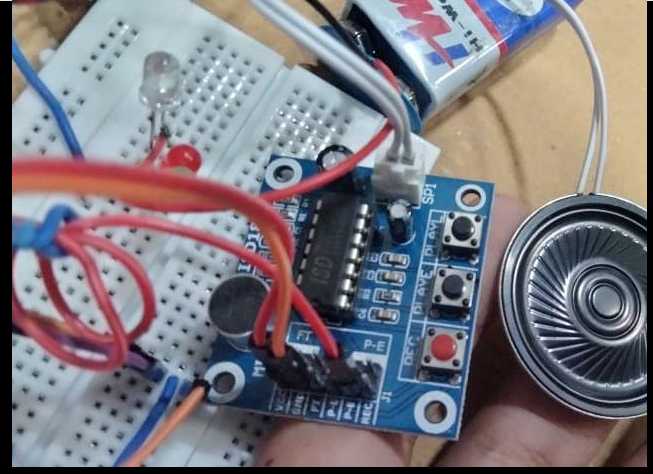
We were able achieve **100%** of our objective with SMS being sent to mobile phone provided and LEDs and ISD module being triggered at the right time

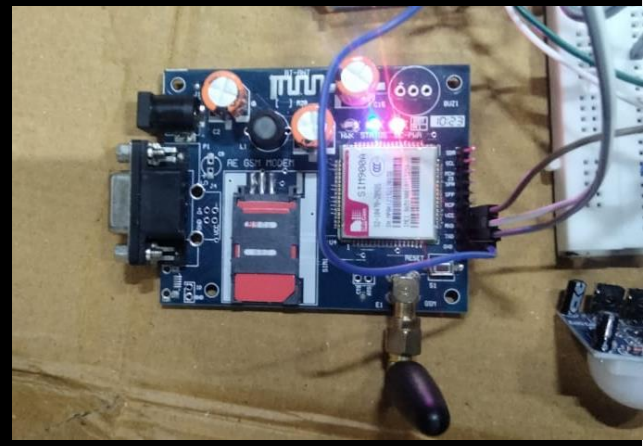
CONCURRENT TASKS

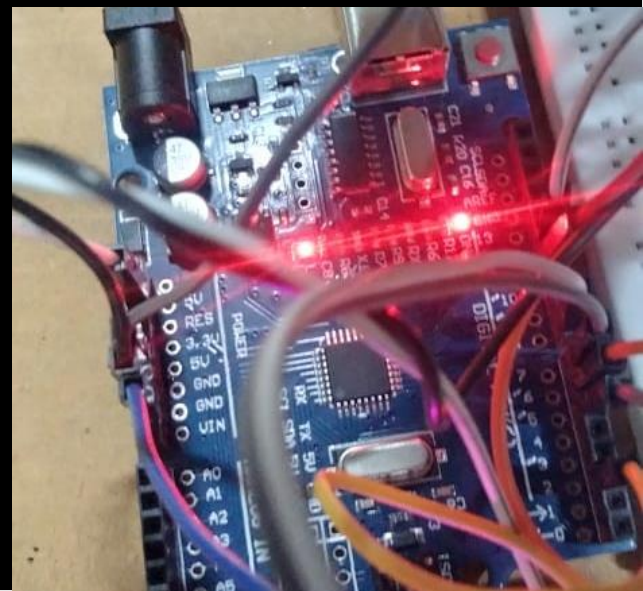
- First we worked on GSM module to **register on network** and send **SMS** just with Arduino without any trigger from the sensors
- Then we integrated the PIR Sensor to **detect motion**
- Then involved Relay Module with LEDs and ISD to **play audio**
- Then enhanced the project with Ultrasonic Sensor as well which **send alike triggers** to PIR sensor

COMPONENTS USED

- PIR Sensor (HC SR05)
- Ultrasonic Sensor (HC SR04)
- LEDs
- Relay Module Single Channel
- ISD1820 Module + 0.5W Speaker
- Microcontroller, Arduino Uno
- GSM SIM900A, 2dB Antenna gain
- Bread Board







SENSOR INTERFACING

- **PIR Sensor**: It’s mounted strategically to cover the desired area. Detects motion based on changes in the infrared radiation. Sends a signal to the microcontroller upon detection
- **Ultrasonic Sensor**: Positioned at critical distance. And sends distance data to the microcontroller which then triggers the relay, ISD and GSM modules

CHALLENGES

Major challenge during our project was registering network on GSM module cause it is compatible to **2G frequency SIMs**. And we tried a lot of time registering it inside our hostel rooms which turned out to a failure as the range of 2G was not strong inside hostel.

But we overcame the problem when we tried it **outside the hostel** in **open area**. And it gave another insight about the functionality of the module.

Another major challenge was **integrating the code** of **all the components** we integrated in single project because we wrote individual codes for the components but not able to write a collective one easily and we suffered a lot in it.

CODE INVOLVED

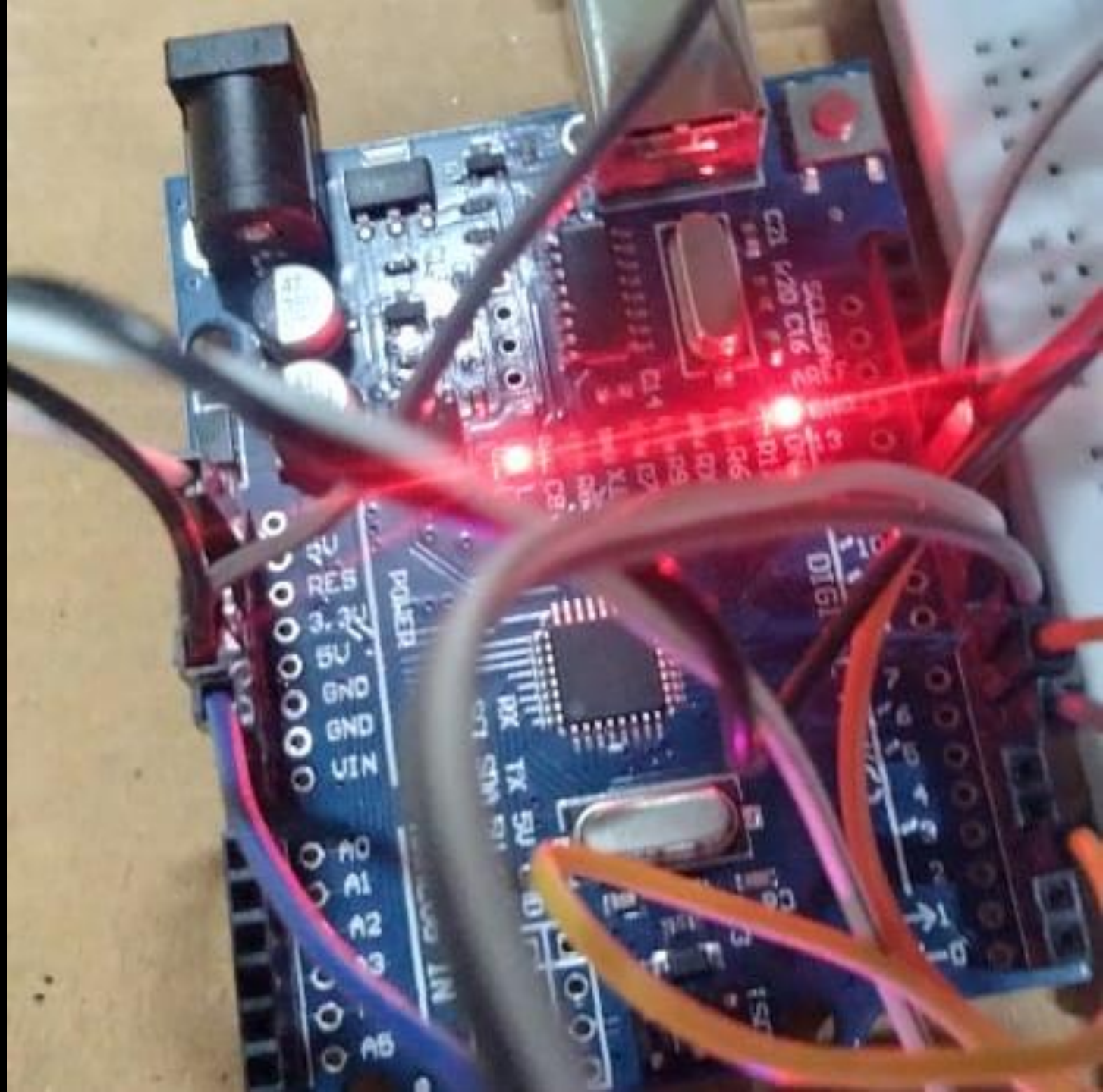
The below provided link is the original code that is being used for the project:

https://drive.google.com/file/d/1aQuL3-I8CQeV5tguYHbRbb6szq6U9a7b/view?usp=sharing

References used:

https://www.electroduino.com/gsm-based-home-security-system-using-pir-sensor-and-arduino/

https://circuitdigest.com/microcontroller-projects/pir-sensor-and-gsm-based-security-system



AIDS & HELP

- We approached some seniors who are involved in IOT projects
- We referred YouTube videos when we were not able to register GSM on network
- https://youtu.be/7Nhr_6940qg?si=xZPZSM-fY8u7tIDK

MAJOR ACCOMPLISHMENTS

We have **integrated Ultrasonic senor** in addition to **PIR** to enhance the security. The Ultrasonic sensor can be placed at critical places where the thief will come if he breaches the PIR sensor security. And either of the sensor trigger the same thing that will cause a psychological panic on the intruder.

We have also added ISD module that plays **prerecorded audio** like “You are being recorded or police has been called repeatedly ” on being triggered.

Following are the links to demonstration of our project:

https://drive.google.com/file/d/1jG18SlQdWJtNHGSr7T6kdRbkDsDzrDq0/view?usp=sharing

https://drive.google.com/file/d/1UmA7VJXojHX7dBZ5X40lRPZHdQsMj1k9/view?usp=sharing