TÜRKİYE CUMHURİYETİ AVRUPA BİRLİĞİ BAKANLIĞI
REPUBLIC OF TURKEY MINISTRY FOR EU AFFAIRS

TÜRKİYE ULUSAL AJANSI
TURKISH NATIONAL AGENCY

Co-funded by the Erasmus+ Programme of the European Union

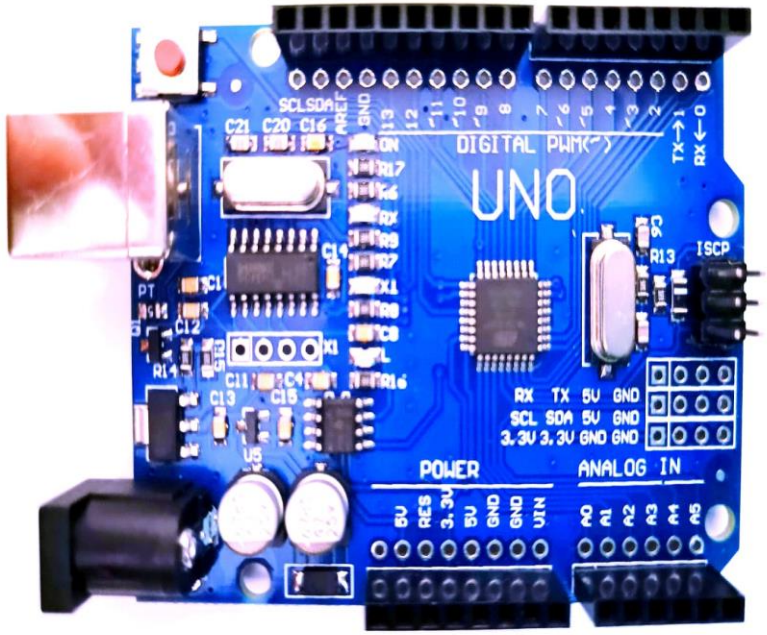
ERASMUS PROJECT

VET of ARDUINOS

WHAT IS ARDUINO?

Arduino is a hardware and software-based development platform designed for creating interactive projects. Arduino boards contain an Atmel AVR microcontroller and various electronic components for circuit connections.

Arduino, with its easily integrable and user-friendly structure, allows even someone with basic knowledge of programming to create advanced software. These software applications can be integrated with modules, boards, and devices, as well as enabling the creation of interactive objects. As an open-source hardware, Arduino also helps you build your own devices using electronic circuits.



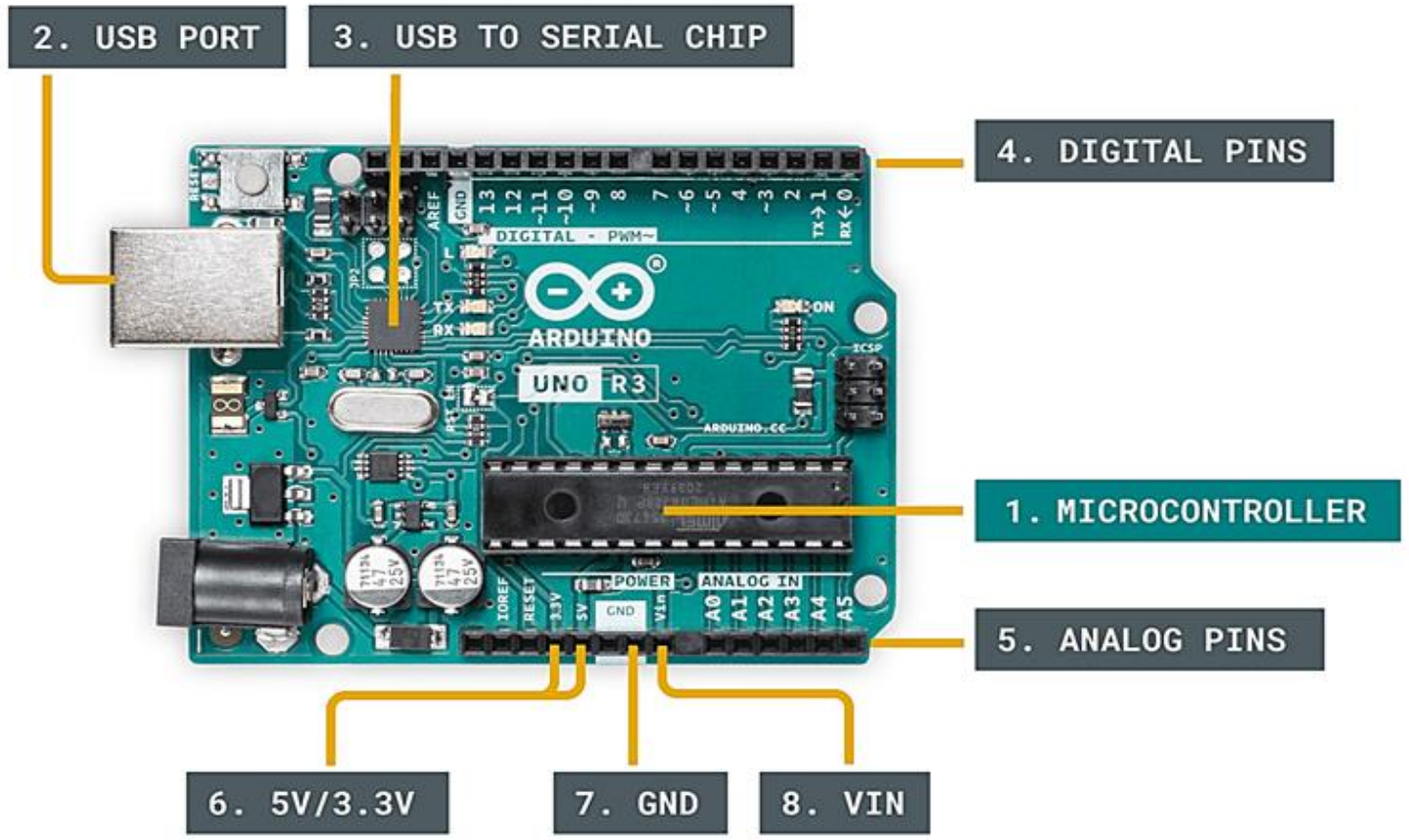
ARDUINO HARDWARE

Over the years, Arduino has published hundreds of hardware designs in various shapes and forms. These include;

			
Arduino UNO R4 Minima	Arduino UNO R4 WiFi	Arduino UNO R3	Arduino Leonardo
			
Arduino UNO Mini Limited Edition	Arduino Micro	Arduino Zero	Arduino UNO WiFi Rev2

ANATOMY OF THE ARDUINO BOARD

Although all Arduino boards are different from each other, there are a few essential components that can be found in almost every Arduino. Let's take a look at the image below:



1. Microcontroller - This is the brain of an Arduino and the component where we upload programs.

2. USB Port - Used to connect your Arduino board to a computer.

3. USB to Serial Chip - An important component that helps convert data from a computer to the built-in microcontroller.

4. Digital Pins - Pins that use digital logic (0, 1 or LOW/HIGH). They are typically used for switches and turning an LED on and off.

5. Analog Pins - Pins that can read analog values with a resolution of 10 bits (0-1023).

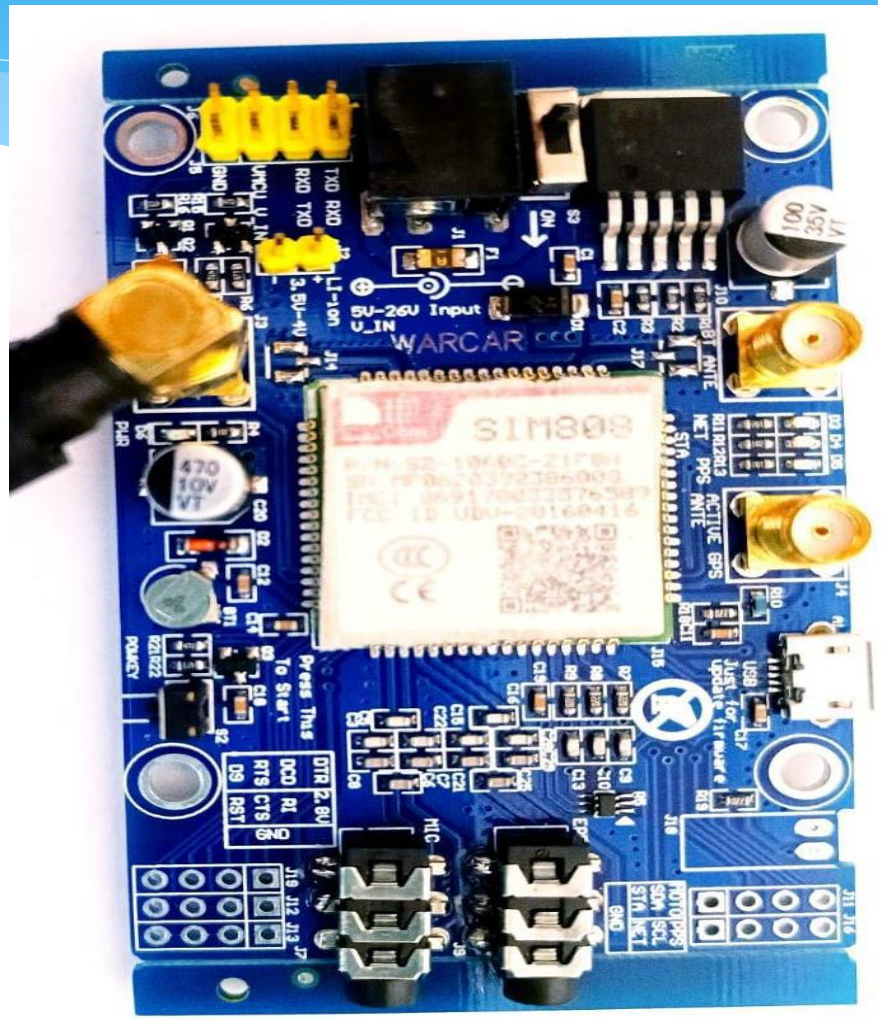
6. 5V / 3.3V Pins - These pins are used to provide power to external components.

7. GND - Also known as ground, negative, or just -, used to complete a circuit with an electrical level of 0 volts.

8. VIN - Stands for Voltage Input, where you can connect external power sources.

SIM808 Arduino GSM Module

SIM808 Arduino GSM GPRS GPS Development Board enables the use of GSM and GPS features when integrated with development boards like Arduino or Raspberry Pi. This module not only has the capability to send and receive SMS but can also perform location tracking. SIM modules are electronic circuits that facilitate data and voice communication using the GSM network.



As a result of our research on Arduino, we designed a project. The project idea aimed to create an early warning system against flood and landslide hazards that could occur in our region. In the following pages, we will focus on this work.

Creating Awareness in the Community and Protecting People from Flood and Landslide Hazards with Arduino-Supported Early Warning Systems

Each year, a project competition organized by TÜBİTAK takes place in our country, and a model of an Arduino-supported early warning system has been designed by our school's teachers and students. With this project, our school has succeeded in winning an award among the 8 cities in the region. The designed early warning system aims to inform the public by detecting signs such as rising water levels or landslides in the event of disasters like floods or landslides.

TÜBİTAK

Before floodwaters reach populated areas, people are evacuated to safe zones, preventing loss of life and property. When a landslide threat is detected, sirens and warning lights are activated to alert individuals and call for them to move away from the danger zones.

Additionally, using the Arduino SIM808 GSM module, SMS alert messages regarding flood or landslide threats are sent to designated individuals. This way, people are informed in advance and can take the necessary precautions. This project aims to detect disasters such as floods and landslides before they occur through early warning systems, ensuring public safety. The goal is to minimize the impact of disasters and reduce loss of life and property.

DEFINITION OF FLOOD AND LANDSLIDE

A flood is an event where rivers, ponds, or other bodies of water overflow their banks and spread into surrounding land areas, typically occurring when there is an excessive amount of rainfall or when water accumulates rapidly.

A landslide is the mass movement of rocks, soil, or other materials that move down slopes. This movement occurs under the influence of gravity, as loose materials slide, roll, or flow downward, usually triggered by factors such as rainfall, earthquakes, rock fractures, or human intervention.

EARLY WARNING SYSTEMS FOR FLOODS AND LANDSLIDES

Early warning systems for floods and landslides are technological systems used to quickly inform the public, local authorities, and other relevant organizations by detecting potential threats of natural disasters in advance. These systems help reduce loss of life, prevent property damage, and facilitate the evacuation of people to safe areas by sending alerts before or shortly after the disaster occurs.

HOW WAS THIS PROJECT IDEA CONCEIVED?

The recurring flood disasters in our hometown of Batman over the years have been a significant factor in choosing this project. If the intense water flow coming from the West Raman and Raman mountains due to rainfall could have been predicted in advance, it could have partially prevented loss of life and property.

Especially in the Black Sea region, where slopes are steep, dozens of landslides occur each year, resulting in loss of life and property. This project aims to partially prevent such losses.

WHAT IS THE IMPORTANCE OF THIS PROJECT?

This study focuses on developing an effective model against flood and landslide risks through early warning systems. As seen in the news to the right, the recent landslide event in the Erzincan region highlights the importance of choosing this project. Based on the findings, our selected project will serve as an inspiration for similar projects and research in the future.

TRT HABER SICAK SAVUNMA ÇOCUK ÖZEL HABER DOSYA HABER DİĞER

Türkiye KAYNAK AA HABER GİRİŞ 13.02.2024 16:17 SON GÜNCELLEME 13.02.2024 22:38

Erzincan'da madenin bulunduğu bölgede toprak kayması

Erzincan'ın İliç ilçesinde altın madeninin bulunduğu geniş bir alanda toprak kayması meydana geldi. Göçük altında kaldığı düşünülen 9 kişiyi arama kurtarma çalışmaları sürüyor.

EARLY WARNING SYSTEM MODEL STUDY

As is known, every year in our country, loss of life and property occurs due to floods and landslides. Therefore, the aim is to establish an early warning system to prevent fatalities from flood and landslide risks. With the efforts of the school's students and advisors, an early warning system has been created using materials from the workshop. To visualize the operation of the early warning system, a river, rocky areas, wooded regions, and a river valley have been modeled to closely resemble reality.

Early Warning System Model Study

The electrical equipment used for the early warning system is listed below.

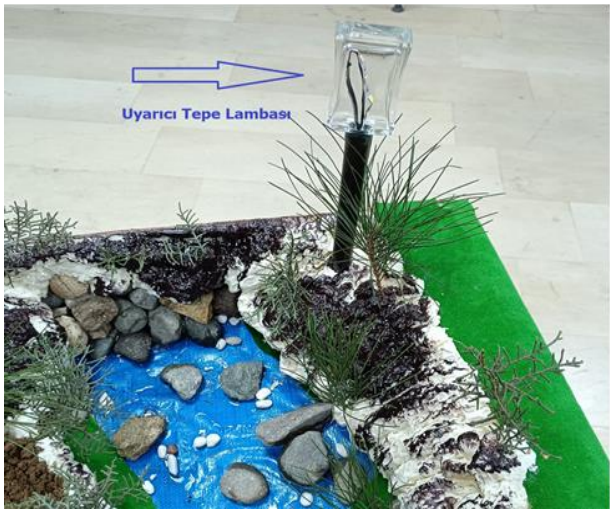
Materials Used:

1. Arduino Uno Board
2. SIM808 GSM Communication Module
3. Liquid Level Relay
4. Units Power Supply 220/12 V DC
5. Unit Power Supply 220/5 V DC
6. Unit Landslide Detection Sensor
7. Unit Liquid Level Measurement Device
8. Unit Fuse
9. Unit Beacon Light
10. Unit Siren
11. Unit Connection Cables

By using the materials mentioned above, when the river level exceeds a certain threshold, the liquid level relay will activate the siren and warning beacon light based on the information received from the measurement device, allowing people to move to safe areas before the water level reaches their living spaces. This early precaution will help prevent loss of life and property.

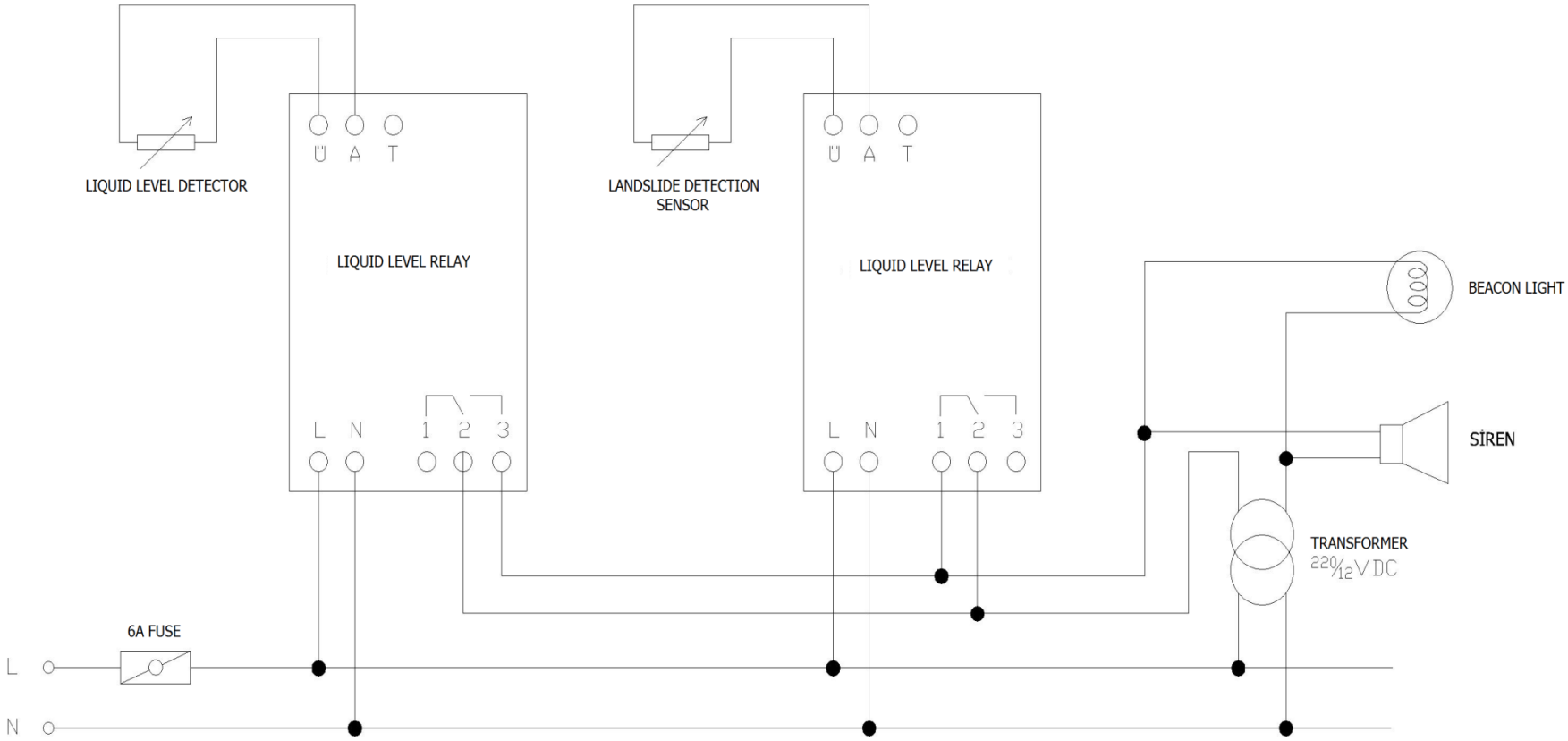
Liquid Level Measurement Sensor

Landslide Detection Sensor



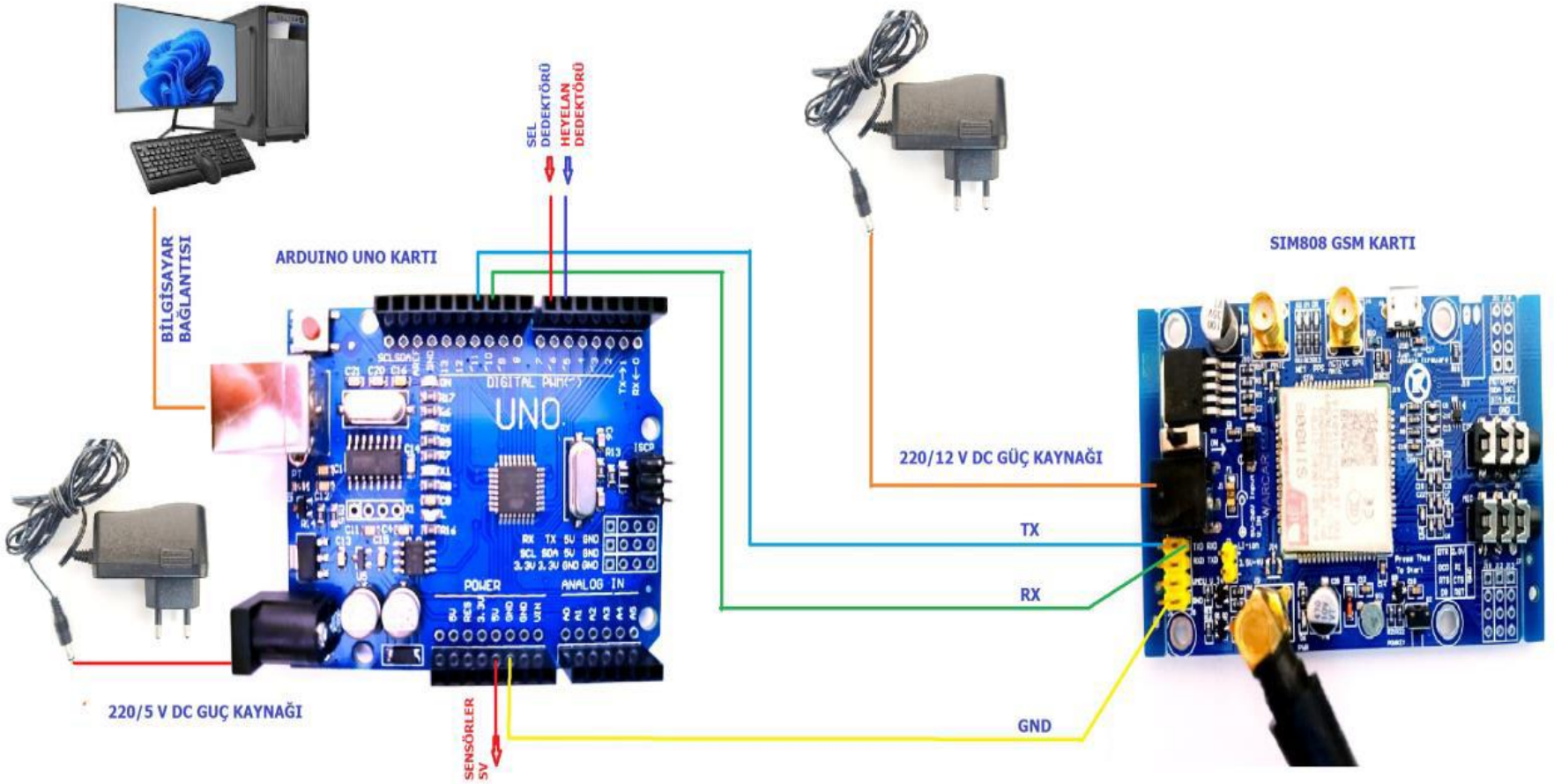
Warning Beacon Light

The electrical connection diagram of our model study titled 'Early Warning Systems for Flood and Landslide Hazards' is shown below.



Early Warning System Electrical Connection Diagram

The electrical connection of the Arduino Uno board with the SIM808 GSM module is shown. This connection enables the sending of alert messages to designated individuals as specified in the Arduino IDE program.



The construction stages of the early warning system are outlined in the following sections. Section 1 shows the initial version of our model made from wooden boards. In Section 2, foam has been used to create mountains around the river, and stones have been placed in the river to make the model more realistic. Section 3 involves making the electrical connections and testing the system's operation. The electrical connections were made internally to maintain the aesthetics. In Section 4, additional visual elements were added using tree branches, paint, and other materials to enhance the appearance of the model.

1 2 3 4

Early Warning System Construction Phase

Thank you for listening to us.