



# TED UNIVERSITY

Faculty of Engineering

Department of Computer Engineering

## **CMPE 491 – Senior Project – Project Specifications Report**

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Name of the Project:

AgroAutomaTED

27/10/2023

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# **1. Introduction**

## **1.1 Description**

The overall aim of our smart agriculture project is to address the urgent problem of global food shortage, which affects 691 to 783 million people, as we can see in the World Bank's 2023 reports. To this end, by focusing on effective irrigation management, we aim to contribute to the overarching goal of zero hunger as outlined in the United Nations' Sustainable Development Goals (SDGs).

The project primarily aims to prevent possible losses and increase efficiency by optimizing agricultural irrigation practices. In this context, we aim to offer a comprehensive agricultural management solution by combining data such as soil moisture, water level, and mineral amount with our Arduino-based device equipped with sensors with a mobile application. To teach farmers better irrigation management, real-time data received through the system and innovations provided by the automation system help farmers make informed decisions. The aim is to find solutions to urgent global problems such as food and water scarcity by leveraging technology to significantly improve irrigation practices, minimize water waste, increase crop yields, and relieve the pressure on agricultural resources, especially in drought-prone regions.

## **1.2 Design and Implementation Constraints**

Some factors that could affect our project include the following:

- Budget limitation is a factor that will play an important role in the hardware design and setup.
- From a technological perspective, the use of Arduino devices can be costly in terms of electricity consumption.
- To establish an uninterrupted network connection between the mobile application and the Arduino device.
- The irrigation system and hardware components may be influenced by varying weather conditions and environmental factors. Therefore, measures must be taken to stabilize the system in response to these dynamic factors.

### 1.3 Professional and Ethical Issues

- Data Privacy: We will ensure this by adhering to data protection regulations and guidelines to protect the privacy and security of data collected by the mobile application and the Arduino device.
- Environmental Responsibility: To minimize water waste and soil damage by developing solutions with sustainable and responsible practices.
- Accessibility: Ensuring that the technology is accessible to a wide range of farmers, including farmers in resource-limited regions.

## 2. Requirements

To briefly describe the requirements, as mentioned in the proposal report, a hardware device, which is Arduino, and an app that informs the user about the conditions of the soil by taking data from the hardware device.

Arduino device is responsible for measuring the moisture level of the soil and some other related information, indicating the water level of the water tank, and providing irrigation while concerning the amount of water used to save it. The user shall sink the hardware device into the ground and put the water level sensor into the right spot of the water tank and the hardware device will inform the user about the conditions of the soil and the water level through the app.

A mobile application is responsible for getting the information from the hardware device and notifying the user. Users shall get notifications if the water level of the tank or the moisture level of the soil is decreased below some threshold value. In addition to that, as specified in the description part, we plan to develop an irrigation solution that automates the irrigation if possible. This might be achieved using the app or the hardware device itself. In terms of development this application “Flutter” is an open-source UI software development kit used to develop cross-platform applications for any web browser, Android and IOS devices (Amadeo Ron, 2018).

### 3. References

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