

## Conceptual Document

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# Smart Irrigation System

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# Contents

<b>General introduction</b>	<b>1</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Project conception</b>	<b>2</b>
2.1 Project Definition . . . . .	2
2.2 UML Diagrams . . . . .	2
2.2.1 Use Case Diagram . . . . .	2
<b>3 Conclusion</b>	<b>5</b>

# List of Figures

2.1	Use Case diagram of Smart Irrigation System . . . . .	3
2.2	Class diagram of Smart Irrigation System . . . . .	4

# List of Tables

# Chapter 1

## Introduction

Rainfall in our country is variable and fluctuates by year. During dry periods, irrigation may be needed to preserve landscape quality. Over- or under-irrigating a landscape can possibly increase disease incidence, waste water and decrease overall landscape condition. Irrigation system efficiency is dependent upon several factors including design, installation and specific site conditions. In fact, Outdoor water use accounts for approximately 30 percent to 50 percent of household water use. A substantial amount of water is lost to evaporation, wind and runoff as a consequence of improper watering methods. Reducing or eliminating this loss decreases utility bills and creates a more water efficient and healthy landscape. .

## Chapter 2

# Project conception

### 2.1 Project Definition

Our project consists on developing a mobile application in order to control and manage a Smart irrigation system which uses weather data and soil moisture data to determine the irrigation need of the landscape in order to maximize irrigation efficiency by reducing water waste, while maintaining plant health and quality.

In addition to temperature and humidity sensors, we will utilize a moisture sensor placed below-ground in the root zone of lawns to determine water need. Then the application will provide an estimation of water need by an ML tool. The controllers can be adjusted to open the valves and start irrigation when needed.

### 2.2 UML Diagrams

#### 2.2.1 Use Case Diagram

The use case diagram is a diagram characterized by an interaction that occurs between a user and the computer system being developed, interacting with the system. In our project, there are two actors: the user who checks his dashboard to get an idea of the plants humidity, temperature, and soil condition status and control the system and the administrator who is able to add nodes.

A class diagram is a schema used to define the classes and interfaces of systems along with their relationships.

For our project, the class diagram summarizes the different components constituting the

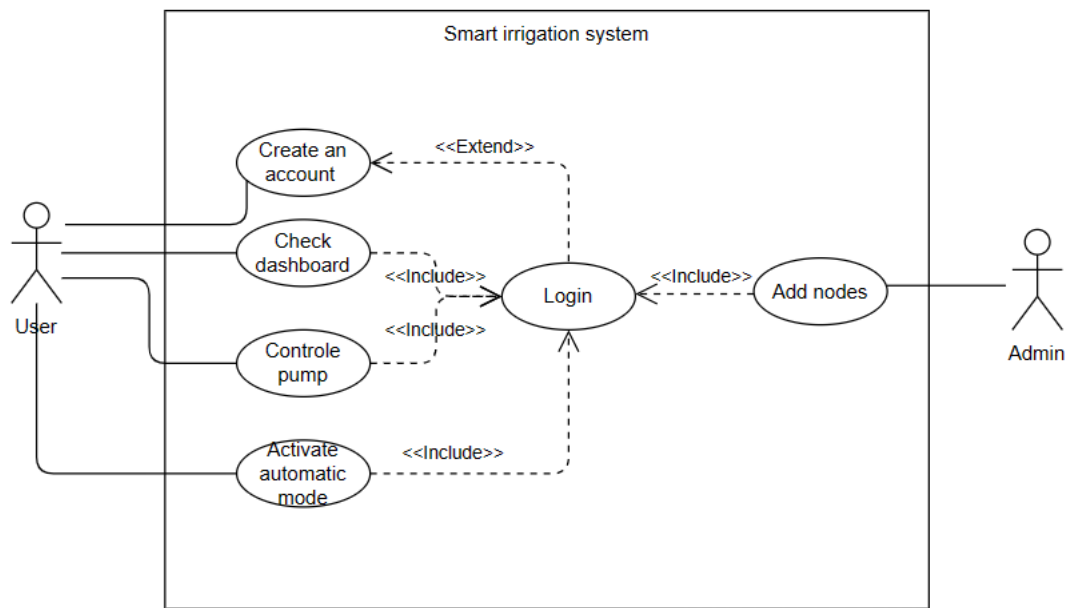


Figure 2.1 – Use Case diagram of Smart Irrigation System

backbone of the project. Indeed, the diagram is composed of an IoT section, which includes sensors such as the temperature and humidity sensor, as well as the soil moisture sensor, communicating with the MQTT broker. There is also a section for user access to the web or mobile application under the administration of the administrator, who has the ability to add and remove users in addition to the Parcel class which allows the user to identify the plants location.

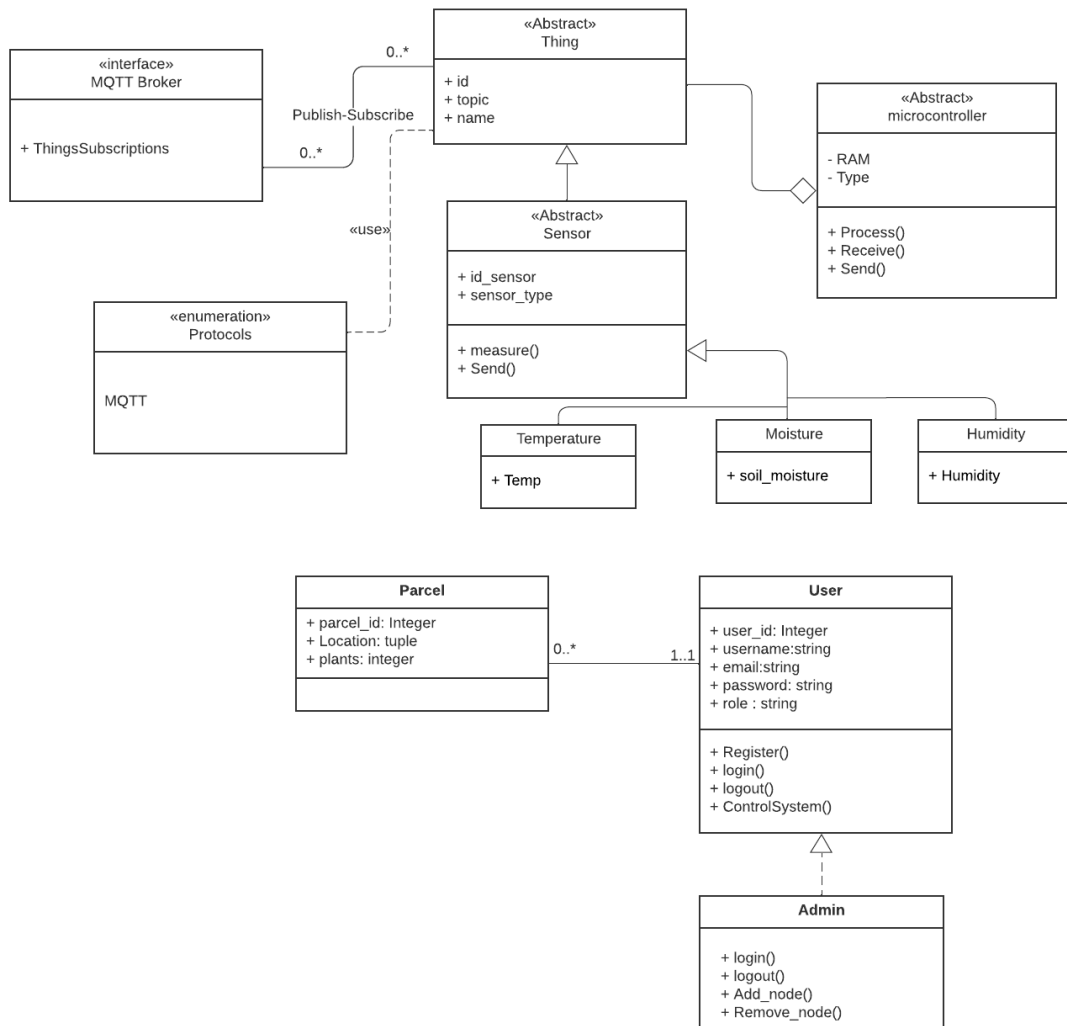


Figure 2.2 – Class diagram of Smart Irrigation System



## **Chapter 3**

# **Conclusion**

This document is dedicated to the design and analysis of the system. Indeed, we have detailed the various user requirements through UML diagrams. We started with the application level, addressing the different features of the application by utilizing UML diagrams (use case, sequence) that allowed us to define the candidate classes, leading to the creation of the database.

# Bibliography