

Dataset for Predicting Soil Moisture with Cheap Sensors and Weather Conditions

Prerequisites:	- Internet of Things background (sensors, embedded programming, LoRa)
Level:	This topic is appropriate for Bachelor and Master Students
Language:	German or English

INTRODUCTION

CoMNETs has been working on the area of agricultural monitoring applications with underground sensor networks for many years. One of the hardware challenges we face is the price of the soil moisture sensor, which is currently around 180 euros. In a previous work, we have explored the possibility to use cheap moisture and humidity sensors and machine learning to approximate the soil moisture. However, the results were not satisfactory enough to be used in real applications. The goal of this thesis is to collect a dataset from several underground sensor networks about temperature, several humidity and moisture sensors, and additionally data from a weather station about rain, wind, air humidity and air temperature.

This project is very well suited either as a Bachelor thesis or as a Master mini project. The evaluation of the dataset is NOT part of this project, but can be conducted in a consequent project (e.g. Master thesis).

PROJECT DESCRIPTION

The goal of this project is to gather an extensive dataset as described above. The individual steps are:

- Select several soil moisture and humidity sensors to be attached to the MoleNet underground sensor platform.
- Connect the sensors and test the platform in a lab environment.
- Select a weather station and corresponding sensors (air temperature and humidity, rain, solar radiation, wind, etc)
- Install at least 3 sensors, a base station and a weather station in an outdoor environment.
- Implement a cloud-based data backup and visualisation tool.
- Gather at least 1 week of data and analyse for plausibility and correctness.
- Documentation and presentation of the work.

It is important that the system remains functional also after the completion of the project and that data is further delivered. Code and first dataset need to be made publicly available under GitHub.

CONTACT

If you are interested in this work, please contact us via mail: projects@comnets.uni-bremen.de