Documentation Plantomation V1.0

Automatic Plant Watering System

Made with LaTeX
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PLANTOMATION

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Contents

1 Prelude

Plantomation is a project started by a friend of mine who had the idea of a self-watering flower pot. After some deliberation and initial drafts he pulled out of it for personal reasons.

I now restart the project because I always forget to water my house plants and eventually they all die. This will be a thing of the past thanks to this small project!

2 Introduction

Plantomation is an automatic plant watering system based on ESP32. It can handle up to four different plants simultaneously and is fully configurable via a simple web interface.

It uses capacitive soil moisture sensors to detect the humidity of the soil in the flower pot. Via a pump and valves, water can be delivered to the plants that need it.

By applying a threshold, the amount of water used for plants can be customized to the plants specific needs.

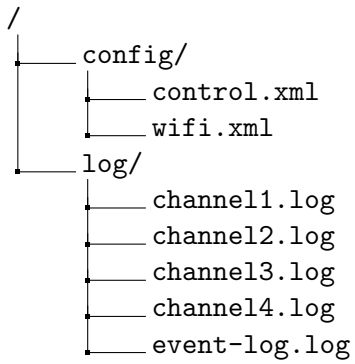
The module is supplied by external 12V DC. Pumps and Valves are driven off 12V directly, moisture sensors are driven by 5V, the spillage sensor is connected to 3.3V.

Config and Log files are saved on the SD card.

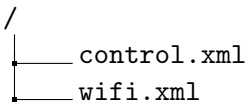
3 File System

The SD card is connected via SPI and is necessary for logging and external config. If no SD-Card is present, the internal config will be used, but no logging will be done. The internal config will always be overridden by the externel config at startup if available.

File Tree SD-Card:



File Tree Internal SPIFFS:



control.xml

Contains information about the channels and their operation. Names, humidity thresholds and operation modes (moisture control/time control/disabled) are stored here for the ESP to act upon and to display in the web interface. The log_enable keys can be used to enable or disable logging for this channel. (SD only)
Default is enabled, errors will always be logged if SD is available.

wifi.xml

Contains all necessary information for wifi-usage, like SSID, password and if the ESP should be in station mode (client inside existing network), or in AccessPoint-Mode (creating its own network). Default is AP-Mode.

Logfiles

If logging is enabled, the ADC-values (hourly) and watering-events will be logged. This way long-term data about the moisture and water usage can be obtained for further fine-tuning. In the event-log, important events will be logged as well, like page loads, spill detects, container empty etc.

4 Configuration

Plantomation mainly uses two XML files for the configuration of the system.

4.1 config.xml

The config.xml is the main config file for the operation of the system. It contains all necessary infos on what to do with each channel as well as some general settings.

The filestructure is as follows:

```
config.xml
└── <config>
    ├── <channels>
    │   ├── <channel1>
    │   │   ├── <name>
    │   │   ├── <op-mode>
    │   │   ├── <moisture>
    │   │   ├── <interval_time>
    │   │   ├── <pump_time>
    │   │   └── <log-enable>
    │   ├── .
    │   ├── .
    │   └── <channel4>
    │       ├── <name>
    │       ├── <op-mode>
    │       ├── <moisture>
    │       ├── <interval_time>
    │       ├── <pump_time>
    │       └── <log-enable>
    └── <general>
        ├── <log-level>
        ├── <debug-level>
        └── <pump_flow>
```

XML Key Description:

- name: Name given to channel/plant
- op-mode:
  - 0: disabled
  - 1: moisture control
  - 2: time control
- moisture: value between 0..100 of moisture sensor range
- interval_time: duration in-between waterings (time-control mode only)
- pump_time: duration for which the pump should be active
- log_enable: 1 enables logging (SD card only)
- log-level:
  - 0: no logging of events
  - 1: only log errors
  - 2: log errors and page connections
- debug-level:
  - 0: no debug output
  - 1: no cyclic debug messages
  - 2: all debug messages
- pump_flow: flowrate of the pump in ml/min

4.2 wifi.xml

The wifi.xml contains all information regarding the intended network and mode.

The filestructure is as follows: