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CLASSWORK

IRRIGATION SYSTEM

HARDWARE AND SOFTWARE FEATURES/DEVELOPMENT CYCLE

A Windows-based GUI was developed using Microsoft VB.Net to manage and control the irrigation system and wireless nodes. Embedded routines were used to send command signals to the six slave nodes/dataloggers. LoggerNet automatically downloaded data from the nodes every 15 min and populated a database on the laptop. The recorded data was then managed by the GUI.

The GUI has a tabular design and comprises several tabs including: (1) a “Blocks” tab for displaying raw real-time data from the in-field sensors and valves on/off status, (2) a tab for showing real-time weather data (“Roza”), and (3) a tab for monitoring the commands sent out and program codes in action (“Console”) The GUI was capable of running in three main functioning modes: simulation, automatic irrigation and manual irrigation. The simulation and manual modes were used for the purpose of testing the system’s hardware and software. The simulation mode was added mainly to test the internal functions without having to operate the hardware. The manual mode, on the other hand, allowed for testing and tuning the hardware more easily.

The GUI collected data from the sensor nodes, downloaded weather data from the nearby weather station, and provided a real-time display of the measurements in individual zones regardless of the node collecting them. The remaining irrigation time corresponding to each sensor/plot was displayed next to the sensor’s name. The GUI ran the irrigation scheduling algorithm every day at midnight, and automatically made decisions for scheduling irrigation

events for twenty-one individual zones within the orchard. It sent control signals to the individual data-loggers which opened or closed latching solenoid valves to turn the water on and off to each block of trees. The software also allowed for manual control of individual zones.

The data recorded in the database by LoggerNet were automatically pulled by the GUI and used to execute the algorithms in parallel everyday at midnight. This led to generating irrigation schedules for 10:30 AM of following day.

FLOWCHART AND ALGORITHM



