Milestone IV Progress Evaluation

Project Title: Autonomous Multi-Cycle Farming in Space

From CSE [coordinator and project sponsor: Philip Chan, pkc@cs.fit.edu]:

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Clients:

Some potential clients: NASA, SpaceX, Blue Origin, Virgin Galactic.
Current client: Dr. Philip Chan Associate Professor, Computer Engineering and Sciences at Florida Institute of Technology, coordinator and project sponsor.

Progress Matrix

Task Matrix for Milestone 4

#	Task	Progress
1	**Design for application used to manage device:**	**64%**
	Configuration Design for configuration library service where users can select new configurations for device, i.e. apples, lettuce, et	50%
	Reports System performance and status globally down to each individual subsystem of a single device Appropriate metrics and report hierarchy based on user selected feature	50%
	Manual control Stop, start, restart, pause, and reset	90%
2	UX/UI survey for CS Forum with appropriate hierarchy based on what user selected	100%
3	One actuator working on production control board	100%
4	Testing progress	30%

Discussion

Task 1

Task 1 has proven to be the most difficult because the difficulty in parsing the YAML file to C#. Currently the parser would be the backbone of the entire GUI design. We are still working on the best metrics to display that would be the most useful. The reports will make much more sense,

in terms of usefulness, when the device becomes wireless capable. A wi-fi dongle has been ordered and this will give us full access to near real time data. Many industries use databases to set device states so we feel our design falls in line.

Task 2

The questions we are asking pertaining to the system are; does the flow make sense? Are the input fields intuitive? Is the application nice to look at and use? One way to answer that is to present the problem the application is trying to solve and then ask questions about the various forms and control flow to see if the surveyor can accurately guess the intentions of each component in the application.

Task 3

Several components on the board require more complex circuits to operate. The fan requires PWM to adjust for speed and the light requires a relay for a switch at higher voltage. The limit switches toggle a pin between the high and low state and are relatively easy to set up. We used a 1k resistor and outputted the current to P9_12 to demonstrate we can use this production hardware.

Task 4

Testing progress of a formal nature was delayed due to an expiring VMWare license. We will be utilizing virtual box to begin designing our SonarQube rules. Due to the unforeseen circumstances the task has been postponed until next milestone.

Team Discussion

Notes are given based on interactions between CSE. They do not necessarily reflect the team member's entire contribution.

- Christopher Millsap <cmillsap2013@my.fit.edu>:
    - Primary on hardware interfaces
    - Primary on GUI application
    - Primary on abstract planning
    - Primary electrical for team
    - Primary on YAML to C# parser
- Giampiero Corsbie <gcorsbie2018@my.fit.edu>:
    - Provided python expertise
    - Primary on internal database control pause, start, restart, resume, shutdown
    - Provided linux expertise
    - Primary on YAML reconfiguration
    - Primary on accounting for multi thread

Each member contributed fully. Communication was always immediate and thorough.

Plans for Next Milestone

Task	Giampiero	Christopher
Functional setup of actual actuators and sensors working with system ● Seeding head on track ● Light and fan ● Linear actuator ● Nema motors ● Moisture sensor	20%	80%
Working POC of application to configure and manage device	30%	70%
Working config feature in application - low priority should be easy	30%	70%
Metrics for reports	80%	20%
Testing rules in SonarQube	25%	75%

Task 1

Functional setup of actual actuators and sensors working with system

- Seeding head on track
- Light and fan
- Linear actuator
- Nema motors
- Moisture sensor

We want to have a built demo as soon as possible. According to MEE we should have the device built in a month. Circuit design has been verified by two profesional outside sources. The moisture sensor is a fancy name for a conductor that can be built with two wires and a resistor. This sensor has already been built by another member of MEE.

Task 2

Working POC of application to configure and manage devices. Currently the GUI application is not fully functional. It cannot edit a full config file and it cannot give any useful control of the device to the user. We plan on finishing the application around this milestone so that we can focus on the hardware programming needed to get the device working for showcase.

Task 3

How scalable can we make this system? Currently we are designing the software to be compatible with many different types of crop. When the hardware catches up we will have a device capable of farming many different plants from a click of a button.

Task 4

We want to provide useful reports for our users. To do this we need to work out what values our system generates should be reported and reviewed.

Task 5

This task has been postponed with milestone 4 and queued up for accomplishment at a later date. The goal is to provide clear reasonable testing metrics to validate the software for vulnerabilities and bugs. The subtasks are to setup a new linux environment for testing since the vmware license for one of our members expired. We will use virtualbox.

Date(s) of meeting(s) with Client during the current milestone 4:

Every two weeks starting 9/13/19

Project Logs			
Action	Date	Time spent in hours	Comments
Met with Dr Chan about Actuator and sensor programming, components of the GUI. M6 discussion on integration evaluation and multicycle.	1/17/20	2	
Met with Dr Chan about config file management: config	1/31/20	2	

current config next, config is running something wrong, nothing is running then start.			
Milestone 4 review/evaluation	2/13/20	TBD	

"See Faculty Sponsor Feedback below"

Faculty Sponsor feedback on each task for the current Milestone:

Task 1

Functional setup of actual actuators and sensors working with system

- Seeding head on track
- Light and fan
- Linear actuator
- Nema motors
- Moisture sensor

We want to have a built demo as soon as possible. According to MEE we should have the device built in a month. Circuit design has been verified by two profesional outside sources. The moisture sensor is a fancy name for a conductor that can be built with two wires and a resistor. This sensor has already been built by another member of MEE.

Integrate with what MEE has currently

Task 2

Working POC of application to configure and manage devices. Currently the GUI application is not fully functional. It cannot edit a full config file and it cannot give any useful control of the device to the user. We plan on finishing the application around this milestone so that we can focus on the hardware programming needed to get the device working for showcase.

Design for app workflow

Task 3

How scalable can we make this system? Currently we are designing the software to be compatible with many different types of crop. When the hardware catches up we will have a device capable of farming many different plants from a click of a button.

Display 2 growth chambers instead of 12

Task 4

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Task 5

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NEXT MEETING: 10-15 what to present at showcase

Faculty Sponsor Signature: _____ Date: _____

Faculty Sponsor Evaluation:

1. Faculty Sponsor: detach and return this page to Dr. Chan (HC 322)
2. Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Christopher Millsap	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Giampiero Corsbie	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Sponsor Signature: _____ Date: _____