

Initial Project Proposal

Team 20

Team Members

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Project Name: TerraFarm

Project Synopsis:

TerraFarm is an automated self-enclosed hydroponic farm suited for small businesses and restaurants who wish to have fresh produce on hand without needing to have a traditional garden space.

Project Description (150-250 words)

- *Why is the project being undertaken?*
Automated operations has been taken seriously in the last few years, and people would like to do anything by themselves, especially farming. People usually like to grow plants for hobby but they do not always have time to take care of them. Therefore, Terrafarm has come up with an idea that you can grow productive plants in your own place to supply for your needs with literally little or no effort.
- *Describe an opportunity or problem that the project is to address.*
This project has a lot of potential because it applies our modern engineering knowledge to something that we take for granted in our everyday lives, farming. The product will automate home grown produce via a hydroponic system. The system will monitor water, mineral, and sunlight intake of the plants and administer resources accordingly. There is a limitation for this project which is that the cost benefit analysis of the produce. It can be pricier than traditional farming. Therefore, the main customers of this project are non-farmers, but restaurant owners and people who love to grow organic products at home.
- *What will be the end result of the project?*
By the end of this project, we would create a real productive application and achieve more knowledge on machine learning. This could lead to more research into a mass production for in-home private individual use. Terrafarm is a critical project, so we think that this project has a good chance to be successful.

Project Milestones

- *3-5 specific and measurable objectives per semester for first & second semester*
- *Estimated completion date for each milestone*
- *Both implementation and documentation milestones*
- Semester 1:
 - Implementation Objective 1: Processing test data for desired outputs
 - e.g what the machine should do at a certain temperature range, moisture level, etc
 - Implementation Objective 2: Storing input data from sensors in a database to be accessed by main computation
 - Implementation Objective 3: Work with the other groups to integrate backend to frontend
 - Documentation Objective 1: Gantt Charts for work plans by the end of October
- Semester 2:
 - Implementation Objective 1: Machine learning to optimize environment
 - e.g Using an algorithm to analyze data stored on database to tweak program's outputs (moisture, fertilizer, light, etc)

Project Budget

- *Hardware, software, and/or computing resources*
- *Estimated cost*
- *Vendor*
- *Special training (e.g., VR)*
- *When they will be required*
- GitHub subscription for business (Soon-ish)
- Server space for machine learning calculations and hosting data (Post prototype?)
- Software licenses (Maybe, depends on language) (Soon-ish)

Work Plan

- *Who will do what*
- Highly dependent on another future meeting with the business owner. Since we haven't clearly defined goals with the business owner
- Everyone will be doing research into machine learning, languages to be considered, and some familiarity with plant growth and what factors are needed
- Most likely focusing on python because of the use of Raspberry Pi's