FAMU/FSU College of Engineering
Department of Electrical and Computer Engineering

Project Charter

Project Name & Team Number:

Robotics & IMU Project, Team #307

Team Members:

Christopher Castro
Cameron Ryals
Atilla Sulker
Ian Scofield

Date Created: 09/09/2022
Date Edited: 01/25/2023

Project Scope

Project Description:

Design, program, and build a robot to navigate an office environment without the use of GPS and scan a QR code located in a unknown location. The environment may include obstacles such as tables, chairs, doors, people, etc. The robot will use any type and number of sensors (IMU, Sonar, LIDAR, etc.) to navigate the space and locate the QR code.

Key Goals:

Based on the expectations set by our sponsor, The Charles Stark Draper Laboratory, Inc., the robot must do all the following:

- Navigate autonomously using on-board sensors in all lighting conditions and over various floor surfaces
- Avoid collisions
- Find a QR code at an unspecified location in an office space
- Scan QR code message
- Locomotion limited to average human walking speed

Markets:

The expected market will be companies/organizations that require the following:

- Assistance scanning QR or like codes in the office environment
- The recording messages created by human workers

Assumptions:

- The QR code is at a height of 4-6 feet off the ground
- The robot will not need to open doors, it will travel through open doorways.
- The floor will be made of typical material used for office environments such as carpet, ceramic tile, and hardwood.
- The robot will be 20 lbs or less.
- The robot will fit through a 24x24x24 inch opening.
- The average walking speed of an adult is expected to be from 2.5 to 4 miles per hour.
- System will navigate with lights on or off within the office space.

Stakeholders:

- Oscar Chuy, Ph.D. Our project advisor at FAMU-FSU College of Engineering
- Babak Norrozi, Ph.D. Our Lead professor at FAMU-FSU College of Engineering
- Jerris Hooker, Ph.D. Our Assistant professor at FAMU-FSU College of Engineering
- Gesnel Gachelin, Representative from The Charles Stark Draper Laboratory, Inc.
- Caitrin Eaton, Assistant Sponsor from The Charles Stark Draper Laboratory, Inc.

Code of Conduct

Mission Statement

Team 307 is committed to ensuring a positive work environment that supports professionalism, integrity, respect, and trust. Every member of this team will contribute to the creation and maintenance of such an environment to ensure the success of the project. We will work together to meet the expectations of our sponsor, advisor, and university.

Roles

Each team member is given a specific role based on their experience and skill set and is responsible for all here-within. If team members require assistance completing any of their tasks due to some major inconvenience, the rest of the team members will aid this member to complete their task within reason.

Team members:

Team Leader – Christopher Castro

Manages the team as a whole; develops a plan and timeline for the project, delegates tasks among group members according to their skill sets, finalizes all documents, and provides input on other positions where needed. The team leader is responsible for promoting synergy and increased teamwork. If a problem arises, the team leader will act in the best interest of the project.

He keeps the communication flowing, both between team members and sponsor. The team leader takes the lead in organizing, planning, and setting up meetings. In addition, he is responsible for keeping a record of all correspondence between the group and 'minutes' for the meetings. Finally, the team leader gives or facilitates presentations by individual team members and is responsible for overall project plans and progress. Will make sure to meet the expectations of the sponsor to his capability.

Financial Advisor and ECE - Ian Scofield

Manages the budget and maintains a record of all credits and debits to project account. Any product or expenditure requests must be presented to the advisor, it is then reviewed and either granted or rejected based on other solutions and use case. A record of these analyses and budget adjustments must be kept. Will make sure to meet the expectations of the sponsor to his capability. Additionally deals with software and hardware of the project; including programming of sensors and systems.

Lead ECE - Christopher Castro

While both Computer Engineers will work on the software aspect of the project, the Lead ECE will work on and oversee the entire software development lifecycle from design all the way to testing. Programming of the sensors will also be part of this role as it will require accepting data from the sensors and making sure that it integrates well with the hardware of the robot. Will make sure to meet the expectations of the sponsor to his capability. Will work hand in hand with the Lead ME and then Integration Engineer to make sure it all works as expected. He maintains line of communication with the lead ME. He keeps all design documentation for record.

Lead ME – Cameron Ryals

While both the Mechanical and Electrical Engineers will work on the physical aspect of the project, the Lead ME will have final say on any disagreements regarding the physical design. Will make sure to meet the expectations of the sponsor to his capability.

Integration Engineer - Atilla Sulker

Responsible for the design of the integration and interfacing of hardware components, including sensors, microcontroller and single board computers (where applicable), power supplies, and data transfer mediums (e.g., cables transmitting data). Will make sure to meet the expectations of the sponsor to his capability.

All Team Members:

- Work on specific tasks of the project but will unite to put all our tasks together to finalize our project
- Work to accomplish project goals and succeed in our project
- Follow through with commitments
- Adopt team spirit
- Listen and contribute constructively
- Speak clearly and thoroughly
- Communicate about any doubts or setbacks they are having
- Be open-minded to others' ideas
- Respect others’ roles and ideas
- Communicate with the entire team about your progress weekly

Communication

The main form of communication will be via Microsoft Teams. Email will be a secondary form of communication for issues that are not time sensitive or for communicating with our Sponsor or Advisor. File transfer will be conducted through Microsoft Teams. Shall there be any issues sharing files, we will send files and information through email. All files will be accessible to all team members. To edit a file that is not part of your designated task, you must first contact the lead of the task of which editing is desired. Team members shall aim to check their Microsoft Teams notifications at least twice a day to stay updated on the latest information and meeting times. Although members will be initially informed via Microsoft Teams, meeting dates and

pertinent information from the sponsor will additionally be sent over email. If a meeting must be canceled, an email must be sent to the group and Sponsor at least 24 hours in advance. Any team member that cannot attend a meeting must give 24-hour advance notice informing the group of his absence unless extreme extenuating circumstances arise. Reasons for absence will be appreciated but not required. Repeated absences in violation of this agreement will not be tolerated.

Team Dynamics

The students will work as a team while allowing one another to feel free to make any suggestions or constructive criticisms without fear of being ridiculed and/or embarrassed. While team members will each have specialized functions, if any member on this team finds a task to be too difficult, it is expected that the member will ask for help from the other teammates. Team members can work on tasks outside of their functions if their main task is completed and/or if doing so would contribute to a more efficient workflow. If any member of the team feels they are not being respected or taken seriously, that member must bring it to the attention of the team for the issue to be resolved. We shall NOT let emotions dictate our actions. Everything is done for the benefit of the project.

Ethics

Team members are required to be familiar with the NSPE Engineering Code of ethics as they are responsible for their obligations to the public, the client, the employer, and the profession. The NSPE Engineering Code of ethics will be stringently followed.

Dress Code

Team meetings will be held in casual attire. Sponsor meetings and group presentations will be in business casual clothing. For formal presentations and meetings, we will wear formal clothing.

Weekly and biweekly Tasks

All the team members will participate in all meetings with the sponsor, adviser, and instructor. During said times, ideas, project progress, budget, conflicts, timelines, and due dates will be discussed. In addition, short-term tasks will be delegated to team members during these meetings. It is expected that at the end of each meeting, team members have clear, deliverable action items for themselves. Repeat absences will not be tolerated.

The team will have both internal and external deadlines. External deadlines pertain to the sponsor. These are dates on which a given task will be delivered to the sponsor. For many of the external deadlines, especially those pertaining to larger milestones and presentations, there will be a corresponding internal deadline which will signify a time when the task needs to be completed. It is expected that tasks will be scheduled for completion days prior to delivering them to the sponsor. This will account for unforeseen disruptions/setbacks in the workflow. The team's mindset will be to get ahead of schedule whenever possible.

Decision Making

It is conducted by consensus and the majority of the team members. Should ethical/moral reasons be cited for dissenting reason, then the ethics/morals shall be evaluated as a group and the majority will decide on the plan of action. Individuals with conflicts of interest should not participate in decision-making processes but do not need to announce said conflict. It is up to everyone to act ethically and for the interests of the group and the goals of the project. Achieving the goal of the project will be the top priority for each group member. Below are the steps to be followed for each decision-making process:

- Problem Definition – Define the problem and understand it. Discuss among the group.
- Tentative Solutions – Brainstorms viable solutions. Discussion will be held to determine the most plausible solution
- Data/History Gathering and Analyses – Gather necessary data required for implementing Tentative Solution. Re-evaluate Tentative Solution for plausibility and effectiveness.
- Design – Design the tentative solution and construct it. Re-evaluate for plausibility and effectiveness.
- Test and Simulation/Observation – Test design for tentative solution and gather data. Re-evaluate for plausibility and effectiveness.
- Final Evaluation – Evaluate the testing phase and determine its level of success. Decide if design can be improved and if time/budget allows for it.

Conflict Resolution

In the event of discord amongst team members the following steps shall be respectfully taken:

- Communication of points of interest from both parties which may include demonstration of active listening by both parties through paraphrasing or other tools acknowledging clear understanding.
- Administration of a vote, if needed, favoring majority rule.
- Team Leader intervention.
- Instructor will facilitate the resolution of conflicts.

Statement of Understanding

By signing this document, the members of Team 307 agree to all the above and will abide by the code of conduct set forth by the group.

Name	Signature	Date
Christopher Castro	CC	01/27/2023

Cameron Ryals	CR	01/27/2023
Atilla Sulker	AS	01/27/2023
Ian Scofield	IS	01/27/2023