

Development Plan
PCD: Partially Covered Detection of Obscured
People using Point Cloud Data

Team #14, PCD
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Table 1: Revision History

| Date | Developer(s) | Change |
|--------------------|------------------------------------|---------------|
| September 20, 2024 | Tarnveer Takhtar, Matthew Bradbury | Initial Draft |

[Put your introductory blurb here. Often the blurb is a brief roadmap of what is contained in the report. —SS]

[Additional information on the development plan can be found in the lecture slides. —SS]

1 Confidential Information?

[State whether your project has confidential information from industry, or not. If there is confidential information, point to the agreement you have in place. —SS]

No confidential information present at this time.

[For most teams this section will just state that there is no confidential information to protect. —SS]

2 IP to Protect

[State whether there is IP to protect. If there is, point to the agreement. All students who are working on a project that requires an IP agreement are also required to sign the “Intellectual Property Guide Acknowledgement.” —SS]

No IP to protect at this time.

3 Copyright License

MIT License

4 Team Meeting Plan

We will be meeting once a week, apart from lecture times, in a physical location on McMaster campus. Alternatively, the meeting can be held virtually on Discord or Microsoft Teams in case of unforeseen circumstances.

We will provide our advisor with updates bi-weekly, scheduling a meeting for larger updates and sending an email for smaller updates. Meetings will be held virtually unless for specific reasons. Virtual meetings will be hosted on Microsoft Teams.

For each meeting the scheduler of the meeting will be the chair. For recurring weekly meetings, the team lead will be the chair. Agenda will be prepared by the chair of the meeting.

5 Team Communication Plan

Github issues, and a regularly updated Kanban board using those issues, will be used as a means of asynchronous communication between members and our advisor outside of regularly scheduled meetings.

6 Team Member Roles

Team Lead:
Tarnveer Takhtar

Approver(s):
Matthew Bradbury

Reviewer(s):
Harman Bassi
Kyen So

Administrator:
Harman Bassi

Coordinator:
Kyen So

7 Workflow Plan

We will be using a branch for each Revision, and separate branches for each major code features. Pull requests will be reserved for merging feature branches, while documentation changes will be manually reviewed and edited.

Github issues will be created for any tasks as per the course outline, issues will also be created for code features. Issue priority and classification will be designated by both deadline, and if it is a pre-requisite of other tasks. Issues will be assigned accordingly as discussed within our meetings. If any discrepancies are found within the documentation, an issue will be made, and assigned.

GitHub Actions will be used to handle CI/CD, triggered each time a pull request occurs for the codebase of the project. A predefined linter will go over the code ensuring consistency with the chosen linter's standard. Additional workflow tests may also be present to ensure compatibility.

8 Project Decomposition and Scheduling

Our Github project will consist of a Kanban board, highlighting the tasks that still need to be done, in progress or completed. <https://github.com/users/takhtart/projects/3>

The Kanban board will contain a high-level overview of the tasks that need to be done, with priority based on deadlines provided by the course outline.

9 Proof of Concept Demonstration Plan

What is the main risk, or risks, for the success of your project? What will you demonstrate during your proof of concept demonstration to convince yourself that you will be able to overcome this risk?

The main risk on this project is the realization of the project itself being more difficult than first perceived. Given that the project is already a proof of concept in of itself, being able to identify unobscured people or objects, will be the first moment of success prior of taking on our main challenge of detecting partially obscured people

10 Expected Technology

Topics to discuss include the following:

We plan to use Python as our primary programming language. Python is well-suited for data processing and machine learning, which we will likely need for our project. We anticipate utilizing libraries such as Open3D for handling point cloud data with a Kinect as our input. We may also use NumPy and SciPy for numerical computations, and Scikit-learn for machine learning tasks. Additionally, we may use deep learning frameworks like TensorFlow or PyTorch, especially if we decide to train our own models given that it's unlikely there are any existing models for the problem we're trying to solve. To maintain code quality, we will employ tools like Flake8 for linting and Pytest for unit testing. For code coverage we plan use Coverage.py to ensure thorough testing. For CI, we will likely use GitHub Actions to automate testing and deployment. Collaboration and version control will be conducted through Git and GitHub. Performance monitoring tools such as Valgrind may be considered for optimizing critical code sections.

11 Coding Standard

The coding standard we will adopt will be Pep 8.

Appendix — Reflection

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

Why is it important to create a development plan prior to starting the project?

It is important to create a development plan prior to starting the project because it allows most of the heavy lifting behind project planning to be done before any work has started. It allows for expectations and workflow to be clearly defined before any issues arise. It also creates a document that can be referenced at other times to avoid confusion.

In your opinion, what are the advantages and disadvantages of using CI/CD?

Employing CI/CD allows for better issue tracking and rollbacks. Utilizing CI/CD gives the opportunity for teams to better track individual issues and commits, leading to increased awareness and visibility on workflow issues. It also allows for easier time rolling back to a previous version in case something goes wrong. Some disadvantages are with the conceptual depth and speed. Ensuring a specific workflow and constant PR reviews can slow things down as contributors have to make sure that they are following the workflow properly and have to wait for PR reviews (when necessary). Furthermore, it is more effort to set up, both in the codebase and conceptually. The process has to be talked through and understood by all team members.

What disagreements did your group have in this deliverable, if any, and how did you resolve them?

Our group mainly debated how to set up our GitHub workflows. Initially, we considered using individual branches for each issue, but we ultimately decided on a more streamlined approach with two revision branches and separate forks. This allows us to effectively manage pull requests for merging feature changes into the codebase. We reached this agreement after discussing the benefits of clarity and collaboration in our development process.

Appendix — Team Charter

External Goals

The team's external goals for this project are to have an impressive project to talk about for interviews. Furthermore, we want an impressive project to show off at the capstone convention. Additionally, we want to develop new skills and hone old skills while working on this project.

Attendance

Expectations

The expectation is that members clearly communicate their availability, and give at least 24 hour notice when not being able to attend meetings. If a member needs to skip/leave early, they are expected to communicate what work they will complete prior to the next meeting and ensure that they are up to date on any project changes. While there is no % of meetings that must be attended, we will be using group consensus to determine if one particular group member is missing a worrying number of meetings.

Acceptable Excuse

An acceptable excuse for missing a meeting or deadline would be any truly unforeseen/unavoidable engagement which requires immediate attention or any engagement that is properly communicated beforehand. The second type of excuse will not be permitted if the rest of the group feels that an individual member has missed too many meetings/deadlines.

In Case of Emergency

In case of emergency, the individual should convey exactly they can and cannot accomplish to the team, and ensure that they complete an adequate amount of work at a later date for whoever ends up covering.

Accountability and Teamwork

Quality

Team members are expected to adequately prepare for team meetings. This means completing agreed upon work prior to meeting times, barring a reasonable excuse. For supervisor/TA meetings, members are expected to adequately understand the reason for the meeting enough to contribute unique ideas/questions to the conversation.

Regarding quality of work, members are expected to complete work at a reasonable pace, allowing room for adequate review to take place prior to deadlines. The work should also be done at a quality similar to the others, i.e. everyone

is contributing at a quality similar to the person of highest engagement/quality level.

Attitude

The team's expectations are that each member completes work with a level of engagement relatively similar to other team members. When providing ideas/interactions, it is expected that each member is treated with respect.

Stay on Track

We will use Github projects to ensure that we are on track. Each task to work on will be stored in an issue, which will have up to date deadlines attached to them, as well as the assignee(s). This will give us the ability to check up and see if tasks are being worked on/reviewed at a timely pace. On top of issues, we will be looking at commits and team meeting attendance to gauge contributions.

In the event that members aren't contributing their fair share, that member will have to purchase snacks for the next team meeting. We will also have a group meeting with them to discuss steps to improve and expectations. If the behaviour continues further, we will escalate the issue to a TA/professor.

Team Building

Team cohesion will be built through friendly conversation/banter and engaging in fun/relaxing group activities.

Decision Making

We will make decisions based on group consensus, and if the vote isn't unanimous we will try to solve the dispute via discussion until the decision is unanimous. If disagrees propagate further, we will escalate to asking our supervisor or TA for advice on how to proceed.