

# Project Updates: 01-12-2023

Sidharth Shanmugam

February 9, 2024

## Introduction

- **Supervision Meetings:**

Consists of a listing in table format of the supervision meetings that have occurred since the last update, including dates, attendees, and a brief description of discussions and actionable items.

- **Actionable Items Recap:**

Consists of a listing in table format of the actionable items from the previous week, briefly discussing the progress made and pending tasks.

- **Additional Project Updates:**

Consists of updates that weren't 'actionable items' from the previous week, such as brief overviews of experiments conducted, data collected, and research findings.

- **Next Week's Agenda:**

Consists of a listing in table format of the actionable items to complete before the next weekly update, including task descriptions, rough timelines, and success metrics.

- **Comments & Concerns:**

Consists of a brief analysis of comments or observations about other aspects of the project, such as facilities, work environment, and any outside interest in the project. Furthermore, outlines any concerns about the project.

# 1 01-12-2023

## 1.1 Supervision Meetings

| Date | Agenda                       | Actionable Items | Attendees |
|------|------------------------------|------------------|-----------|
| -    | <i>No meeting this week.</i> | -                | -         |

## 1.2 Actionable Items Recap

| Actionable Item                | Progress Report  | Pending Tasks  |
|--------------------------------|--|--|
| Exand research and make notes. | <ul style="list-style-type: none"> <li>• From the few gathered papers, I have read two and have made very in-depth notes/literature reviews in my project journal.</li> <li>• They were bubble detection papers for extracting bubble characteristics to monitor gas seepage from the ocean floor.</li> <li>• The papers used Canny edge detection, which is different to my starting point with Simple Blob Detection.</li> <li>• Using Canny as a starting point, one of the papers described using the Snake-method to extract the exact outlines of the bubbles.</li> <li>• Bubble tracking was outlined in the papers: by using a Kalman filter with the previous two captured frames, then by applying the new detection of bubbles, weighted matchings can take place using the Hungarian algorithm.</li> </ul> | <ul style="list-style-type: none"> <li>• From these papers, it is clear that there is a basic/overall standardised method for detecting bubbles (using Canny). This is a different path compared to what I was originally pursuing with image thresholding and blob detection.</li> <li>• I will try to experiment with the edge detection methodologies that were outlined in the reports I read - this should help me gauge the complexities involved and see the performance physically.</li> <li>• I need to read more literature - there was one that was cited by both the papers I read, and it should go into greater depth of how Canny was employed to detect bubbles. I will be reading this next.</li> </ul> |
| Research histograms            | <i>No progress on this.</i>  | <ul style="list-style-type: none"> <li>• Since the literature I'm reading focusses on Canny edge detection, there isn't any need for thresholding and blob detection, therefore I can temporarily pause the research on histograms.</li> <li>• Once I get a clear view on how the <i>standardised</i> method of bubble detection works, I can then compare it with blob detection, and when I get on to that I will resume the research on an automated thresholding method with histograms.</li> </ul>  |

### 1.3 Additional Project Updates

| Additional Update     | Description   |
|-----------------------|---|
| Obese Project Journal | <ul style="list-style-type: none"><li>• The Project Journal document is starting to get really big (currently just under 20MB) and the project hasn't even properly started yet.</li><li>• It doesn't seem like a great idea having a singular file that is growing at this rate in a Git repository (GitHub has file size limits which I may quickly reach).</li><li>• I explored a few tools I could use to help solve this:</li><li>• <math>\text{\LaTeX}</math>: I can separate one document into multiple files, which can be imported into a singular file to render a PDF. But it's not quick enough to be able to jot down progress.</li><li>• Markdown: Very simple and great for jotting progress quickly. But, features are sparse, you cannot import multiple files into a singular file to render, cannot easily create references/bibliography tables, etc.</li><li>• Dendron: a Markdown based note-taking app that is a Visual Studio Code extension. Packed with useful features, but a nightmare to work with - not easy to use at all.</li><li>• I need to figure out a better tool.</li></ul> |

## 1.4 Next Week's Agenda

| Actionable Item   | Description   | Success Metrics  | Target |
|---|---|--|--------|
| Expand research and make notes.                           | <ul style="list-style-type: none"><li>• Read and make notes of currently gathered papers.</li><li>• Expand literature research by reading related cited work.</li><li>• Think about how real-time can be achieved.</li></ul>  | <ul style="list-style-type: none"><li>• Make notes in project journal.</li></ul>       | Friday |
| Experiment with Canny edge detection for bubble detection | <ul style="list-style-type: none"><li>• Best starting point is to use the paper that the two papers I read this week cited for the technicalities of how Canny can be employed.</li><li>• Once I understand the technicalities, I can then experiment with bubble detection using Python, OpenCV, and the bubble test images that I had extracted/produced.</li></ul> | <ul style="list-style-type: none"><li>• Log progress in the Project Journal.</li></ul> | Friday |

## 1.5 Comments & Concerns

No comments or concerns at the moment.