

Project Updates: 10-11-2023

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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 10-11-2023

1.1 Supervision Meetings

| Date | Agenda | Actionable Items | Attendees |
|------------|---|--|--|
| 09-11-2023 | <ul style="list-style-type: none">• Discussed real-time software research findings.• Tour of the ISA, desk assignment.• Meetings to happen bi-weekly in person until next semester. Will be in touch with Paul & Ben with any project updates.• Discussion about hypervisors with Ben. Using Docker to package script and assign CPU/hardware, potentially solving OS scheduling issues.• I've shown interest in the 'improving real-time computing' aspects of the project. May have some aspects of underwater testing using facilities.• Rewriting software in C to reduce the overheads introduced by Python.• Paul & Ben mentioned to start simple with the software logic - with simple thresholding - then fine tuning to improve accuracy.• Ben mentioned to read older literature (e.g. 2010-era) on digital image processing - since there won't be any added complexities such as computational intelligence/ML/AI.• Work can be done to research the performance of different algorithms to detect and eliminate backscatter. | <ul style="list-style-type: none">• Ben will send me some underwater footage to help me test any code without needing to implement in hardware and physically test.• I will ask Ben to send me the existing Python code so that I can get it set up on my Raspberry Pi.• With some underwater footage, I can modify the existing Python code to stream the video from file instead of from a camera, I can try to experiment with hypervisors (Docker) to see differences in performance. If there is an improvement, I will implement Docker in my final code.• I will try to research digital image processing from <i>older</i> literature.• I will try experiment with running C programs on Raspberry Pi. | <ul style="list-style-type: none">• Sidharth Shanmugam• Paul Mitchell• Benjamin Henson |

1.2 Actionable Items Recap

| Actionable Item | Progress Report | Pending Tasks |
|--|--|--|
| <ul style="list-style-type: none">• Next meeting in person to see existing lighting system. After seeing the existing system, I can decide the avenue I'd like to pursue. | <ul style="list-style-type: none">• I have shown interest to delve into the 'improving real-time computing' avenue.• I have seen the existing lighting system, and have received a tour of the ISA. | <ul style="list-style-type: none">• <i>No pending tasks.</i> |
| <ul style="list-style-type: none">• Carry out some rough preliminary research for the 4 potential objectives: improving real-time computing, underwater testing, backscatter depth perception, ML-based backscatter position tracking. | <ul style="list-style-type: none">• Initial research into 'improving real-time computing' has been conducted with some reading into real-time software (documented in the Project Journal).• I have not conducted any research on the other 3 objectives since those avenues would probably not be pursued.• Underwater testing aspects may need to be researched, however, not any time soon. | <ul style="list-style-type: none">• <i>No pending tasks.</i> |

1.3 Additional Project Updates

| Additional Update | Description |
|-------------------------------|-------------|
| <i>No additional updates.</i> | - |

1.4 Next Week's Agenda

| Actionable Item | Description | Success Metrics | Target |
|---|--|---|--------|
| Experiment with hypervisors | <ul style="list-style-type: none"> • Get existing Python code and some underwater GoPro footage from Ben. • Modify the existing Python code to stream the video from file instead of from a camera. • Package the software with Docker, measure performance differences. | <ul style="list-style-type: none"> • Modified code should be working and containerised with Docker. • Make notes in project journal, discuss during the next supervision meeting. | Friday |
| Gather some digital image processing literature | <ul style="list-style-type: none"> • Since this is quite early on and I have other modules to focus on this semester, I won't be going into too much depth with the literature. • So this actionable item would be to simply gather a list of potential pieces of literature that I could read in depth at a later date. • I should be making some brief notes on the contents. | <ul style="list-style-type: none"> • Log the brief notes in the Project Journal, citing the sources of the literature. | Friday |
| Experiment with RPi and C programming | <ul style="list-style-type: none"> • Make simple scripts in C and run on Raspberry Pi. • Set up a simple-yet-efficient workflow that can speed up development time in preparation for when I start writing the project software. | <ul style="list-style-type: none"> • Log progress in the Project Journal, maybe even store code in a 'spike' repository on Github. | Friday |

1.5 Comments & Concerns

No comments or concerns at the moment.