Project Updates: 08-12-2023

Sidharth Shanmugam

December 8, 2023

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 08-12-2023

1.1 Supervision Meetings

1.2 Actionable Items Recap

1.3 Additional Project Updates

1.4 Next Week's Agenda

1.5 Comments & Concerns

No comments or concerns at the moment.

Date	Agenda	Actionable Items	Attendees
07-12-2023	• Discussed research finding - It's good to start with fundamental practices such as simple blob detection, Canny, etc. With a solid fundamental understanding, I can explore AI/ML avenues to employ a neural network to improve the parameters to detect bubbles and predict movement. • Discussed hypervisor aspects - Hypervisor is a solution to run programs at the lowest-level closest to system functions (must have high priority level to reduce task switching that causes jitter). • Discussed real-time aspects - Starting in Python, I could use implement various tasks in the form of functions, one for capturing a frame, one for processing the frame, one for Canny, one for tracking prediction, etc, for example. With these tasks in functions, I can use the thread package (maybe) to implement a simple round-robin task scheduler. I can log the entry and exit times for each task to measure how long it takes to parameterise real-time. Based on these parameters I can fine-tune the algorithm parameters to make it conform to real-time requirements. • Ordering components - The list of components I proposed was good, we should add the global shutter camera to the list.	• Compare differences between hypervisors: Jailhouse and Docker. • Finish off reading literature on the technicalities of Canny for bubble detection.	• Sidharth Shanmugam • Paul Mitchell • Benjamin Henson

Actionable Item	Progress Report	Pending Tasks
Expand research and make notes.	• There's one paper that discusses the technical aspects of using Canny to detect bubbles, this will be read next.	• 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.
Experiement with Canny edge detection for bubble detection	*No progress on this.*	• Unfortunately, I could not find time to play around with this. • I can try to get started next time, but currently prioritising the modules that are running in this semester.

Additional Update	Description
Obese Project Journal	• No progress on this yet as I still can't find a solution that will work well. • Will make do with MS Word, maybe will look into implementing LaTeXfor next semester.

Actionable Item	Description	Success Metrics	Target
Expand research and make notes.	• Read and make notes of currently gathered papers. • Expand literature research by reading related cited work. • Think about how real-time can be achieved.	• Make notes in project journal.	Friday
Compare differences between hypervisors: Jailhouse and Docker.	• I will be using one of them to increase program priority to eliminate Jitter as much as possible.	• Log progress in the Project Journal.	Friday
Experiement with Canny edge detection for bubble detection	• *Not a priority, try to make a start if possible.* • 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. • 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.	• Log progress in the Project Journal.	Friday