

PROCESS REPORT 2

TEAM 1

ADAM DUKE – 17718781

ARTUR KAROLEWSKI - 17388976

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INTRODUCTION

This process report outlines how our team coped with the process of developing a solution to the assigned design challenge. It outlines what we as a team hoped to achieve by the end of the module. It also discusses how we planned and managed our project as well as how we cooperated as a team. To conclude we offer an overall assessment of our team's approach to the project and what could be improved.

EXPECTATIONS

Initially we expected to have a finished product by the end of the module, a smart camera that accurately detected people and estimated head poses with minimal error (no false or duplicate detections) under a range of operating conditions (adverse lighting and variable appearance of people).

However, once we began examining source code, researching the relevant theoretical areas and considering potential implementation issues (hardware limitations and operating conditions), we realised that our initial aim was unrealistic. We reevaluated our goals and decided to first aim for a simpler system to operate under simplified conditions: Only detect people in a particular section of the frame (removes the need to track individuals frame to frame as they pass the camera), implement a face detector that only detects faces front on (removes the need to implement a non-pose specific face detector and head pose estimator) and impose a limit of one person being in the camera's field of view. This minimal viable product would detect people that are standing directly in front of the point of interest and determine if they are looking by trying to detect a frontal view of a face. We also identified more complex versions of the system that we could implement if we reached this first milestone. However, we fell short of this first milestone. By the end of the module we had only implemented person detection, face detection and head pose estimation in separate programs that processed single images not video streams.

PROJECT PLANNING

Key factors when deciding on a project were scalability and modularity. Scalability offered us the freedom to reevaluate our end goal depending on time constraints and the current progress of the project. Modularity provided a platform for even workload distribution and supported our decentralised management style (outlined in the 'Project Management' section below).

We used the scheduled weekly meetings to track the overall progress of the project and to plan what tasks needed to be completed in the week ahead. However, upon reflection we realised that our action points for each week were too general. This resulted in unfocussed work that spanned several weeks without concluding with significant results. We scheduled additional meetings to plan reports and video logs. Each member did their bit for the report/video log and then one member compiled it into a cohesive whole.

PROJECT MANAGEMENT

Our team adopted a decentralised management style whereby each member worked on their own tasks and guided their own research. This worked quite well initially as it avoided conflict arising due to power struggles or tensions as a result of micromanagement. It also provided each member the opportunity to research areas they were interested in. During the weekly meetings we updated our team mates on our research and tasks and ensured we were all working towards a common goal. As well as this, we created a shared OneDrive folder so we could exchange information with each other and work on documents together. Decisions were made democratically.

CO-OPERATION WITHIN THE GROUP

Throughout the module we co-operated effectively as a team. From the outset a group chat and a shared OneDrive folder was established to enable easy communication and sharing of information. Weekly meetings allowed us to make decisions as a team and evenly distribute the workload as well as plan and compose reports/video logs/presentations. Our decentralised style of management lent itself to team members working on tasks individually as well as in pairs.

CONCLUSION

The team process went well. We had no conflicts and all members remained enthusiastic and motivated. The scalability of our project meant we could adjust our expectations for the end product as time went on. The modularity of our project along with our management style supported an even workload distribution and a productive work environment within our group. A shared OneDrive folder proved invaluable in the exchange of information and the collaboration on reports.

However, a couple of improvements could be made. Composing a Gantt Chart at the beginning of the module would have helped us to better manage our time so we could make enough

progress between submissions. Also, we could have planned our tasks more wisely. As mentioned previously, our action points for each week were very general. More specific action points would have helped us focus our efforts, making small amounts of progress more often instead of assigning open ended tasks with far off deadlines that yielded results of little value. We only began working on designing our algorithm and implementing person detection and head pose estimation towards the later stages of the module. These are the main constituent of our project and the most complex. Starting this earlier would have maximised the amount of time we had to work on it.

APPENDICES

PROJECT IDEAS

PROJECT IDEAS

- Motion activated security camera that captures the face of the person.
- Facial recognition.
- Snapchat Filter.
- 3D modelling.
- Scan arm and overlay bones & blood vessels.
- Panorama photo.
- Children's AR game (identify coloured shapes).
- Object recognition with labels & dimensions.
- Place robot models on the floor.
- **Camera that analyses how often people look at an advert.**
- Retro hockey game where the paddles are controlled by the motion in each half of the frame.
- Yoga pose analyser.
- Emotional response analyser.
- Photo style transfer (photobooth).
- Security camera to detect cars, license plate and driver.

REFLECTIVE JOURNAL 1

TEAM 1

WEEK 1 – WEEK 4 (FEBRUARY 4TH – MARCH 1ST)

ADAM DUKE – 17718781

ARTUR KAROLEWSKI – 17388976

JAMES OLIVER – 17365531

FRANK GALLAGHER – 17335161

1 PROGRESS TO DATE

- Decided on a project idea.
- Researched methods for implementing person detection, facial detection and head pose estimation.
- Setup a VNC viewer to remotely connect to the Raspberry Pi.

For our project we decided to design a smart camera capable of identifying the direction of a person's gaze, with the aim of positioning the device above a noticeboard, recording the number of passers-by and analysing how many look at the advertisement and how long for. We are currently pursuing the use of the OpenVINO toolkit to implement person detection, facial detection and head pose estimation, so we can avoid building and training neural networks from scratch. Sample apps that use the OpenVINO toolkit are available for us to learn from. We spent of our time researching and implementing methods for remotely connecting to the Raspberry Pi. Avoiding the need to physically connect a VGA cable, keyboard and mouse is essential for our chosen application. Initially we created a PuTTY SSH link to the board and established a terminal window connection. We then able to setup a GUI connection to the Raspberry Pi using VNC Server.

2 TEAM REFLECTION

So far, we have been working well as a team and haven't experienced any major issues. All team members have been attending the weekly meetings and the practical sessions. The most challenging aspect of the project so far has been collaborating on research. A shared online folder has proved invaluable in this regard, as it has enabled us to share resources and edit documents together. In the Monday meetings we discuss our

progress to date and the work that needs to be completed in the week ahead, concluding with the assignment of individual tasks. Each member works on their tasks and updates the team on their progress. When faced with significant decisions, such as our project idea or what content to put in the video log, we scheduled an additional meeting where we brainstormed ideas and decided on a plan of action. Our approach to solving problems and making decisions has worked thus far so we will continue this practice for future problems.

3 INDIVIDUAL REFLECTIONS

3.1 ADAM DUKE

To date I have established an SSH terminal connection with the RasPi, setup a graphical connection using the VNC software, and being implementing the vision software that we chose 'Motion'. To date we have configured it to stream a live video from the camera to a browser window, although it seems to be stuck on a setting which reduces the framerate to 2/3 per second. Mainly we have been reading a mixture of setup guides online and utilizing trial and error while playing with settings, and we have successfully implemented motion alerts and logs. We believe that we are on the right track and we will continue to try and resolve out framerate issues.

3.2 ARTUR KAROLEWSKI

Up to this point, I have been researching information about how neural networks work, learning the Python syntax, writing some of my own sample Python programs and I also edited the first video log. I have also made sure I understand how we managed to connect the Raspberry Pi so that it streams live video by talking to James or Adam every time progress was made. I carried out my research by watching YouTube videos. I found the animations and commentaries easier to follow and understand than reading long articles. I also watched video tutorials about Python as well as doing coding exercises on HackerRank and analysing sample code from various websites. I recorded a few clips for the video log and edited them on my laptop. I also added some simple animations to demonstrate how we imagine our device will work. So far, I am satisfied with what I have learned from my research and with how the video log turned out. I think that I might start reading some more in-depth stuff about Python and neural networks. The videos are good but don't go into full detail about some of the areas. Uploading the sample code to the Raspberry Pi and seeing how it works would also have been a better way of seeing how the code works. As for the video log, I think recoding some screen footage with a screen recorder would have been better for some parts of the video rather than recording the screen with the phone.

3.3 JAMES OLIVER

One of my tasks was to gain a video stream from the Logitech c270 webcam. My initial approach to the task of getting a video stream was to use the internet to find a software package to get a video stream from the webcam. This approach was only a partial success as I could only get a still image from the webcam using the fswebcam software package. In future I would be more specific it. My second approach was to see if any of the other groups had gotten the webcam to work and ask them what package they used to get it to work. This was a success as Cian found the package motion and the online guide <https://www.instructables.com/id/Raspberry-Pi-remote-webcam/> on how to get a video stream from the webcam. What I have found difficult to date is to get the camera and the software to provide a smooth clear stream to the computer I have been looking through the documentation for the motion package to resolve this issue. I resolved this by increasing stream_maxrate from 1 to 30 and framerate to 1500. I have learned that minor changes to a config file can make a large difference in the running of the program so I need to be cautious when tuning in the future. Another one of my tasks to date was to assist Adam in setting up the remote access to the raspberry pi. I did this by researching and assisting in the setup process I was successful as Adam was successful

3.4 FRANK GALLAGHER

These past few weeks I have been researching ways of implementing the person detection, facial detection and head pose estimation procedures involved in our project. Currently I am pursuing the use of the Intel Distribution of the OpenVINO toolkit, which is a tool designed for optimized OpenCV apps as well as using deep learning for computer vision. I have begun to build the development environment for OpenVINO on Ubuntu. Since parts of the toolkit are based on neural networks, I have researched the structure of neural networks and how they are trained. Most of this research was done by watching video tutorials and reading wiki pages. This approached worked well for the research of neural networks because the graphical medium helped me understand their operation. However, a better approach for researching the OpenVINO toolkit would have been to build the development environment sooner and build some of the sample apps.

REFLECTIVE JOURNAL 2

TEAM 1

WEEK 5 – WEEK 12 (MARCH 4TH – MAY 10TH)

ADAM DUKE – 17718781

ARTUR KAROLEWSKI – 17388976

JAMES OLIVER – 17365531

FRANK GALLAGHER – 17335161

4 PROGRESS TO DATE

- Begun testing OpenCV with clips and images we took
- Setup the RasPi to run a sample program on boot
- Use sample head-pose, person detection and facial recognition apps to establish a platform for our program

5 TEAM REFLECTION

Throughout this project, we believe that we have worked well as a team. We encountered no major issues, and any problems we encountered were always solved by discussing them as a group. An essential part of our project was a dedicated shared folder that was used to share documents and information, as well as a list of sources and references being used. All team members met up during the Monday morning meetings and established the goals for the coming week. Tasks would usually be assigned to individuals or occasionally teams of two. When it came to the task of larger reports, vlogs or large decisions, we met together in a quiet meeting room and discussed what needed to be done.

Overall, we believe that this 'Divide and Conquer' approach has worked well, and we hope to continue to use it in future projects.

6 INDIVIDUAL REFLECTIONS

6.1 ADAM DUKE

- Succeeded in establishing a faster framerate from the webcam to the RasPi.
- Setup the Motion software to save 30 second clips from the webcam to be piped into OpenCV so that the analysis could be performed on the video.

6.2 ARTUR KAROLEWSKI

- I put together the video logs 1,2 and 3 for our group.
- I made the presentation slides for our group.
- I tested some sample Python programs on my laptop.
- I made sure to keep up to date and understand any progress made by other members of the group.
- I researched and read about OpenVINO and OpenCV development toolkits as well as read more about different methods of face and person detection mentioned by other group members.
- Overall, I have improved my knowledge about signal and image processing as well as learned some basic information about neural networks.

6.3 JAMES OLIVER

- I attempted to use an ethernet connection to SSH into the RasPi with x11 forwarding to get graphical content from a terminal connection. I was unsuccessful at this as I was running into firewall
- Worked out how to get a video stream from the Webcam to be captured in OpenCV so if the project got to the stage on running of a real time video stream the implementation would be easier.
- I have gained a greater understanding of how digital images are formed.
- I have used sample vision processing apps to see how they work
- I have gained a basic understanding of neural network and built a sample sigmoid neural network.

6.4 FRANK GALLAGHER

- Implemented OpenVINO pedestrian tracker and face detection demos.
- Implemented OpenCV python scripts to perform person detection, face detection and head pose estimation on single images.
- Researched the following theoretical aspects of our project:
 - Machine learning in image processing.
 - Neural networks.
 - Support Vector Machines.
 - Person Detection using Histogram of Oriented Gradients.
 - Face Detection using Haar Cascades.
 - Head pose estimation.
- Designed algorithms that incorporate person detection, face detection and head pose estimation.
- Composed the final report with input from team members.

I carried out research by reading academic papers, books and online tutorials as well as watching YouTube videos. I also met with a lecturer in the Computer Science department with domain experience to discuss the material I had been researching and to get advice on how to use this research in our project. Obtaining information from multiple sources and in different mediums helped me gain a good understanding of the concepts. Using Mendeley proved invaluable in managing references. In hindsight, I should have better documented my research so that when it came to writing the final report, I wouldn't have to revisit all of the sources again, I could just consult my notes.

MEETING 1

TEAM 1

Time: 11:00 am

Date: 11th February 2019 (Week 2)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

TOPICS TO BE DISCUSSED

1. IDEAS FOR PROJECT

Discussion: Panorama photo, Snapchat style filter (face & voice distortion), 3D modelling, facial recognition, overlay blood vessels on skin, speech to text, virtual whiteboard, object recognition with dimensions and children's educational AR game whereby the child identifies coloured shapes. The potential difficulty and scalability of the project.

Conclusion: Team is more interested in a project based on image processing. Need an ambitious idea that can be scaled down if required.

Action Point: Decide on a project.

2. RESEARCH TOPICS

Discussion: Python, Raspberry Pi, image processing and credible sources for such topics.

Conclusion: The project requires the use of a raspberry pi, the python programming language and image processing techniques so a good knowledge of these subjects is necessary.

Action Point: Research Python, raspberry pi and image processing techniques.

3. RISK ASSESSMENT

Discussion: Compliance with data protection laws.

Conclusion: Research into possible risks associated with the project required.

Action Point: Complete Risk Assessment Form.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Complete Risk Assessment form	All members	12 th Feb 2019 (1 day)
Decide on project	All members	18 th Feb 2019 (1 week)
Research Python, Raspberry Pi and image processing	All members	25 th Feb 2019 (2 weeks)

MEETING 2

TEAM 1

Time: 11:00 am

Date: 18th February 2019 (week 3)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Ideas for the project.
- Foundational research topics (Raspberry Pi & Python).

PROGRESS MADE

- Decided on a project idea – a camera that analyses the attention given to an advertisement/noticeboard.
- Completed the Risk Assessment form.
- Adam & James worked on SSH-ing into the raspberry pi from a laptop.
- Artur & Frank began researching neural networks and the OpenVINO Toolkit.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Complete Risk Assessment Form	All members	completed
Decide on project	All members	completed
Research Python, Raspberry Pi and image processing	All members	ongoing

TOPICS TO BE DISCUSSED

1. RISK ASSESSMENT FORM

Discussion: Does the Risk Assessment form need to cover data protection?

Conclusion: Risk Assessment form needs to be modified to cover data protection issues.

Action point: Revise Risk Assessment form so it addresses data protection issues associated with the project idea.

2. VIDEO LOG 1

Discussion: Video Log 1 is due on the first of March. Content is limited since it is the early stages of the project. Should tell the story of the foundations of our idea, the plan of implementation and the resources available.

Conclusion: Need to brainstorm content for video log

Action point: Create story board and gather clips and snapshots.

3. RESEARCH TOPICS

Discussion: Remote access into raspberry pi from a laptop is necessary for our application. First step is accessing webcam feed. Neural nets and OpenVINO.

Action point: Research neural networks, how to remotely access the Raspberry Pi and how to access the webcam feed.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Research Python and Raspberry Pi (continued from last week)	All members	25 th Feb 2019 (1 week)
Revise Risk Assessment Form	All members	21 st Feb 2019 (3 days)
SSH-ing and webcam feed	Adam & James	25 th Feb 2019 (1 week)
Neural nets and OpenVINO	Artur & Frank	25 th Feb 2019 (1 week)
Video Log planning	All members	1 st March 2019 (2 weeks)

MEETING 3

TEAM 1

Time: 11:00

Date: 25th February 2019 (week 4)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Revise risk assessment form to amend for data protection.
- Research OpenVINO.
- Video Log 1.

PROGRESS MADE

- Risk assessment form amended and signed off
- Video Log 1, Arthur has made intro. Will continue to take point on physical design of video, with input from team members.
- Adam and James successfully created a graphical wireless connection to the Pi, in such a way that it is now possible to avoid connecting UI and monitors in future.
- Arthur and Frank researched OpenVINO and the basics of neural networks.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Research Python	All members	Completed
Revise Risk Assessment form	All members	Completed
Webcam feed	Adam and James	Ongoing
VNC connection (SSH)	Adam and James	Completed
Neural Nets and OpenVINO	Frank and Arthur	Completed
Video Log Planning	All members	Ongoing

TOPICS TO BE DISCUSSED

1. VIDEO LOG 1

Discussion: Decided to spend most of the video describing the project in detail and what we hope to achieve. Since video content is limited at this point, we will focus on describing what we have been researching so far.

Conclusion: Brainstorm content for Video Log clips.

Action point: Plan and execute Video Log 1.

2. REFLECTIVE JOURNAL 1

Discussion: Explain targets achieved throughout project so far.

Conclusion: Discuss goals achieved by each team member.

Action point: Submit Reflective journal 1.

3. ACHIEVE LIVE VIDEO CONNECTION TO PI

Discussion: Find a software that can be loaded onto the Pi that will allow a live video stream from the webcam to be viewed onto the Pi.

Conclusion: Continue researching different software.

Action point: Work on establishing a connection between the webcam and the Pi.

4. OPENVINO

Discussion: Apps are developed using the OpenVINO toolkit on a development machine and then are deployed to the target hardware. Is the Neural Compute Stick required to run OpenVINO apps on the Raspberry Pi?

Conclusion: Need to build the OpenVINO development environment and find out if OpenVINO apps can be run without Neural Compute Stick.

Action point: Build OpenVINO development environment.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Reflective Journal 1	Adam and Frank	1 st March 2019
Plan video log 1 (ongoing from last week)	All members (Artur lead)	1 st March 2019
Achieve Live Video Connection	James and Adam	4 th March 2019
Build OpenVINO development environment	Frank	4 th March 2019

MEETING 4

TEAM 1

Time: 11:00

Date: Monday 4th March 2019 (week 5)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Reflective Journal 1	Adam and Frank	Complete
Plan and compose Video Log 1	All Members (Artur lead)	Complete
Achieve live video connection	James and Adam	Complete
Build OpenVINO environment	Frank	Complete

TOPICS TO BE DISCUSSED

1. TUNE LIVE VIDEO

Discussion: Tune live video feed. Play with the config settings to try and improve the framerate and the resolution without compromising the speed of transmission.

Action point: Tune live video feed

2. BUILD SAMPLE OPENVINO APPS

Discussion: Now that we have researched neural networks and OpenVINO, we will attempt to build some sample apps to practice implementing algorithms.

Action point: Build Sample OpenVINO apps

3. RESEARCH MOTION ON RASPBERRY PI

Discussion: Try and increase the accuracy of the built-in motion detection in the software.

Action point: Research Motion on Raspberry Pi.

4. PLAN AND COMPOSE INTERIM REPORT

Discussion: Plan the structure of the report and who will do what sections. Everyone writes their sections and then one person edits. Analyse our overall progress and include our future expectations.

Action point: Plan and compose Interim Report

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Tune Live Video Feed	James	11 th March 2019
Build sample apps on OpenVINO	Artur and Frank	18 th March 2019
Research Motion on RasPi	Adam	11 th March 2019
Plan and compose Interim Report	All members	18 th March 2019

MEETING 5

TEAM 1

Time: 11:00

Date: Monday 11th March 2019 (week 6)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Tune Live Video Feed	James	Ongoing
Build sample OpenVINO apps	Artur and Frank	Ongoing
Research Motion on Raspberry Pi	Adam	Ongoing
Plan and compose Interim Report	All members	Ongoing

TOPICS TO BE DISCUSSED

1. INTERIM REPORT

Discussion: Structure of the Interim Report is different to what we initially thought. Need a section covering theoretical background. Deadline is on Friday so need to focus on it this week.

Action point: Write Interim Report.

2. CONTINUATION OF LAST WEEK'S TASKS

Discussion: More time is required to complete the tasks assigned in last week's meeting. Next week is study week, so the deadline for these tasks is extended to Monday 25th March (Monday after study week).

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Tune Live Video Feed (ongoing from last week)	James and Adam	25 th March 2019 (2 weeks)
Build sample apps on OpenVINO (ongoing from last week)	Artur and Frank	25 th March 2019 (2 weeks)
Research Motion on Raspberry Pi (ongoing from last week)	Adam and James	25 th March 2019 (2 weeks)
Compose Interim Report (ongoing from last week)	All members (Frank lead)	15 th March 2019 (4 days)

MEETING 6

TEAM 1

Time: 11:00

Date: 25th March 2019 (week 7)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Interim Report.
- Extending deadline of tasks.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Tune live video feed	James & Adam	Completed
Build sample OpenVINO apps	Artur & Frank	Ongoing
Research Motion	Adam & James	Ongoing
Compose Interim Report	All members (Frank lead)	Completed

TOPICS TO BE DISCUSSED

1. CURRENT PROGRESS

Discussion: Raspberry Pi setup. Remote control of Raspberry Pi achieved. Webcam connected to Raspberry Pi and video feed displayed. OpenVINO development environment built. Submitted Reflective Journal 1, Video Log 1 and Interim Report.

Conclusion: Not enough progress has been made with the algorithm/software for person detection and head pose estimation. Need to focus on developing apps with OpenVINO and researching other software libraries.

Action point: Build sample OpenVINO apps. Research the use of 'traditional' computer vision libraries (OpenCV) for person detection.

3. INTERVIEW AND PRESENTATION

Discussion: Presentation and interview most likely this Thursday (28th March). In presentation we need to discuss what project idea is, the structure of the system, implementation issues and how we are approaching it. To prepare for interview we need to review the interim report and reflective journal.

Action point: Prepare slides for presentation.

4. VIDEO LOG 2

Discussion: Due next Friday (5th April). No significant progress made since last video log.

Conclusion: Need to make more progress so there are new topics to cover in the video log.

Action point: Plan and compose video log 2.

5. PROCESS REPORT 1

Discussion: Due next Friday (5th April). What is a process report?

Conclusion: Team unsure what a process report is.

Action point: Plan and compose Process Report 1.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Build sample OpenVINO apps	Frank	1 st April 2019 (1 week)
Research OpenCV for person detection	Artur & James	1 st April 2019 (1 week)
Research and experiment with Motion software	Adam	1 st April 2019 (1 week)
Prepare slides for presentation	All members	27 th March 2019 (2 days)
Plan and compose Video Log 2	All members (Artur lead)	5 th April 2019 (2 weeks)
Plan & compose Process Report 1	All members	5 th April 2019 (2 weeks)

MEETING 7

TEAM 1

Time: 11:00

Date: 1st April 2019 (week 8)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Current Progress.
- Interview and Presentation.
- Video Log 2.
- Process Report 1.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Build sample OpenVINO apps	Frank	Completed
Research OpenCV for person detection	Artur & James	Completed
Research and experiment with Motion software	Adam	Ongoing
Prepare slides for presentation	All members	Completed
Plan and compose Video Log 2	All members (Artur lead)	Ongoing
Plan and compose Process Report 1	All members	Ongoing

TOPICS TO BE DISCUSSED

1. INTERIM PRESENTATION & INTERVIEW

Discussion: Takes place this Thursday 4th April. Slides for the presentation are complete. Need prepare 'scripts' and practice giving the presentation. Need to review the interim report and reflective journal to prepare for the interview, focusing on the technical details (Person Detection and Head Pose Estimation).

Action point: Prepare scripts, practice giving presentation and prepare for interview.

2. VIDEO LOG 2

Discussion: Due this Friday 5th April. Include ethical considerations, implementation difficulties and a more detailed account of the workings of the system. Show the output of the OpenVINO pedestrian tracker as an example of what we are trying to achieve. Mention that we are shelving OpenVINO.

Action point: Plan and compose Video Log 2.

3. PROCESS REPORT 1

Discussion: Due this Friday 5th April. Purpose of a Process Report is to convey details of what sub goals have been accomplished (what and how), what problems have been encountered and whether the project is expected to be completed on time (the overall status of the project). Each team member will write a brief account of what tasks they have completed and one person will compose these accounts into a process report.

Action point: Plan and compose Process Report 1.

4. SOFTWARE DEVELOPMENT

Discussion: The OpenVINO toolkit is difficult to use due to its hardware restrictions and the complexity of its implementation. OpenCV is a more comprehensive library and is much easier to consume in Python, relatively speaking.

Conclusion: Shelve the OpenVINO toolkit and pursue the use of the core OpenCV library to implement person detection and head pose estimation.

Action point: Implement and analyse OpenCV person detection and head pose estimation samples.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Experiment with motion software and webcam (ongoing from last week)	Adam	8 th April (1 week)
Prepare for presentation and interview	All members	4 th April (3 days)
Plan and compose Video Log 2	All members (Artur lead)	5 th April (4 days)
Plan and compose Process Report 1	All members	5 th April (4 days)
OpenCV sample person detection and head pose estimation	Frank and James	22 nd April (3 weeks)

MEETING 8

TEAM 1

Time: 11:00

Date: 8th April 2019 (week 9)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Interim presentation & interview.
- Video Log 2.
- Process Report 1.
- Software development.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Experiment with motion software and webcam	Adam	Completed
Prepare for presentation & interview	All members	Completed
Plan and compose Video Log 2	All members (Artur lead)	Completed
Plan and compose Process Report 1	All members	Completed
OpenCV sample person detection and head pose estimation	Frank & James	Ongoing

TOPICS TO BE DISCUSSED

1. SOFTWARE DEVELOPMENT

Discussion: As discussed in the previous meeting, we will be shelving OpenVINO and be focussing more on using OpenCV to implement person detection, facial, detection and head pose estimation. Dlib is another computer vision library that we could use. We need to analyse and build python OpenCV and dlib samples for person detection, facial detection and head pose estimation. We also need to plan the structure of the algorithm and how we can scale its complexity.

Action point: Analyse and build person detection, facial detection and head pose estimation samples. Plan potential algorithm structures.

2. TESTING DATA SET

Discussion: Need data set to test person detection, facial detection and head pose estimation, as well as the performance of our overall algorithm. Require video footage of people walking past the camera, standing in front of the camera and close ups of head movement.

Action point: Capture video footage to test algorithm.

3. RESEARCH FOR FINAL REPORT

Discussion: Our interim report was lacking in the theoretical background section. Must include theory on neural networks in the final report. Section on signal processing techniques used in our system also needs to be included in the final report - Neural Networks/Person Detection/Facial Detection/Head Pose Estimation (What is the technique? How does it work? Why is it used).

Action point: Research theoretical background.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Analyse & build person detection, facial detection & head pose estimation samples (ongoing from last week)	Frank & Artur (All members)	22 nd April (2 weeks)
Plan potential algorithm structures	Frank	22 nd April (2 weeks)
Capture video footage to test algorithm	Adam	15 th April (1 week)
Research theoretical background	James (All members)	---

MEETING 9

TEAM 1

Time: 11:00

Date: 23rd April 2019 (week 10)

Location: E2.08

Attendees: Frank Gallagher, Adam Duke, Artur Karolewski, James Oliver

REVIEW OF LAST WEEK

SUMMARY OF LAST MEETING

- Last week was study week, the last meeting took place the week before (week 9).
- Software Development.
- Testing Data Set.
- Research for Final Report.

STATUS OF LAST WEEK'S ACTION POINTS

Task	Persons Responsible	Completed/Ongoing
Analyse & build person detection, facial detection & head pose estimation samples	Frank & Artur (All members)	Ongoing
Plan potential algorithm structures	Frank	Ongoing
Capture video footage to test algorithm	Adam	Ongoing
Research theoretical background	James (All members)	Ongoing

TOPICS TO BE DISCUSSED

1. SOFTWARE DEVELOPMENT

Discussion: We need to continue analysing OpenCV Python code for implementing person detection, facial detection and head pose estimation. This sample code can be used as a basis for developing our own algorithm. Due to the fast approaching deadline, our algorithm must be modular and scalable in terms of complexity. First, we can implement person detection, facial detection and head pose estimation individually and then begin to combine them in increasingly complex ways to achieve a more accurate and functional product. Video footage is required to test each of the modular components and the algorithm as a whole.

Action point: Develop algorithm, Capture footage for testing.

2. FINAL REPORT

Discussion: The Final Report is worth the most marks so requires the most of our effort. It is due at 5pm on 10th May. As mentioned in the previous meeting, the interim report was lacking in detail. We need to continue researching neural networks and how they are utilised in person detection, facial detection and head pose estimation. We need to ensure we have reliable sources, such as academic papers, to give our theoretical background credibility. The final report must have diagrams to aid in our explanations of the theoretical background and our solution. Similar to the interim report, all team members will do research for the final report and then one person will compose it. In order to have a complete report, we need to have at least a basic algorithm to test.

Action point: Research for Final Report, Compose Final Report.

3. VIDEO LOG 3

Discussion: Due at 5pm on 10th May. Needs to cover every aspect of the project: Project brief, our idea, ethical considerations, hardware available, implementation issues, structure of our solution, algorithm development, experimental validation and future work. In order to have a complete video log, we need to have at least a basic algorithm to test. All members will participate in creating the video log through voice recordings and acquiring videos and images with one team member composing all of the content into a video log.

Action point: Compose Video Log 3.

ACTION POINTS FOR THIS WEEK

Task	Persons Responsible	Deadline
Develop algorithm	Frank	7 th May 2019
Capture footage for testing	Adam & James	7 th May 2019
Research for Final Report	All members	7 th May 2019
Compose Final Report	Frank	10 th May 2019
Compose Video Log 3	Artur	10 th May 2019