Project Journal

This project journal documents the weekly supervision meetings. Each week, a new section is created by copying the template from the last page and filling in the details. This allows to keep track of decisions and agreements, to ensure the project is on track and we are achieving our objectives.

Contents

2023-06-08

- Verification of Point cloud from YCB
- Verification of sampling results for Burg-toolkit- done – to do verify the contact pts visually
- Ferrari Canny F1 score implementation logic
- Check for ConvONet issue

What have you done since last meeting?

- What have you learnt?
  - Tried to understand and sample the YCB dataset with burg toolkit
- What did you spent your time with, whether or not it did lead to results?
  - Sampling and saving collision-free contact points, though not quite sure if its correct. Verification required
- How much time did you manage to spend on the project, were there any distractors?
  - Half a day on an average .
- Go through list of action points from last meeting
  - NA
- Show progress and results: visualise and measure → show deliverables
  - Point cloud out, sampling contact point data file

What issues or questions did you come across?

- Did you get stuck somewhere?
  - Using ConvONet seems to require Linux? Failing in my windows, tried to install Linux but running into issues.
- Is there anything you spent much more time with than you thought you would?
  - Yes, I thought I could use pre-trained models of ConvONets to generate object representation, but using ConvONets is taking time. I have allocated 3 weeks though.
- What have you not learnt yet, but feel like you should learn?
  - I need to understand how pointcloud representation and object representation could be simultaneously used
- Is there anything your supervisor could help with?
  - With verification of the steps followed until now, and with clarification of doubts. Also with Ferrari Canny F1 score – metric for grasp quality explanation.

What are you planning to do in the next week?

- List tasks and work packages for next week
  - Implement metric and get the ground truth data ready. Try to use ConvONets to generate object representation
- Suggest deliverables for next meeting
  - Ground truth data with score.

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
  I'm behind I should have been completed my ground truth data generation, By I have started working on ConvOnets simultaneously and would probably catch up with the plan in the next 2 weeks.
- Check your objectives → are we getting closer to achieving your objectives?
  Weekly object now achieved.

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
    I am doing   confident

Notes:

- DEV BRANCH IN BURG TOOLKIT - .obj files can be input instead of ply
- poisson disk sampling in burg toolkit try to conv to pointcloud repre -- save as numpy array
- save in numpy - individual obj
- for 2 fingered grasp - check for increasing the friction cone and verify te stability- scoring apart form ferrari canny - check for other papers.
- mesh model in ply, cp, score
- sampling - oversample good cps - 70, undersample bad ones, 30%

Feedback from supervisor:

- Save the contact point in numpy form not csv

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- Access for GPU server and lab computers

2023-06-16

- DEV BRANCH IN BURG TOOLKIT - .obj files can be input instead of ply --Done
- poisson disk sampling in burg toolkit try to conv to pointcloud representation -- save as numpy array -- Done
- save in numpy - individual obj – Done
- antipodal scoring - check

What have you done since last meeting?

- What have you learnt?
- Tried to use DexNet, GraspNet and PointNetGPD to come up with scoring for 2 fingered grasps
- What did you spent your time with, whether or not it did lead to results?
- Reading and trying out scoring methods
- How much time did you manage to spend on the project, were there any distractors?
- 5 to 6 hours
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables
- The npy format representation of pointcloud and contacts

What issues or questions did you come across?

- Did you get stuck somewhere?
- Yes, need to develop a scoring method
- Is there anything you spent much more time with than you thought you would?
- Yes dataset creation
- What have you not learnt yet, but feel like you should learn?
- Wrench resistance implementation
- Is there anything your supervisor could help with?
- Yes, explaining how wrench resistance could be implemented for scoring

What are you planning to do in the next week?

- List tasks and work packages for next week
- Develop the scoring method and convonets
- Suggest deliverables for next meeting
- Ground truth for 2 fingered grippers and object representation

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- A little behind
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing ☐ I am not confident ☒ I am fairly confident ☐ I'm on track

Notes –

- Metric that uses the angle directly. Ip- contact points c1, c2 and surface normal of point 1 and 2
- Check the angle between connecting line of the two contact points
- Q = a1+a2
- Max score = 360 degree
- Min score = find out?
- Should be Continuous score
- Use o3d_pc_to_numpy -- done
- To create numpy array of the pointclouds – this has normal that u can use to calc score.
- Save the score with contacts numpy
- Plot the distrib to confirm both the cases.
- angle
- in util to get the angles between vectors for scoring
- sign_array
- change and check if we can get angles more than defined

Feedback from supervisor:

- General notes

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-06-23

- Verify the code changes for sampling grasps

What have you done since last meeting?

- What have you learnt?
- The new metric calculation
- What did you spent your time with, whether or not it did lead to results?
- Yes dataset creation is almost complete
- How much time did you manage to spend on the project, were there any distractors?

- Go through list of action points from last meeting
- All completed
- Show progress and results: visualise and measure → show deliverables
- Generated dataset

What issues or questions did you come across?

- Did you get stuck somewhere?
  no
- Is there anything you spent much more time with than you thought you would?
  Yes dataset creation
- What have you not learnt yet, but feel like you should learn?
  Wrench resistance implementation
- Is there anything your supervisor could help with?

  Verification of dataset created

What are you planning to do in the next week?

- List tasks and work packages for next week
  Convonets
- Suggest deliverables for next meeting

  Convonet object representation

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing	☐ I am not confident	☒ I am fairly confident	☐ I'm on track

---

Notes –

Save the cp numpy as dict

Cps – 2,3 both together

Angles - put together n

Score

Name: val and save the angles and score - npz

Cal angle based on sign -1 and 1, so if its 1 it is positive and -1 is negative 0 then it would 180 degree

Create a func to test the functionality as well as generate scores for bad grasps

Feedback from supervisor:

- General notes
  Do convonets reading
  Jabref – reference
  Thesis – create a structure to start writing

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-06-29

- Show the changes and output
- Thesis structure

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?

- Go through list of action points from last meeting

  All completed
- Show progress and results: visualise and measure → show deliverables
  Generated visualisation

What issues or questions did you come across?

- Did you get stuck somewhere?
  visualisation
- Is there anything you spent much more time with than you thought you would?
  Yes dataset creation
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
  Convonets
- Suggest deliverables for next meeting

  Convonet object representation

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
   I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.
  Yes decided to revise the project goal as the time consumed for dataset creation exceeded and would probably require lot more time to devise soring metric for each of the other griper types.

Action Points:

-   ToDo's for supervisor and student

2023-07-06

Worked on developing the baseline model

What have you done since last meeting?

-   What have you learnt?
    Iterative refinement using analytical methods
-   What did you spent your time with, whether or not it did lead to results?
-   How much time did you manage to spend on the project, were there any distractors?

-   Go through list of action points from last meeting

    All completed
-   Show progress and results: visualise and measure → show deliverables
    Review code for baseline

What issues or questions did you come across?

-   Did you get stuck somewhere?
-   Is there anything you spent much more time with than you thought you would?
-   What have you not learnt yet, but feel like you should learn?
-   Is there anything your supervisor could help with?

    Verification of the baseline code

What are you planning to do in the next week?

-   List tasks and work packages for next week
-   Suggest deliverables for next meeting
    Im planning to Experiment the baseline model

Do you feel like you are on track with your project?

-   Check your work plan → are you ahead/behind? Do we need to adjust?
-   Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☐ I am fairly   ☒ I'm on track
   I am doing   confident

Notes –   Im on track with newly updated project plan

Feedback from supervisor:

Decisions:

-   Anything we decided to do or not to do

- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-07-13

Experimentation results of the base line model

What have you done since last meeting?

- What have you learnt?
- Different visualisation and plotting methods
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?

- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

The generated metrics for the baseline model

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

Review and confirmation of the baseline outcomes

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Continue experimentation and come up with results

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
    I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-07-20

Experimentation and developing evaluation mode in the baseline for evaluation 10000 grasps

What have you done since last meeting?

- What have you learnt?
  ConvONets
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Latent features gathered for all of the YCB datasets

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
    I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-07-27

Evaluated 10000 grasps for 6 objects and developed metrics for comparison

What have you done since last meeting?

-   What have you learnt?
    Plotting metrics
-   What did you spent your time with, whether or not it did lead to results?
-   How much time did you manage to spend on the project, were there any distractors?

-   Go through list of action points from last meeting

-   Show progress and results: visualise and measure → show deliverables
    Generated graphs

What issues or questions did you come across?

-   Did you get stuck somewhere?
-   Is there anything you spent much more time with than you thought you would?
-   What have you not learnt yet, but feel like you should learn?
-   Is there anything your supervisor could help with?

    Verification of metrics created

What are you planning to do in the next week?

-   List tasks and work packages for next week
-   Suggest deliverables for next meeting
    Continue developing reports and graphs for different metrics for baseline, write dissertation

Do you feel like you are on track with your project?

-   Check your work plan → are you ahead/behind? Do we need to adjust?
-   Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
   I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

-   Anything we decided to do or not to do
-   Decisions on which algorithms to pursue, etc.

Action Points:

-   ToDo's for supervisor and student

2023-08-03

No meeting- Halfway workshop
Shared the reports generated and got confirmation

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
- For convonets to make CUDA work in collab
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
  ConvSDFNets
- Suggest deliverables for next meeting

Convonet object representation

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing   ☐ I am not confident   ☒ I am fairly confident   ☐ I'm on track

---

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-08-10
Latent representation using ConvSDFNet

What have you done since last meeting?

- What have you learnt?
  To work with ConvONets and to generate latent code
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables
  Code changes for ConvONets for latent code -confirmation

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

No

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Visualisation of latent code

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☒ I am fairly   ☐ I'm on track
   I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-08-17

Neural Network development

What have you done since last meeting?

- What have you learnt?
- Read PointNet architecture and gag refine to understand the model architecture
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?

- Go through list of action points from last meeting

- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

No

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Model code verification and review

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing   ☐ I am not confident   ☒ I am fairly confident   ☐ I'm on track

---

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-08-24

Issue with Neural Network model training. Trying to resolve the difference in grid and contact point shapes

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

Worked on the model

Neural Network code verified but issue with Training

What issues or questions did you come across?

- Did you get stuck somewhere?
  Yes difference in grid / contact point shapes creating issue in grid_sampling
- Is there anything you spent much more time with than you thought you would?
  Yes training the model
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting

  Making the model work and showing the best_model

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing ☐ I am not confident ☒ I am fairly confident ☐ I'm on track

---

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-08-31

Finished model dev- issues resolved

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?

- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables
  Review the model training

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

No

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Got comments that the models performance needs to be improved, work on the improvement of the model performance.

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what I am doing   ☐ I am not confident   ☐ I am fairly confident   ☐ I'm on track

---

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-09-07

Still working on training the model to improve performance.

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

Yes model performance

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting
  Making improved model performance.

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☐ I am fairly   ☐ I'm on track
     I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-09-14

Still working on model performance. Showed progress in the dissertation writing to Dr Martin

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors?
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
  Model performance enhancement
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting

  Continue working on model performance/ thesis writing

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☐ I am fairly   ☐ I'm on track
   I am doing   confident

Notes –

Feedback from supervisor:

Dr Martin asked to try pre-normalising the contact points/

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student

2023-09-21

Review on dissertation and advised on the presentation

What have you done since last meeting?

- What have you learnt?
- What did you spent your time with, whether or not it did lead to results?
- How much time did you manage to spend on the project, were there any distractors
- Go through list of action points from last meeting
- Show progress and results: visualise and measure → show deliverables

What issues or questions did you come across?

- Did you get stuck somewhere?
  Model performance enhancement
- Is there anything you spent much more time with than you thought you would?
- What have you not learnt yet, but feel like you should learn?
- Is there anything your supervisor could help with?

What are you planning to do in the next week?

- List tasks and work packages for next week
- Suggest deliverables for next meeting

  Continue working on model performance/ thesis writing

Do you feel like you are on track with your project?

- Check your work plan → are you ahead/behind? Do we need to adjust?
- Check your objectives → are we getting closer to achieving your objectives?

☐ I have no idea what   ☐ I am not confident   ☐ I am fairly   ☐ I'm on track
    I am doing   confident

Notes –

Feedback from supervisor:

Decisions:

- Anything we decided to do or not to do
- Decisions on which algorithms to pursue, etc.

Action Points:

- ToDo's for supervisor and student