

AI-POWERED INTELLIGENT DIMENSIONING TOOL FOR MICROSTATION

Ethan Shellem-Prince

Arup

RESEARCH CONTEXT

- Studies have demonstrated potential of AI.
- Dimensioning is a critical task within the design process.
- Manual dimensioning is very time consuming.
- Limited studies focusing on developing AI tools for Design process software.

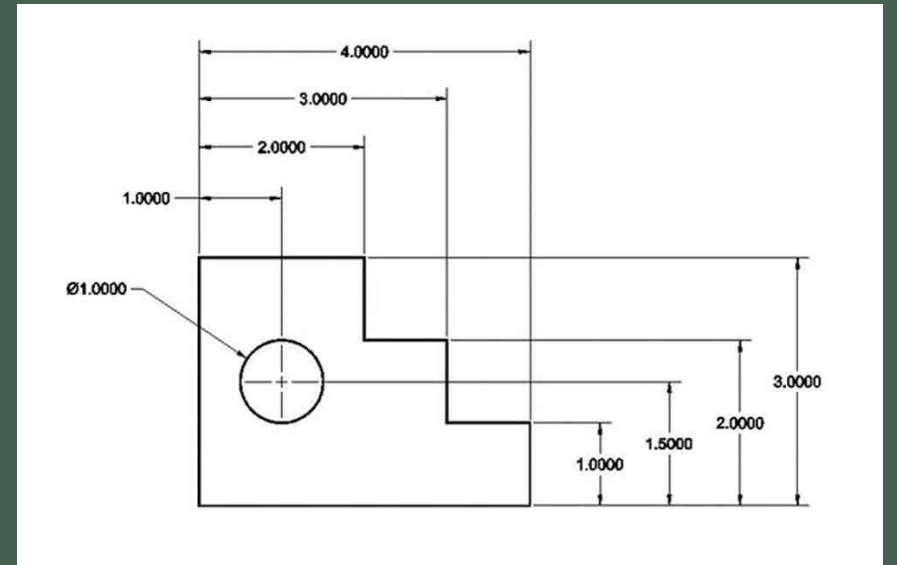


Figure 1

RESEARCH PROBLEM

- Time consuming
- Human Error
- Inconsistency's
- Lack of automation

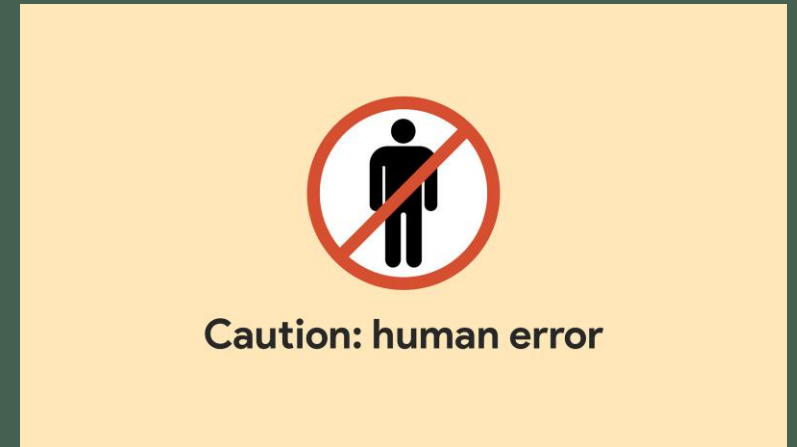


Figure 2

RESEARCH AIM & OBJECTIVES

- Aim - To develop and evaluate an AI-powered MicroStation add-in that can automate the process of intelligent dimensioning, improving efficiency, accuracy, and consistency in civil engineering design.
- Objective 1 - To identify and implement suitable AI techniques for automating the tasks of dimension placement, formatting, and verification within the MicroStation environment.
- Objective 2 - To develop a user-friendly interface that seamlessly integrates the AI-powered features into the MicroStation workflow.
- Objective 3 - To evaluate the performance and effectiveness of the proposed add-in through rigorous testing and comparison with existing dimensioning tools.

LITERATURE REVIEW

- Title: The potential use of AI to improve the civil engineering design processes.
- Key Findings
- Research Gaps



Figure 3

LITERATURE REVIEW [CASE STUDY'S]

- Case Study 1 - AI-Powered Traffic Management in Singapore [1]



Figure 4

- Case Study 2 - AI-Powered Collaboration in the Sydney Metro Project [2]



Figure 5

RESEARCH/DEVELOPMENT METHODOLOGIES

- Research philosophy
- Research Approach
- Research Strategies
- Methodology for Software Development

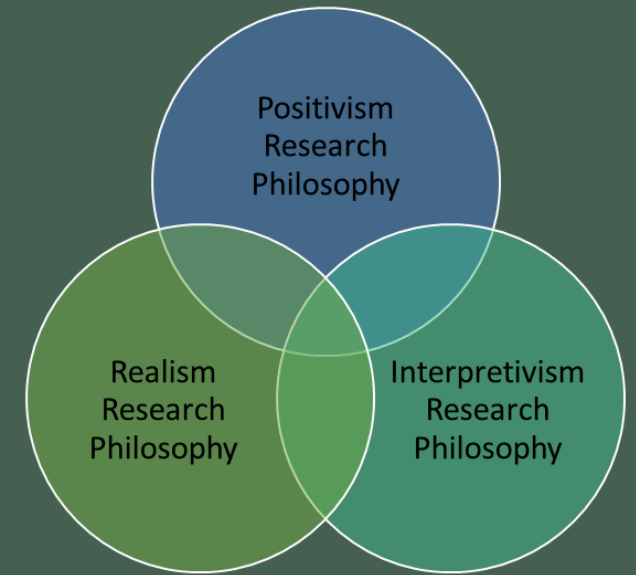


Figure 6



Figure 7

RESOURCES/MATERIALS

- Hardware Resources
- Software Resources
- Data Resources
- Human Resources

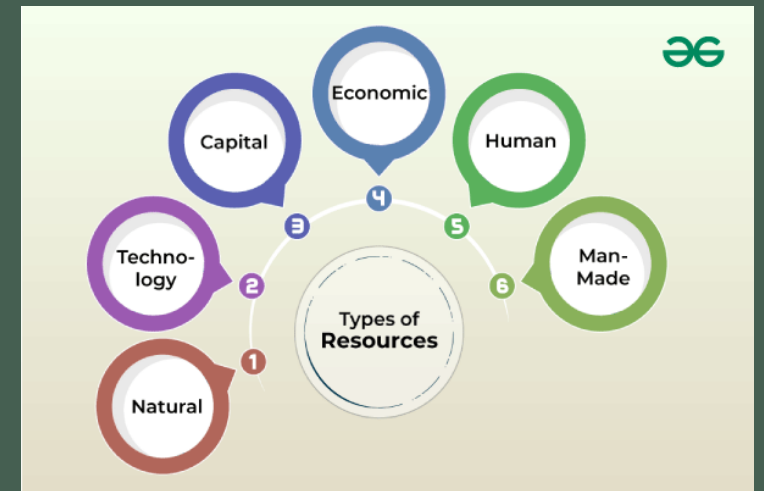
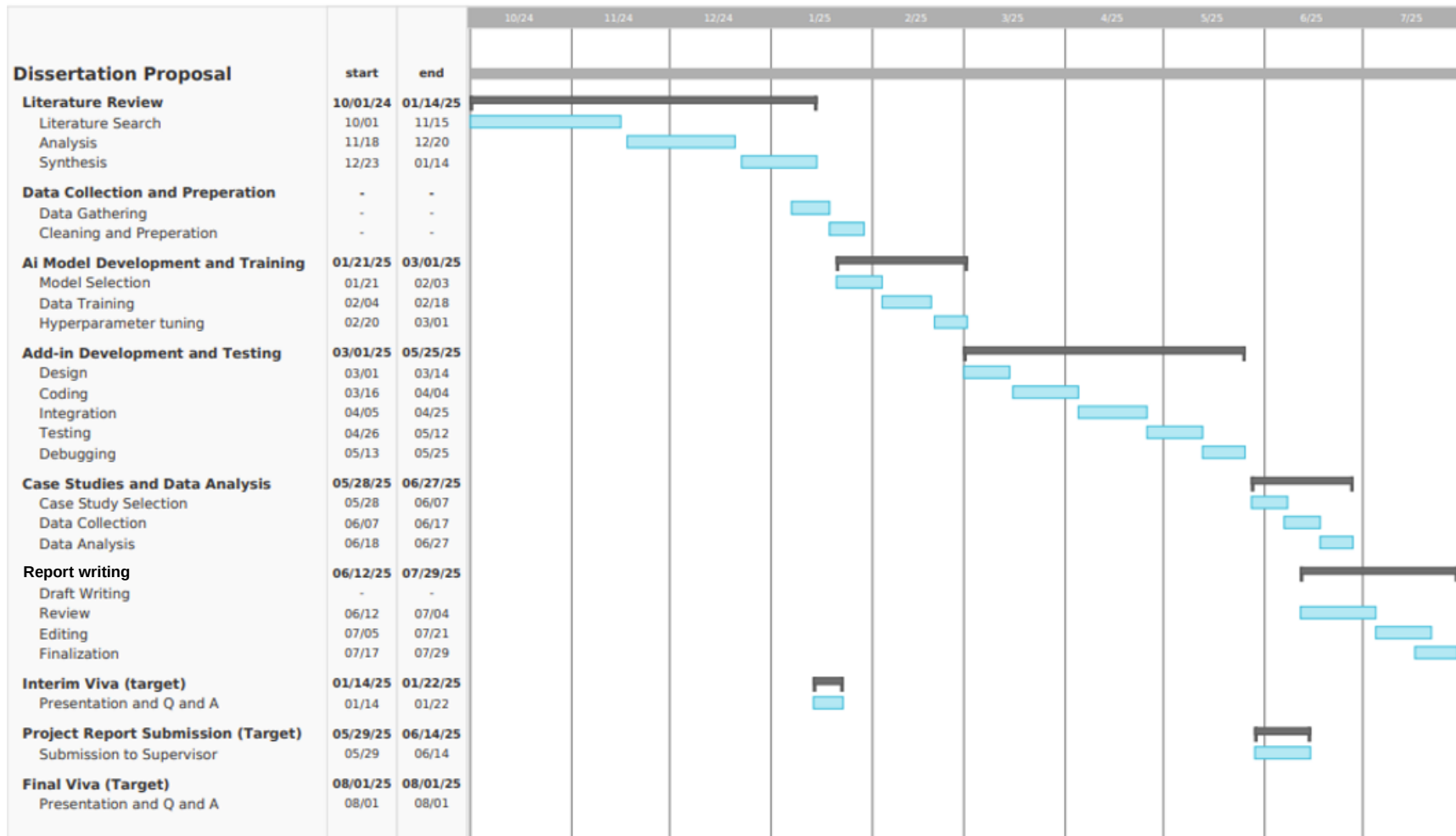


Figure 8



PROJECT PLAN

REFLECTION

- My reflection on this research proposal.

REFERENCES

- [1] Iliopoulou, C., Kepaptsoglou, K. Combining ITS and optimization in public transportation planning: state of the art and future research paths. *Eur. Transp. Res. Rev.* **11**, 27 (2019).
<https://doi.org/10.1186/s12544-019-0365-5>
- [2] Gharehbaghi, K., McManus, K., Hurst, N., Robson, K., Pagliara, F., & Eves, C. (2023). Advanced rail transportation infrastructure as the basis of improved urban mobility: research into Sydney as a smart city. *Journal of Urban Technology and the Built Environment*, 101-116.
- Figure 1: <https://www.thefabricator.com/thefabricator/article/cadcamsoftware/dimensioning-and-its-role-in-drafting-and-design>
- Figure 2 : <https://uxdesign.cc/human-error-an-important-ingredient-in-great-designs-5cd1c278ba7f>
- Figure 3 : <https://www.bibguru.com/blog/how-to-literature-review/>
- Figure 4: https://www.lta.gov.sg/content/ltagov/en/getting_around/public_transport/rail_network.html
- Figure 5: <https://transportnsw.info/travel-info/ways-to-get-around/metro>
- Figure 6: <https://www.george-business-review.com/how-to-write-a-research-methodology/>
- Figure 7: <https://blog.hyperiondev.com/post/types-of-software-development/>
- Figure 8 <https://www.geeksforgeeks.org/types-of-resources/>

LINK TO RECORDING

- Please find the YouTube link to the recording below:
- <https://youtu.be/DiEJDI8k1bo>