Declaration

This report has not been submitted for any other degree at this or any other University. It is solely the work of us except where cited in the text or the Acknowledgements page. It describes work carried out by us for the capstone design project. We are aware of the university's policy on plagiarism and the associated penalties and we declare that this report is the product of our own work.

Student: Date:

Signature:

Student: Date:

Signature:

Student: Date:

Signature:

Abstract

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Acknowledgment

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Table of Contents

List of Figures

List of Tables

1 Introduction and Motivation

1.1 Problem statement

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

1.2 Project significance

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

1.3 Project objectives

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

2 Background and Related Work

2.1 Background

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

2.2 Related work

One of the essential ideas of the project is navigating and tracking the objects while minimizing the required time to detect all targets. Various methods and approaches were studied and implemented in previous research papers with different constraints and goals in mind. The methodology and algorithm in each paper was different as some of them used AI related algorithms while others relied on heavy mathematical calculations to determine the best path. In paper Huang and Savkin, the main idea was to propose a navigation algorithm that enables each UAV to determine its own movement locally and track pedestrians (mobile targets), it focused on multiple drones to cover a specific area. Peng, Liu, and Zhang took the advantage of DRL to develop an online path planning algorithm based on double deep Q-learning network (DDQN). The constraints were to minimize the energy consumption of the UAV, the objects on the ground were not stationary and were following a Gauss-Markov movement pattern. Author Huang, Savkin, and Li aimed to propose a reactive real-time sliding mode control algorithm to navigate a team of UAVs (UAS). The area was divided into multiple sub-areas using the Voronoi partitioning technique, each drone was responsible for a sub-area, he implemented his ideas for both types of tergets, stationary targets and mobile.
All the mentioned papers presented their solutions using different simulation software. However, none of them was implemented in the real-world which questions the reliability of the algorithms.

3 Requirements Analysis

3.1 Functional requirements

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.2 Design constraints

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.3 Design standards

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.4 Professional code of ethics

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.5 Assumptions

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4 Proposed Solution

4.1 Solution overview

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4.2 High level architecture

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4.3 Hardware/software to be used

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

5 Proof of Concept

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

6 Market Research and Business Viability

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

7 Project Plan

7.1 Project milestones

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

7.2 Project timeline

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

7.3 Anticipated risks

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

8 Short Guide

Please read the guides available online about the right way to write LaTeX such as how to include a math symbol in text (e.g. x not x) and a proper noun with all capitals (e.g. SQL not SQL).

Below are examples of different constructs in a report. You can copy-paste and change the content. For more information, refer to the relevant package manual in CTAN.

Figure 1: The arch linux logo

8.1 Figure

8.2 Equations

$$E_p = mgh = mg(x_f - x_i) \tag{1}$$

$$E_k = E_t + E_r$$

$$E_t = \frac{1}{2}mv^2 \tag{2}$$

$$E_r = \frac{1}{2}I\omega^2 \tag{3}$$

$$I = \frac{1}{2}MR^2 \tag{4}$$

$$\omega = \frac{v}{r}$$

$$E_k = \frac{1}{2}mv^2 + \frac{1}{2}I\left(\frac{v}{r}\right)^2 \tag{5}$$

where E_p is the potential energy, E_k the kinetic energy, E_t the translational energy and E_r the rotational energy.

$$\begin{aligned}
\frac{\partial E_p}{\partial m} &= \frac{\partial}{\partial m}(mgh) \\
&= gh \\
\frac{\partial E_p}{\partial g} &= \frac{\partial}{\partial g}(mgh) \\
&= mh \\
\frac{\partial E_p}{\partial h} &= \frac{\partial}{\partial h}(mgh) \\
&= mg
\end{aligned}$$

8.3 Simple table

Table 1: Slope, intercept and their uncertainties

Slope		Intercept (J)	
Value	Error	Value	Error
1.0933	0.0300	0.0148	0.0157

8.4 Table from a csv file

Table 2: Translational and rotational energies.

m kg	v_m $\mathrm{m\,s^{-1}}$	E_t J	δE_t J	E_r J	δE_r J
0.055	0.17	0.000 79	0.000 01	0.280	0.007
0.075	0.20	0.001 50	0.000 02	0.387	0.010
0.095	0.23	0.002 51	0.000 03	0.512	0.013
0.115	0.25	0.003 59	0.000 03	0.605	0.015
0.135	0.27	0.004 92	0.000 04	0.706	0.018

8.5 Graph from a csv file

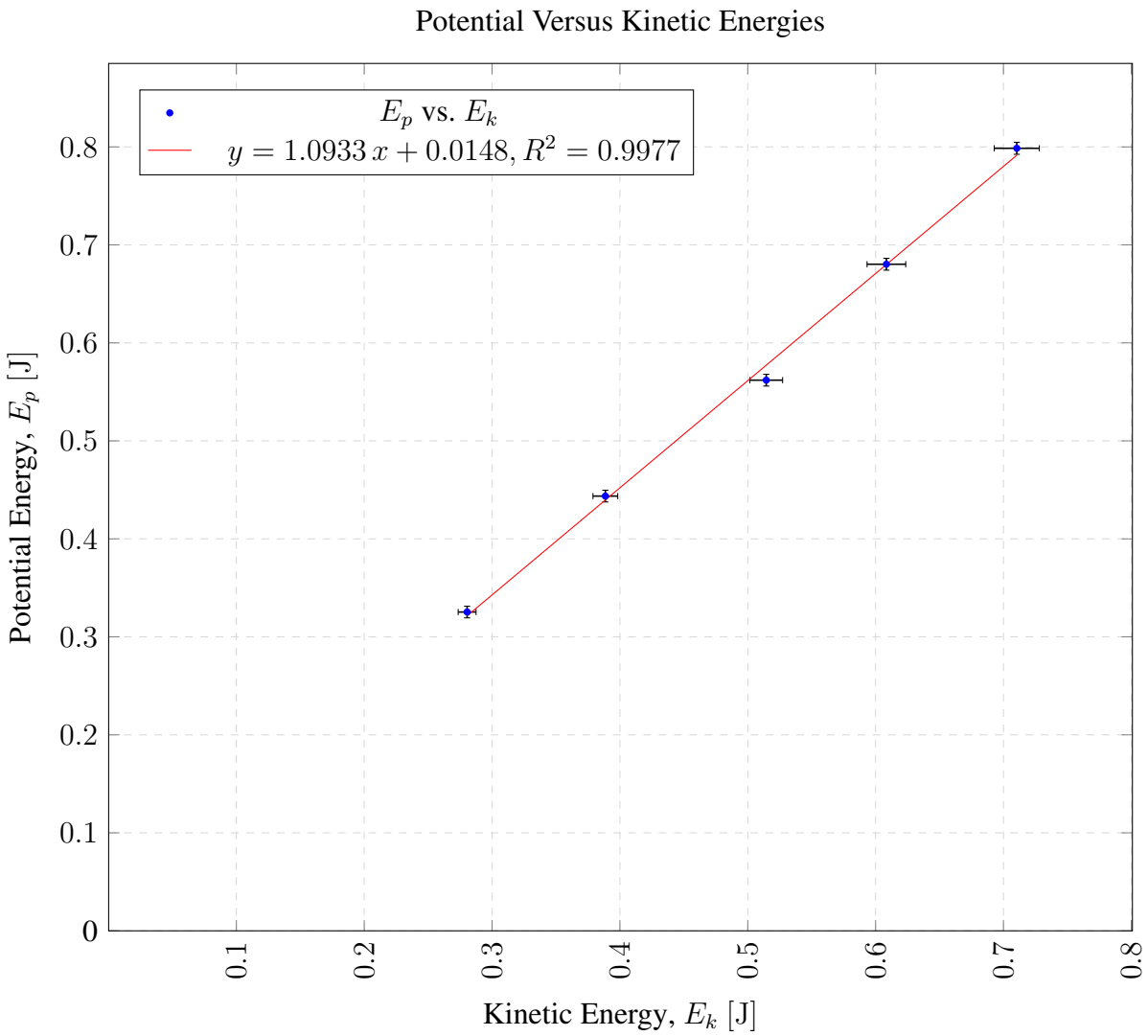

Figure 2: The relationship between potential and kinetic energies.

8.6 Citations

- **in-text citation**: use `\cite{dirac}` to produce [5] or `\textcite{dirac}` to produce Dirac [5]
- **citation in parentheses**: `\parencite{knuthwebsite}` produces [6] (for IEEE, this has no difference to the `\cite{}` command above.)

8.7 Cross-references

Label using suitable names with the following format: figure `\label{fig:<name>}`, tables `\label{tab:<name>}`, sections `\label{sec:<name>}` and equations

`\label{eq:<name>}`.

Then when cross-referencing, use `\cref{<type>:<name>}` (or `\Cref{<type>:<name>}` when used at the beginning of a sentence)

References

[1] H. Huang and A. V. Savkin, "Navigating uavs for optimal monitoring of groups of moving pedestrians or vehicles," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 4, pp. 3891–3896, 2021.

[2] Y. Peng, Y. Liu, and H. Zhang, "Deep reinforcement learning based path planning for uav-assisted edge computing networks," in *2021 IEEE Wireless Communications and Networking Conference (WCNC)*, IEEE, 2021, pp. 1–6.

[3] H. Huang, A. V. Savkin, and X. Li, "Reactive autonomous navigation of uavs for dynamic sensing coverage of mobile ground targets," *Sensors*, vol. 20, no. 13, p. 3720, 2020.

[4] S. Zhou, B. Li, C. Ding, L. Lu, and C. Ding, "An efficient deep reinforcement learning framework for UAVs," in *2020 21st International Symposium on Quality Electronic Design (ISQED)*, IEEE, Mar. 2020, pp. 323–328. DOI: 10.1109/isqed48828.2020.9136980.

[5] P. A. M. Dirac, *The Principles of Quantum Mechanics*, ser. International series of monographs on physics. Clarendon Press, 1981, ISBN: 9780198520115.

[6] D. Knuth. "Knuth: Computers and typesetting." (), [Online]. Available: http://www-cs-faculty.stanford.edu/~uno/abcde.html.

Appendix

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.