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:

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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

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1 Introduction and Motivation

1.1 Problem statement

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1.2 Project significance

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1.3 Project objectives

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2 Background and Related Work

2.1 Background

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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 **hua21**, 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. **pen21** 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 **hua20** 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.

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3 Requirements Analysis

3.1 Functional requirements

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3.2 Design constraints

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3.3 Design standards

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3.4 Professional code of ethics

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3.5 Assumptions

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4 Proposed Solution

4.1 Solution overview

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4.2 High level architecture

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4.3 Hardware/software to be used

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5 Proof of Concept

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6 Market Research and Business Viability

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7 Project Plan

7.1 Project milestones

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7.2 Project timeline

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7.3 Anticipated risks

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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

$$
\begin{aligned}
E_p &= mgh = mg(x_f - x_i) \qquad (1)\\
E_k &= E_t + E_r\\
E_t &= \frac{1}{2}mv^2 \qquad (2)\\
E_r &= \frac{1}{2}I\omega^2 \qquad (3)\\
I &= \frac{1}{2}MR^2 \qquad (4)\\
\omega &= \frac{v}{r}\\
E_k &= \frac{1}{2}mv^2 + \frac{1}{2}I\left(\frac{v}{r}\right)^2 \qquad (5)
\end{aligned}
$$

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

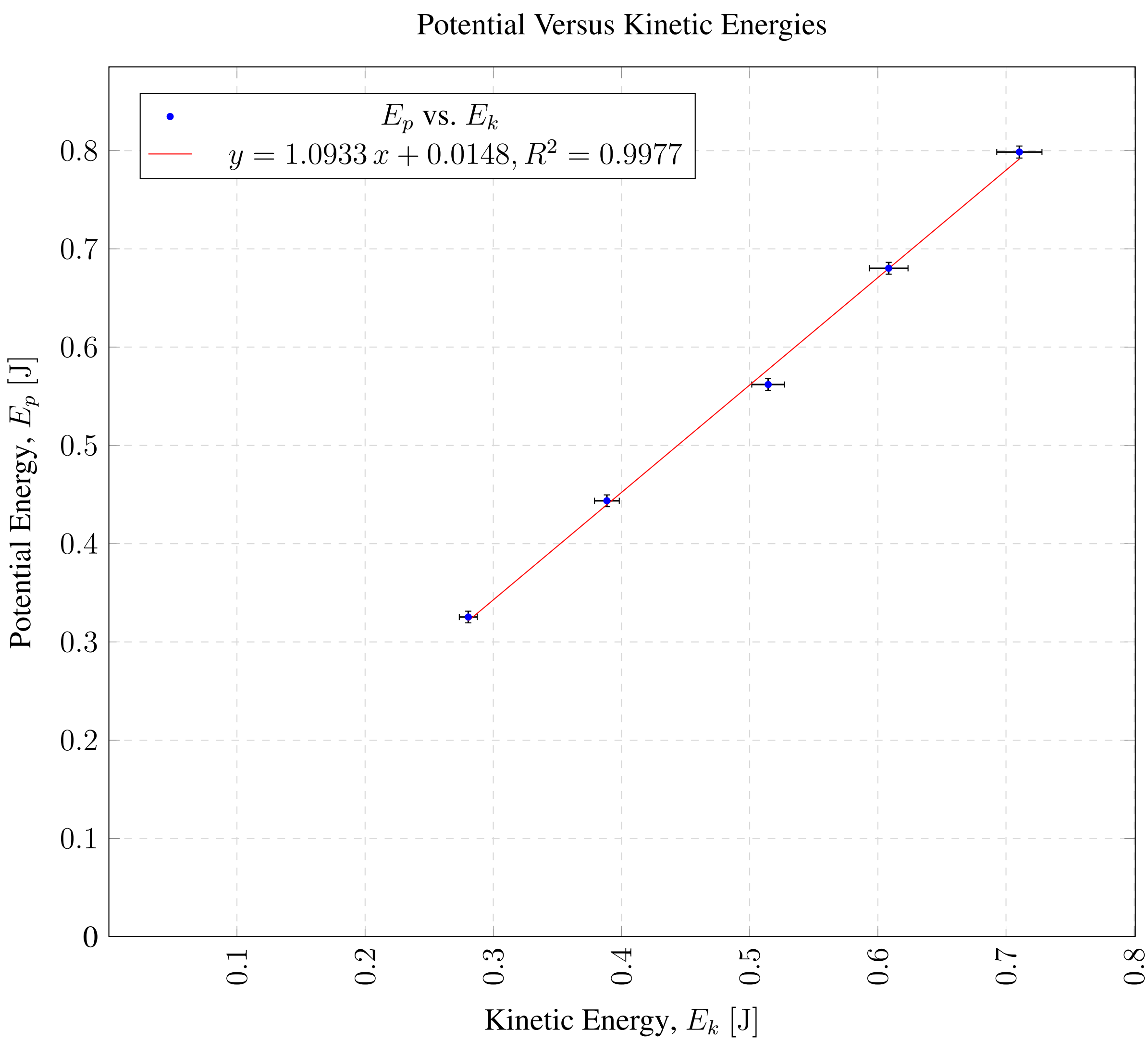

Figure 2: The relationship between potential and kinetic energies.

8.6 Citations

- **in-text citation**: use `\cite{dirac}` to produce **dirac** or `\textcite{dirac}` to produce **dirac**
- **citation in parentheses**: `\parencite{knuthwebsite}` produces [**knuthwebsite**] (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)

Appendix

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