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\*The proper term for what I’m looking to do here is \*Search and Rescue\*.

## But where does AI factor into all this? And it will have to lmao.

This document is going to detail the technology used to make the “Missing Person Rescue” project. The technology in this project is going to mainly be graph theory and algorithms to identify areas that a missing person may potentially go if they get lost from a certain location.

As a working example, I am going to take a nearby mountain. Carrauntoohil would be a nice reference to use for this. The area is going to need to be mapped and the most dangerous areas identified. Obtaining this data could be a difficult task as the data on the area is sparse. The “Devils Ladder” for example, would be a highly prioritised area as it has many rough rock formations that may cause someone to fall and become immobile. From the information gained, you could use Graphs to devise a search area that would give priority to these areas.

### GUI application programming.

This application would need a GUI to insert the data where the person may have potentially gone missing. To fit the theme of the project, I may decide to use either C++ or Java as my preferred language. C++ would be a good candidate because it prioritises speed and performance over ease of use. Java would be a good candidate because I am already familiar with Graphs and programming in this already. From a Professional Development perspective, I want to try something new, so I am currently leaning towards C++.

## What kind of Data is required?

### What Kind of Data would be useful about the subject needing rescue.

Certain data about the missing person would have to be ascertained to gather the list of their possible locations. The most important would be the approximate location before they got lost, you could use certain data about the person in question to gather how far they may have travelled, fitness etc. This could be where AI comes into the project. You could use picture data to gather approximate fitness levels.

### Data on Locations where missing people were found.

This data could be useful in locating the person afterwards. This would be a nice way of incorporating machine learning into the project. It could assess the distance from location the person got lost from to predict where they may have gone. Something like this: <https://www.kaggle.com/datasets/thesagentist/open-missing-person-cases-inside-national-parks> although they don’t have data on Irish cases, so I may have to settle for an American dataset.

### Data on Graph Algorithm Performance

Pathfinding algorithms will have to be implemented into the project to decide where to search. Luckily, there is no shortage of algorithms to use for this purpose. Dijkstra's algorithm, Breadth first and Depth First will all receive consideration in factoring in which is the likely way to reach people first.

### Terrain Data.

Otherwise known as 3D mapping data.

Data on areas that need to be searched can be gathered using a combination of different potential techniques. Photogrammetry could be used to assess the mountain. This would be a difficult method as it is time consuming and expensive, although a smaller model of an areas could be used as a proof of concept. A special map could be made combining the information gained from several different map types, and here is a useful link from Atlas.com that details different map types.

Photogrammetry on a mountain: <https://www.youtube.com/watch?v=gdd31rgS1q8> Nice idea, but would be prohibitively expensive for a project. This could also be an area where AI may factor into assessing the 3d model from the photogrammetry scan.

<https://www.worldatlas.com/articles/what-are-the-different-types-of-maps.html>

Physical Map, Geologic Map, Topographic Map.

Useful references/links:

Kerry Mountain Rescue: https://kerrymountainrescue.ie/carrauntoohil-route-descriptions/ - This site possesses images and basic maps that may be of use when finding areas that may be particularly dangerous. Also comes with useful advice on navigation and such. This website also contains map data where “special care is required”.

# To-Do list:

* Send email to Kerry Mountain Rescue.
* I’d consider it to be bad practice to link a paper and not cite what page it came from. Nobody is going to read a whole paper to find one or two lines. Oh my god, the citations are the entire book lmao.
* Make a Glossary for terms, ML = Machine Learning, for example.

## Kerry Mountain Rescue Questions and answers.

If meeting with them directly, maybe record meeting so you don’t forget.

Q. How do they gather data on the terrain of the mountains?

Q. Market data. Is there any major demand for such a program?

Q. Would a navigation system be of help to them?

Q. What kind of devices and technology or software could assist them in their approach to locating their objectives?

Q. What are the major challenges currently facing the rescue process, and would a product like this help them along?

Q. What areas of mountain etc. need to be paid special attention to?

Q. Do they have any literature that may assist in search parties, like a guidebook, etc. What resources do they recommend for information on the location process.

## Literature Review.

Prioritise literature that focuses on mapping 3d spaces.

Google Co-Lab is similar to Jupyter Notebooks, but requires no setup.

Previous similar coding project.

Big section on how satellite navigation works.

Limitations of already existing technologies. APIs could have limited usage. Look this up.

Google has APIs on finding elevation. Look for these.

Waze, Google Maps, etc.

## Difficulties and challenges associated with project.

Difficulties tying code with data gathered.

This project covers a lot of ground. Have to consider which areas specifically to put time and effort into. Such as using an API for the Navigation etc.

## Possible Tools for use, APIs, etc.

Google Elevation API

[How does GPS system determines altitude? - Quora](https://www.quora.com/How-does-GPS-system-determines-altitude)

03/10/2024 - Right time to narrow down the scope of the project, do that this weekend lmao.