**Research Project Report**

**Predicting player survivability in the video game Surviving Mars**

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**1 Introduction**

**1.1 Research Question**

How neural networks help predict human survivability in the video game Surviving Mars.

OR

How neural networks help find the best locations to start the colony in the video game Surviving Mars.

**1.2 Background**

**1.3 Datasets**

Surviving Mars Maps from <https://www.kaggle.com/peijenlin/surviving-mars-maps>

It is a dataset collected from a video game called Surviving Mars where players face challenges when colonizing Mars. This dataset contains a rich number of attributes, mostly resources, such as metal and water at a specific location and altitude.

**1.4 Libraries Used In The Research**

@TODO Description for each machine learning library

Tensorflow, Keras, Scikit-learn

**2 Methodology**

**2.1 Data Analysis**

@TODO Find and describe problems in the datasets. Should we normalize data? Should we generate new attributes? How graphs look like?

Not all of the data is initially understandable, an example of problems with the topography data can be seen here in this [notebook](https://www.kaggle.com/telemaque/unexpected-finding-in-surviving-mars-maps-dataset/data).

**2.2 Data Preprocessing**

@TODO Flatten, Normalize data etc. based on 2.1

The dataset that we will use has been flattened already, available [here](https://www.kaggle.com/peijenlin/surviving-mars-maps) on Kaggle. However, it will still need preprocessing as it does not include target values to determine whether or not a map, or area of the planet is hospitable.

**2.3 Neural Network Model**

@TODO NN architecture

CNN vs GAN

**2.4 Training, Testing and Validation**

@TODO Plot some graphs, including testing and evaluation (in TensorBoard)

**2.4 Hyperparameters Tuning**

@TODO Testing different set-up for the net, including number of neurons, number of layers, learning rate, activation function and etc.

**3 Results**

@TODO Figures

**4 Discussion**

@TODO Read from 3

**5 Conclusion**

@TODO Conclusion

**References**

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