**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 find the coat, age, gender and or breed of a cat.

**1.2 Background**

**1.3 Datasets**

Cat Breeds from <https://www.kaggle.com/ma7555/cat-breeds-dataset>

This is a dataset collected from various pet forums and websites dedicated to relocating or housing pet. This is how the dataset is able to account for gender, age, coat, and breed of each cat.

**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?

The data contained an uneven numbers of breeds and coats, meaning the data had to be limited to a certain number of images per cat breed or coat.

**2.2 Data Preprocessing**

@TODO Flatten, Normalize data etc. based on 2.1

The initial dataset is cluttered and uneven, many cats who did not have a breed or a coat, or too little number of images per coat or breed, needed to be trimmed. We used a minimum of 500 images per breed, this would increase our chances of training more accurately and faster. Many of the cats in the initial dataset ID file did not exist or were not included in the image folder, the missing cat images needed to be trimmed from the list of labels before training. Before training begun, we also needed to account for the new number of breeds and coats as many of the cat breeds, over half, were cut from the preprocessed data.

**2.3 Neural Network Model**

We used two variations of the CNN model to find the best accuracy and correlation to coat, breed, age and gender. The first is a basic form of the CNN with two internal convolutional layers, a single input layer and a single dimension output layer, this structure is a deeper learning version of the base CNN. The second is a two-layer input, multidimensional output CNN, with two internal convolutional layers, two convolutional input layers, and a multidimensional output layer for predicting the age, breed, gender and coat of a cat.

**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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