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Initial Software List - 09/10/2022 (Gilles)

Created By	Kareem Assad
Stakeholders	Gilles Myny
Status	Approved
Type	Project Kickoff 🚀
Created	@September 10, 2022 12:12 PM
Last Edited Time	@November 13, 2022 9:18 PM
Last Edited By	Gilles Myny
Date	@September 10, 2022
Participants	Gilles Myny

Software Libraries & Neural Network Research - Gilles Myny

Tensorflow and Keras (supplied from tensorflow) are great libraries to use for neural network creation and model training. A virtual environment to create the neural network and train it will be necessary, preferably on a cloud platform such as Google Cloud so that GPU processing can occur off-site from the groups computers, and can also be worked on by multiple people rather than installing independent dependencies and shifting neural network models between each student.

* mostly all done in Python with a few exceptions

Public neural networks do exist on the internet all over GitHub, however creating a neural network model from scratch will be more configurable, and also a better learning experience. Trial and error will occur a lot when choosing how many neural network model hidden layers will need to be present, how many neurons in each hidden layer, what type of firing function will be used (i.e. rectified linear, stepper, etc.), what kind of optimizer will be used for the model compilation (i.e. stocastic gradient descent, adam, etc.), and how the neural network model will calculate loss (i.e. sparse or binary categorical cross entropy, etc.). All this being said there's a lot of customization which will drastically affect the results of the neural network decision pattern and accuracy of the output.

In our case it is almost certain we are going to be using a deep neural network (neural network with 2 or more hidden layers) due to our multiple outputs and need for accuracy; this dives deeper into deep learning.