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AE 457
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Budget and Supports

Budget

1. Proposed Budget (\$0)
 - a. Data collection: \$0
 - i. Obtaining JPG/image formatted spectrographs from BRAMS
 - b. Model creation: \$0
 - i. Creating a machine learning model with Keras/Tensorflow
 - c. Model training: \$0
 - i. Using a machine to train the machine learning model to detect meteors within the JPG/image formatted spectrographs
 - ii. Will be done on a local machine (not within the cloud)
 - d. Model application: \$0
 - i. Using the trained model to detect meteors within the JPG/image formatted spectrographs
 - ii. A terminal/command line based application will be used, can be run on existing systems
2. Best Case Scenario Budget (\$400-\$1200/month)
 - a. Data collection: \$0
 - i. Obtaining JPG/image formatted spectrographs from BRAMS
 - b. Model creation: \$0
 - i. Creating a machine learning model with Keras/Tensorflow
 - c. Model training: \$144-\$1000/month (Assumes roughly 25% run time per month)
 - i. Using a machine to train the machine learning model to detect meteors within the JPG/image formatted spectrographs
 - ii. Cloud based
 1. \$0.76/hr for a GCP Compute Engine machine (16 cpus + 60 GB of ram)
 2. \$4.50/hr for TPU training on GCP (8 cpus + 64 GB of ram)
 - d. Model application: \$180/month
 - i. Domain (\$10/yr)
 - ii. EC2 (\$160/month)

Supports

- Personal computer
 - Can be used for development and machine learning model training
- GCP Compute Engine cluster (provided from manager at previous internship)
 - Can be used for machine learning model training
 - All costs are waived

- This means that the best case scenario of using GCP to train the machine learning model can be done while avoiding the cost of training
- Dataset (provided by BRAMS)
 - Used to train machine learning model
 - Openly available if an account is made with BRAMS

The budget that will be used is based on the proposed budget. This is because the two budgets presented above only differ in the model training and application sections. Furthermore, a model application that is accessible via the internet/website is not required, a simple terminal based application will suffice. The budget does not need to account for this and additional savings can be made by not creating additional applications. Finally, because a GCP Compute Engine cluster has been provided, the model training within the “Best Case Scenario Budget” can be achieved at no additional cost. This leaves the final proposed budget at a total of \$0 dollars and allows for high end hardware to be used to quickly and efficiently train the machine learning model. As a precautionary measure, the machine learning model will be developed using Keras/Tensorflow within the Kubeflow Pipelines framework. This means that should the GCP Compute Engine cluster no longer be available to me, the model can still be trained on a local machine while keeping the total cost at \$0.