**Executive Summary**

Recently, NASA has been watching the stars hoping to find planets in other solar systems. Finding planets in other solar systems is tricky. They are much too far away to be seen directly. Out of the millions of stars being observed, only several thousand exoplanets have been confirmed. When a planet “transits” between its star and our viewpoint, it blocks some of the light coming from that star. Looking for these dips in brightness is how most of the confirmed planets we know about today were discovered.

The goal of this project is to build a neural network that can detect planetary transit events in time series of the brightness of stars. The data was obtained from NASA’s Bulk Data API. The model used in this project is a one-dimensional convolutional neural network. These kinds of neural networks are often used in image detection, because they are very good at detecting patterns.

How do we know if this model is successful? Accuracy is important, but we want to minimize false negatives because we don’t want to be excluding stars that may have a planet that we can learn something about. This exoplanet detection method is known to have a high false positive rate. There are a lot of weird things going on in space that may produce false signals, such as solar systems with multiple stars and giant cosmic dust clouds, and who knows maybe a few aliens too.

The model classified the hold out training set with 85% accuracy compared to a baseline of 31%. When applied to unseen data without confirmed planets mixed in. It classified planets up to 15 times better than chance. The model predicted 98 planets, of which 12 were confirmed planets. There were 40 confirmed planetary systems in the unseen dataset.

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