# Data Science Programming: Project Proposal

## Eric Stevens

**Title:** Voice Signal Digit Recognition

**Aims:** In this project I will attempt to build a classifier that is capable of distinguishing single spoken digits form on and other.

**References:** I have not located any particular articles but I know they are out there and CSLU is a great place to work on a project like this.

**Dataset:** I will be using a collection of 2000 recordings that has been made available on github. <https://github.com/Jakobovski/free-spoken-digit-dataset/tree/master/recordings>

**Libraries:** I will be using several of the libraries we have discussed in class and some we haven’t. The key library I hope to use is the scipy.signals library. This will be used for signal analysis and feature design and extraction. After that I hope to use PyMC3 for Bayesian machine learning.

**Approach:** My approach will be to design and extract features that take into account both the frequency domain signatures of signals and the relationships between time domain blocks. I have never worked with cepstral analysis before but this may be the application for it. It will be important to use some time series approaches to capture the changes that occur throughout a spoken digit. I am hoping that there will be a way to model the harmonic relationships between the present frequencies and not the frequencies themselves, since different speakers will have different spoken frequency range characteristics.

**Metric of Success:** Success will be measured by the percentage of numbers that can be accurately understood by the model. Since there are 10 digits (0-9) we can achieve a baseline model that has 10% accuracy by simply guessing a single digit every time. A successful model will have to perform better than this, and my goal will be to perform much better than this.