**Technical Report Outline**

***Technical Problem***

* Monitoring and forecasting the health of lakes
* Transition from oligotrophic to eutrophic state is harmful to local ecosystems and communities
* If a transition is detected early enough, we can work reverse the process, or mitigate its effects
* The ability to predict if and when these regime shifts occurs would provide a useful tool for mitigating harmful ecological transitions like these.

***Design***

* What are wavelets and what are CNNs? How can NN classification help us with solving our problem?
* Describe the process of data processing
* Timeseries wavelet transform convolutional neural network
* Two Types of Analysis:
* classifying the domain of the timeseries
* identifying signs of a regime shift
* Two Kinds of Data
* Small moving window
* Large window
* Two Kinds Data Output
* Raw classification
* (for windowed approach): probability based on previous iterations of the window

***Results***

*Components of the Project*

|  |  |  |
| --- | --- | --- |
|  | *Whole Timeseries* | *Small Moving Window* |
| *Regime Shift Identification* | *Results = success* | *Results = Failed* |
| *Domain Classification* | *-----* | *Results = moderate success* |

*Lessons Learned and Analysis*

*- larger windows appear to learn better*

***Future Work***