

# CS 6890 ADL Project Proposal

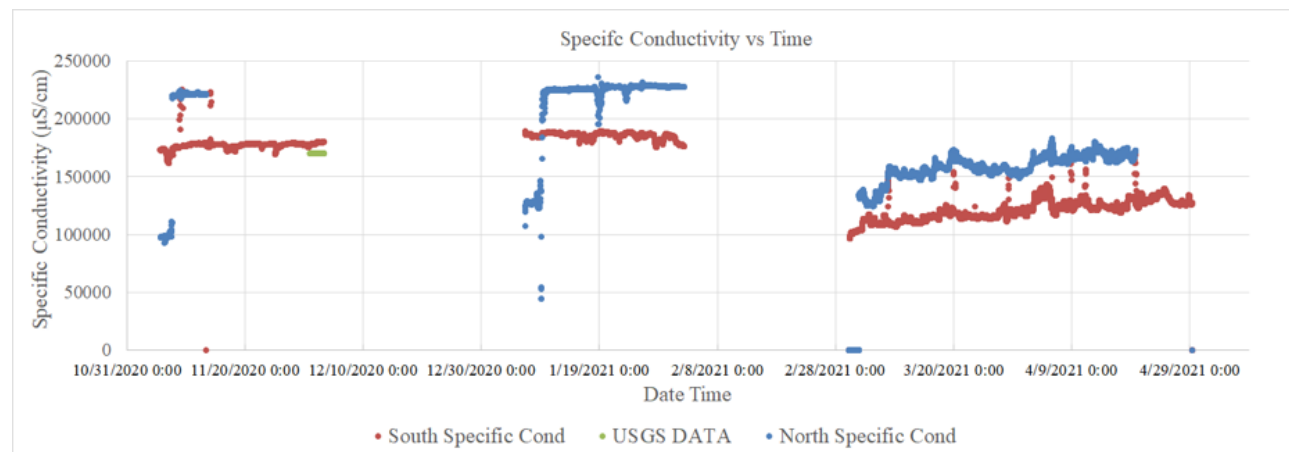
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Project Title: Temporal Projection of Grocery Sales

# Introduction

Build DNN network to predict future values dependent on past information

- Time Series Problems
- Projection of information for missing data pools
- Business projections



# Proposed Project

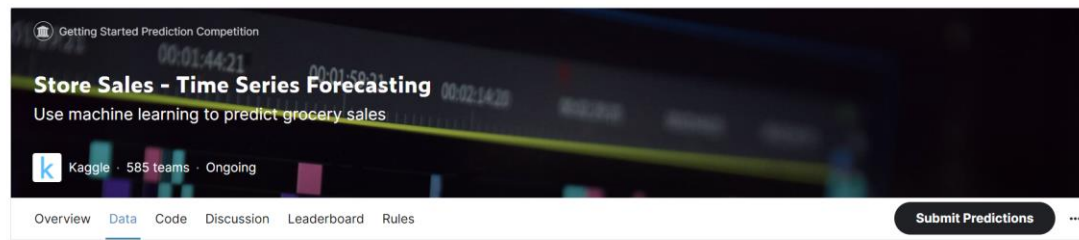
This Project comes from a Kaggle competition called Store Sales - Time Series Forecasting (<https://www.kaggle.com/competitions/store-sales-time-series-forecasting/data>)

The Goal:

- Accurately predict the unit sales for store items of an Ecuador Grocery Retailer

The Data:

- Data is provided by Kaggle and is readily available and cleaned (downloaded from Kaggle)
  - Already separated to Train and Test datasets
  - Time information, sales, and product identification



## Dataset Description

In this competition, you will predict sales for the thousands of product families sold at Favorita stores located in Ecuador. The training data includes dates, store and product information, whether that item was being promoted, as well as the sales numbers. Additional files include supplementary information that may be useful in building your models.

### Files

7 files

### Size

124.76 MB

# Previous Work

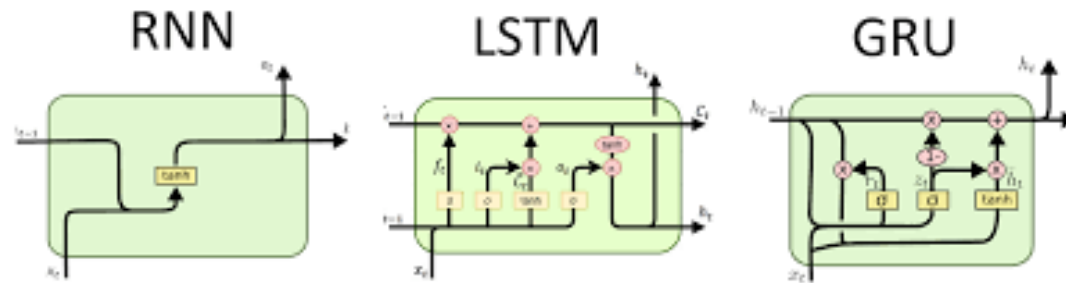
From AAAI there were 4 papers relevant to my desired topic

- Tang, X., Yao, H., Sun, Y., Aggarwal, C., Mitra, P., & Wang, S. (2020). Joint Modeling of Local and Global Temporal Dynamics for Multivariate Time Series Forecasting with Missing Values. *Proceedings of the AAAI Conference on Artificial Intelligence*, 34(04), 5956-5963. <https://doi.org/10.1609/aaai.v34i04.6056>
- Yao, H., Wu, F., Ke, J., Tang, X., Jia, Y., Lu, S., Gong, P., Ye, J., & Li, Z. (2018). Deep Multi-View Spatial-Temporal Network for Taxi Demand Prediction. *Proceedings of the AAAI Conference on Artificial Intelligence*, 32(1). <https://doi.org/10.1609/aaai.v32i1.11836>
- Wu, Y., Ni, J., Cheng, W., Zong, B., Song, D., Chen, Z., Liu, Y., Zhang, X., Chen, H., & Davidson, S. B. (2021). Dynamic Gaussian Mixture based Deep Generative Model For Robust Forecasting on Sparse Multivariate Time Series. *Proceedings of the AAAI Conference on Artificial Intelligence*, 35(1), 651-659. <https://doi.org/10.1609/aaai.v35i1.16145>
- Zhang, C., Song, D., Chen, Y., Feng, X., Lumezanu, C., Cheng, W., Ni, J., Zong, B., Chen, H., & Chawla, N. V. (2019). A Deep Neural Network for Unsupervised Anomaly Detection and Diagnosis in Multivariate Time Series Data. *Proceedings of the AAAI Conference on Artificial Intelligence*, 33(01), 1409-1416. <https://doi.org/10.1609/aaai.v33i01.33011409>

# Methodology and Desired Outcome

Planned Network:

Long Short-Term Memory(LSTM)  
Recursive Neural Network (RNN)  
Gated Recurrent Unit (GRU)



[https://www.google.com/imgres?imgurl=http%3A%2F%2Fdprogrammer.org%2Fwp-content%2Fuploads%2F2019%2F04%2FRNN-vs-LSTM-vs-GRU.png&imgrefurl=http%3A%2F%2Fdprogrammer.org%2Frrnn-lstm-gru&tbnid=ZdAXCOHNPG2ueM&vet=12ahUKEwiZ4sqO35X9AhX6KkQIHsJD1UQMygBegUIARDGAQ..i&docid=UeNxOPf6Kcn\\_6M&w=1849&h=557&q=GRU%20vs%20lstm&ved=2ahUKEwiZ4sqO35X9AhX6KkQIHsJD1UQMygBegUIARDGAQ](https://www.google.com/imgres?imgurl=http%3A%2F%2Fdprogrammer.org%2Fwp-content%2Fuploads%2F2019%2F04%2FRNN-vs-LSTM-vs-GRU.png&imgrefurl=http%3A%2F%2Fdprogrammer.org%2Frrnn-lstm-gru&tbnid=ZdAXCOHNPG2ueM&vet=12ahUKEwiZ4sqO35X9AhX6KkQIHsJD1UQMygBegUIARDGAQ..i&docid=UeNxOPf6Kcn_6M&w=1849&h=557&q=GRU%20vs%20lstm&ved=2ahUKEwiZ4sqO35X9AhX6KkQIHsJD1UQMygBegUIARDGAQ)

Desired Outcomes:

Increased Knowledge of time  
series predictions

Applicable knowledge to  
current research interests

High performing network for  
temporal predictions

Additional Outcome:

Apply LSTM,RNN and GRU to current  
GSL research

Thank You