



EMELIA: A Machine Learning System to Enhance Error Reporting & System Performance

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Motivation

Rescue 21 is a communications system used to save lives out at sea. Our client, General Dynamics, is responsible for maintaining and servicing this vital communications system to ensure its reliability out in the field.

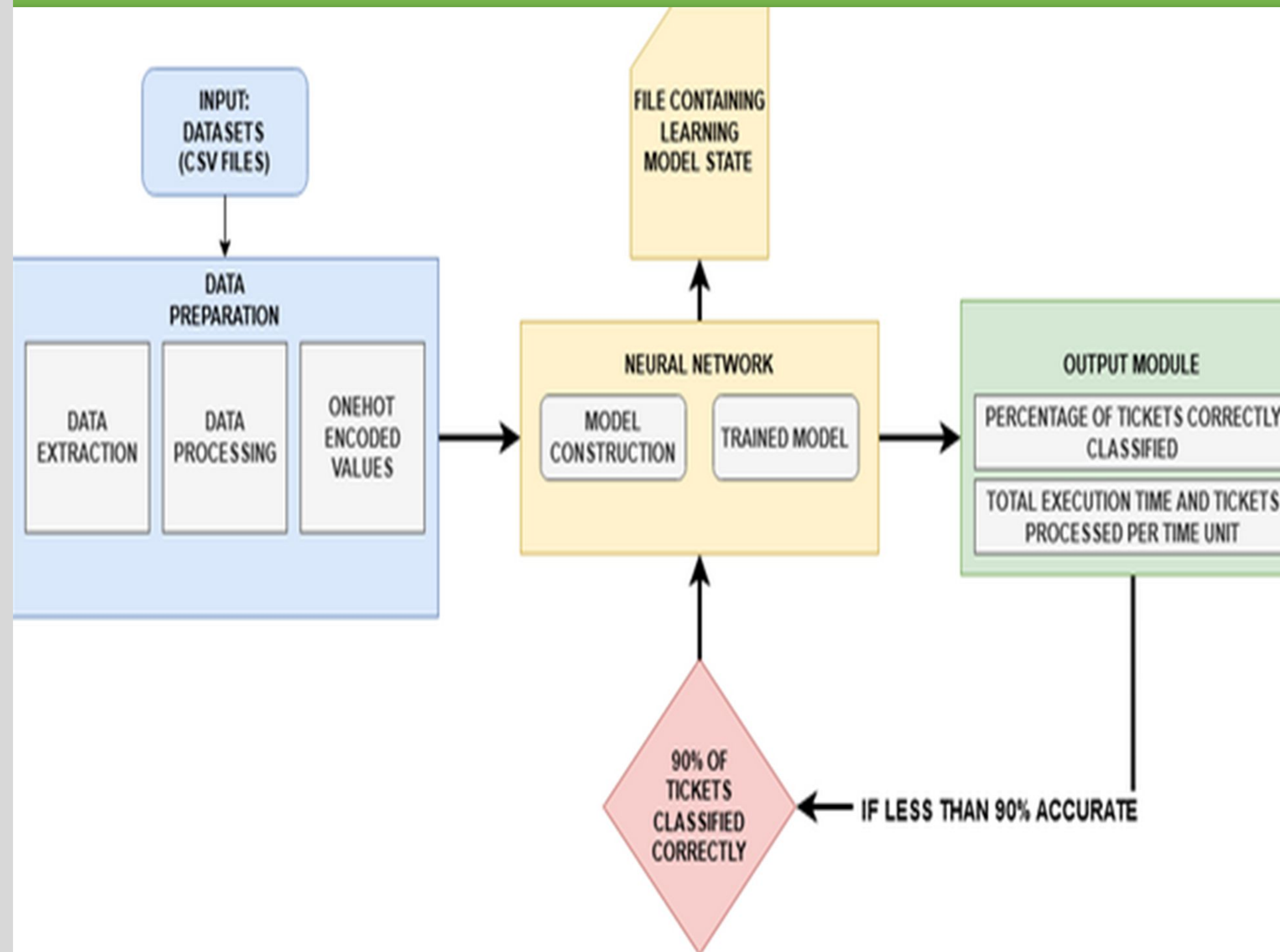
The motivation for this project comes from the need to produce a ticket classifier for the Rescue 21 communications ticket system. Currently, our client has a team of engineers that must classify ticket data manually. This process is time consuming when successful and becomes even more costly of time and effort if a ticket should be misclassified. Since this system is responsible for saving lives out at sea, ticket data regarding outages or system errors must be:

- Accurate in terms of the type of outage
- Reliable in assisting the engineering team in servicing the system

Our capstone team, Team SmartState, has been tasked with analyzing this problem and creating a solution that will enhance our clients' ticket classification system. The solution?

EMELIA: Event-driven Machine Learning Intelligent Assessor

Architecture



Technologies

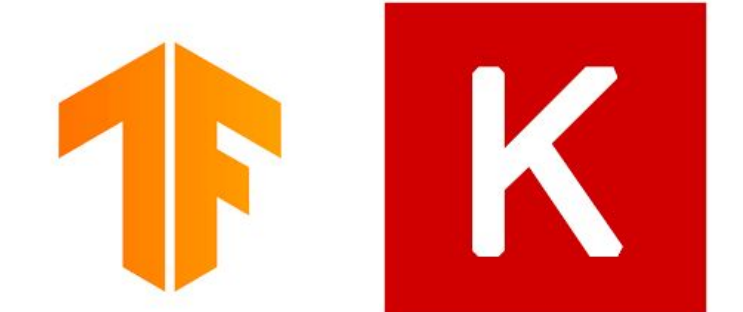
Development Environment:

- Conda Package Manager
- Jupyter Notebook



Implementation:

- Tensor Flow
- Keras
- Numpy
- Python 3.6



Website:

- HTML
- CSS
- Bootstrap



Features

- Classify input data
- Process data provided for training
 - Convert CSV data to OneHotEncoded values
 - Pass the input to a neural network
- Automate evaluation of learning model accuracy by comparing predictions to test data set
- Provide performance metrics such as:
 - Total execution time
 - True positive
 - True negative
 - False positive
 - False negative

Solution

We envision an accurate, scalable, and maintainable application that will classify tickets for the General Dynamics engineering team. This machine learning solution would be able to receive raw ticket data and make ticket classification predictions based on the input provided. Once the system has trained on the input data, new data will be passed to create prediction values using test tickets that have not been seen by the machine learning model. The predicted values are what the system “thinks” the tickets should be classified for each label. These Predicted values will be compared to real ticket data and the overall Accuracy of ticket classification will be reported to the system engineer.

EMELIA Will:

- Extract data
- Produce system/data metrics
- Class prediction utilizing Neural Network
- Significantly decrease time needed to classify tickets

Ticket Dataset



EMELIA



Classification



System Metrics



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