

SmartState



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Our Sponsor



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General Dynamics Mission Systems

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General Dynamics Mission Systems

**GENERAL
DYNAMICS**

Domain: Rescue 21

21ST CENTURY SEARCH AND RESCUE



WHAT IS IT?

Communication and Tracking System

Utilized by the Coast Guard

Maintained by General Dynamics

Challenge: Ticket System

Error Reporting System

- Tickets tell a story of how the system failed.
- 20-30 per month

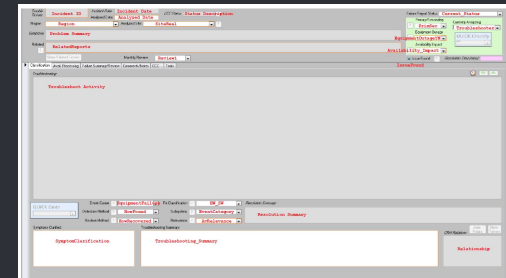
Current process of Resolution:

- FRACAS team members analyze tickets by hand
- Classify each ticket individually

Communication Towers



Ticket Interface

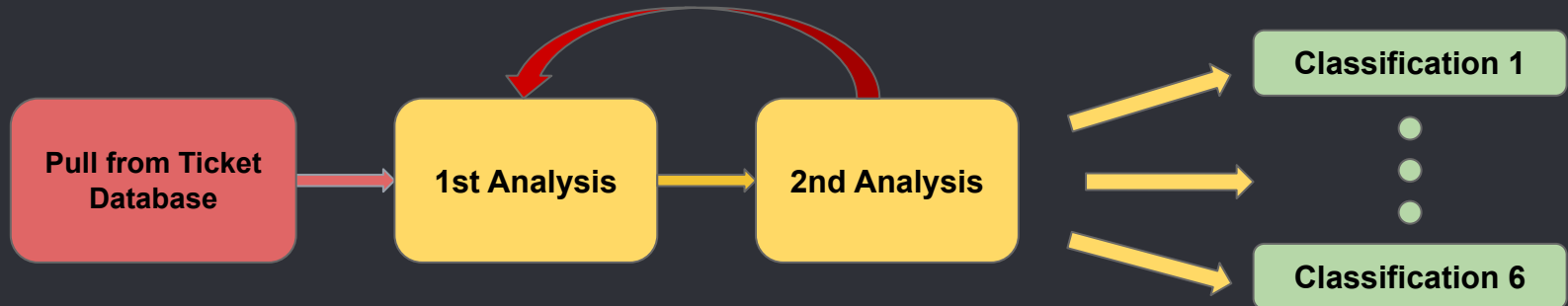


Problem Statement

Approximately **10 minutes** spent on each ticket

- Each ticket is sent to second reviewer ~ **10 minutes**
 - If the ticket contains an error, it is returned to initial reviewer
 - **30 minutes** spent on misclassified ticket

Need ticket data to analyze long term trends in system performance



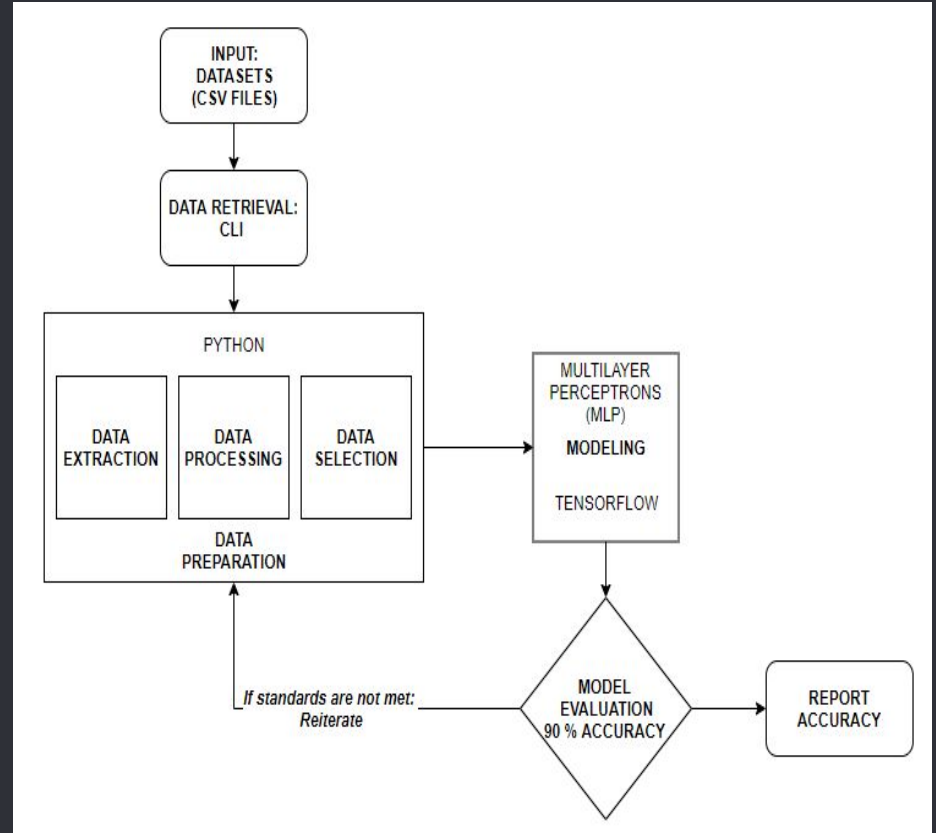
Solution Overview

Envisioned Solution:

- Event-driven Machine Learning Intelligent Assessor (EMELIA) that will be able to effectively analyze and classify system failures.

EMELIA will:

- Extract data
- Utilization of multilayer perceptrons modeling
- Be trained using a large database
- Increase efficiency



• Requirements

○ Acquisition:

- Phone interview
- Skype meeting sessions
- Video lectures sent by client
- Online tutorials

Requirements

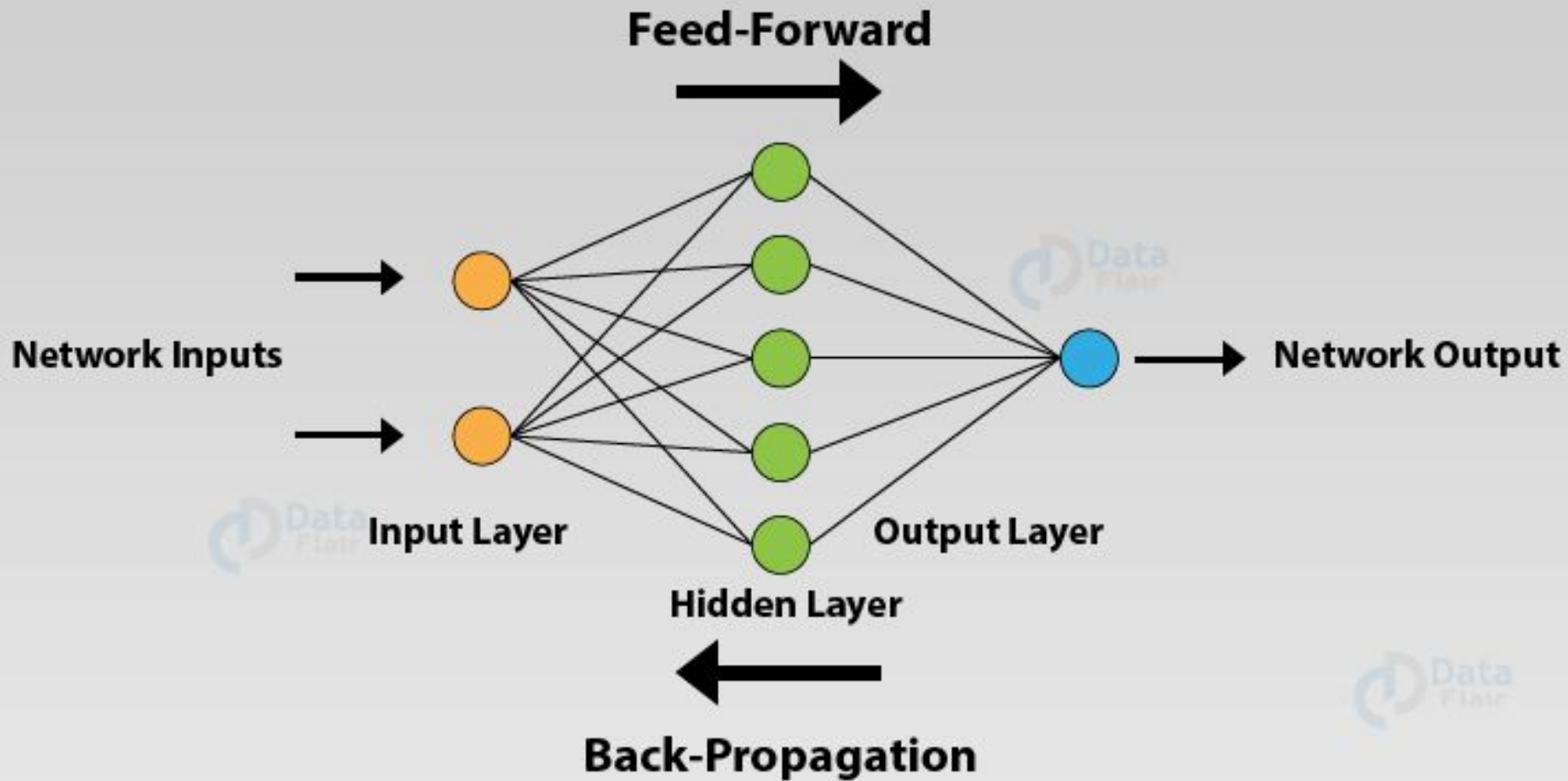
Key Requirements:

- Train data
- Classify input data
 - Take in data created from the ticket system
 - Excel spreadsheets
 - Pass the input to a neural network learning model
 - Assess EMELIA's data classification performance
- Verify accuracy

Requirements

Functional Requirements:

- Classify input data
 - TensorFlow
 - Data is used as the input weights for the classifier
 - Use of Gradient Descent to adjust inputs
 - Adjust parameters to reduce output error
 - Reduce classification errors
 - Back propagation to adjust weight values



• Requirements

Performance Requirements:

- Accurate
 - 90% success rate or better
- Scale well with growing data sets
 - Speed is important
- Integrate with other ticketing processes

Environmental Constraints:

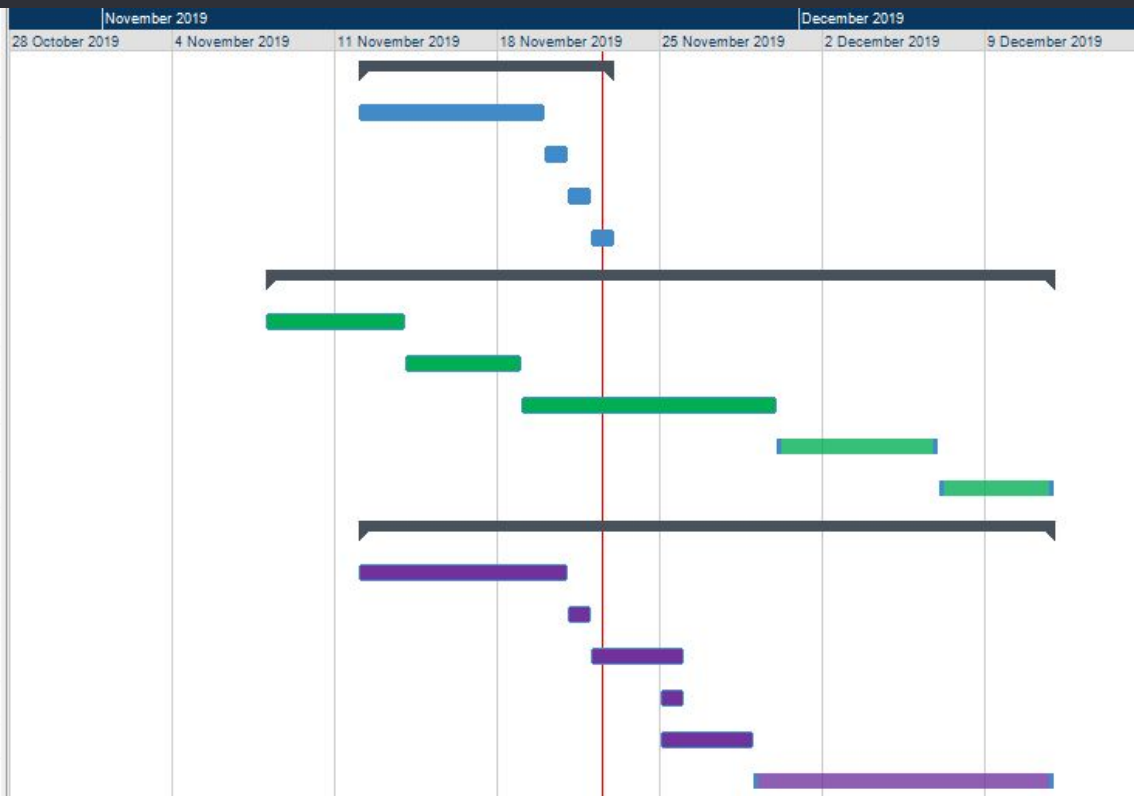
- Developing without source code
 - Security Concerns
- Classifying “scrubbed” data
- Understanding ticket system

Risks

	Severity	Likelihood	Mitigation
Compatibility	High	High	Communication Be perfect
Misclassification	Medium	High	Continuous testing Set a real-value confidence level

Schedule

	Task Name	Start	End
1	Design Review	11/12/2019	11/22/2019
2	Prepare for Dry Run	11/12/2019	11/19/2019
3	Dry Run	11/20/2019	11/20/2019
4	Prepare For Presentation	11/21/2019	11/21/2019
5	Presentation	11/22/2019	11/22/2019
6	Requirement Specification	11/8/2019	12/11/2019
7	Non Functional Requirements	11/8/2019	11/13/2019
8	Functional Requirements	11/14/2019	11/18/2019
9	Rough Draft	11/19/2019	11/29/2019
10	Final Draft	11/30/2019	12/6/2019
11	Signed Requirements document	12/7/2019	12/11/2019
12	Prototype	11/12/2019	12/11/2019
13	Research Ticket System for Classification	11/12/2019	11/20/2019
14	Extract/Clean Data from Tickets	11/21/2019	11/21/2019
15	Build Neural Network	11/22/2019	11/25/2019
16	Test Initial Prototype Accuracy	11/25/2019	11/25/2019
17	Refactor Prototype	11/25/2019	11/28/2019
18	Tech Demo	11/29/2019	12/11/2019



Conclusion

EMELIA will assist in the ticket classification process

- Take in data from an Excel spreadsheet and pass into a machine learning classifier

EMELIA needs to reach 90% accuracy

- Time needed to fix misclassified tickets is not efficient

Allow commands that will assess the performance of EMELIA

- Our next phase will focus on developing a functional prototype