Analysis and visualization of complex software system traces

FINAL EVALUATION

Group 7

QA for Fintech Applications using Machine Learning

PRODUCT OWNERS

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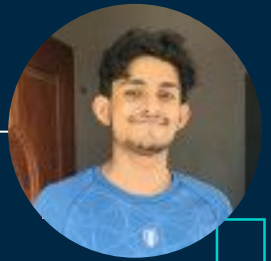

RIDMA JAYASUNDARA

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PART 01

INTRODUCTION

Understanding the Problem

1.1

Understanding the Problem

- About 15 years ago log files were simple and human readable
- Now, log files extends upto GigaBytes while selections containing the word ‘error’ is about 200 -300 MegaBytes
- Typically, log files can contain millions of lines per working day, making manual analysis impractical and error-prone.
- QA Engineers nightmare …

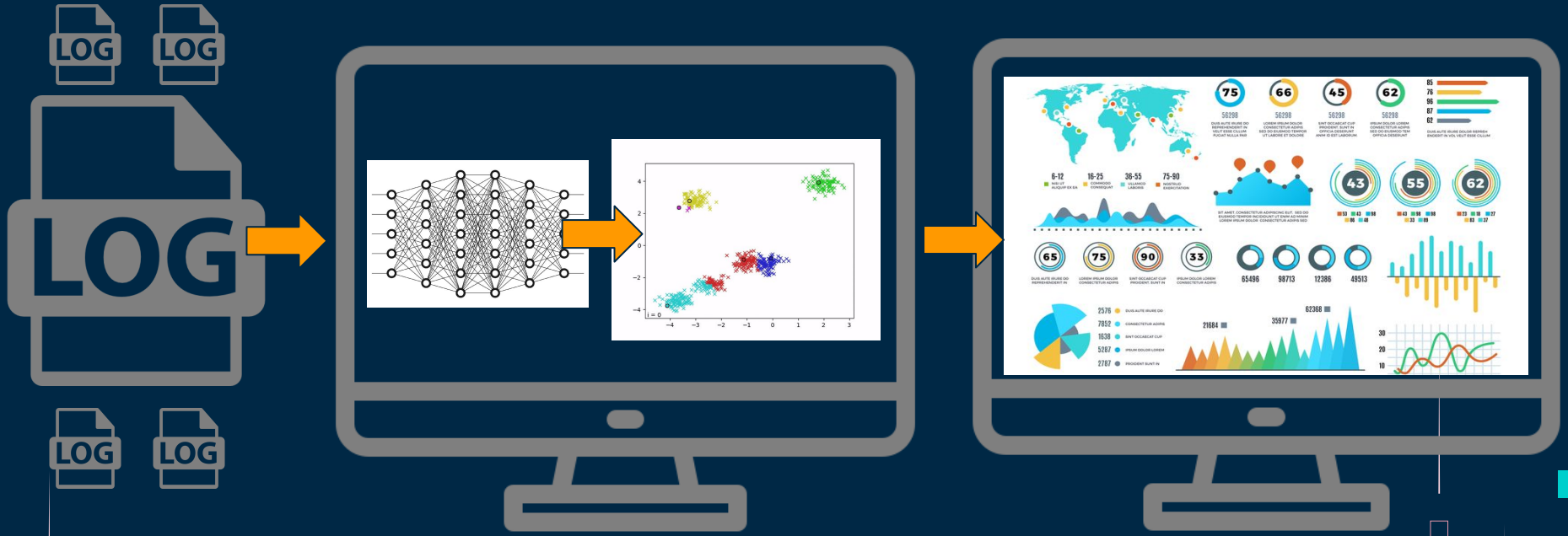
Solution

1.2

Solution

- To develop machine learning models for anomaly detection and issue identification in system traces (in form of log files)
- To visualize the system traces using interactive dashboards to provide a human understanding of what is happening in the system
- To evaluate the effectiveness of the proposed approach on real-world FinTech applications

Solution



Process 1.3

PROCESS

1. **Data Collection**
    - Size of data set = 45 GB
    - No. of log files = More than 27,000
2. **Exploratory Data Analysis (EDA)**


```
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File Name	Number of Columns	Size	Line Count
2015/2015-CW-9/lphost18_wls2_unix-process_prod-appserver_2015.03.01_00.00.01.csv	13	156K	1419
2015/2015-CW-9/lphost18_wls2_unix-process_prod-appserver_2015.02.28_00.00.01.csv	13	156K	1418
2015/2015-CW-9/lphost18_wls2_unix-process_prod-appserver_2015.02.27_00.00.00.csv	13	156K	1414
2015/2015-CW-9/lphost18_wls2_unix-process_prod-appserver_2015.02.26_00.00.00.csv	13	152K	1417
2015/2015-CW-9/lphost18_wls2_unix-process_prod-appserver_2015.02.25_00.00.01.csv	13	152K	1417
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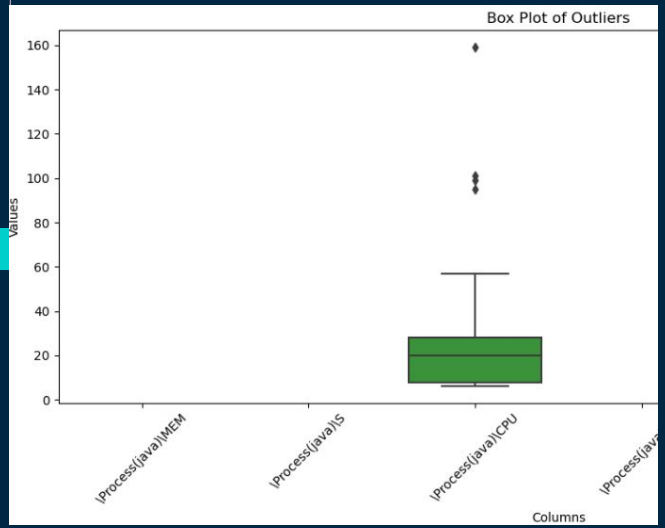
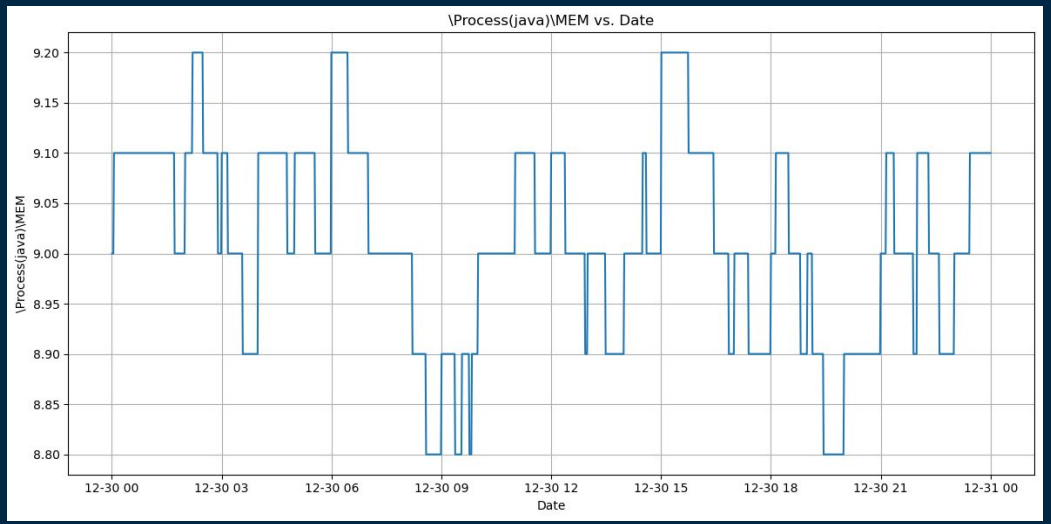
2015/2015-CW-9/lphost18_wls2_log_prod-appserver-log_2015.02.28_00.00.01.csv	3	52K	1441
2015/2015-CW-9/lphost18_wls2_log_prod-appserver-log_2015.02.27_00.00.00.csv	3	52K	1441

PROCESS

3. **Statistical Log File Analysis**

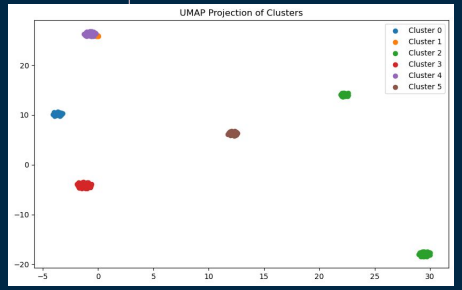


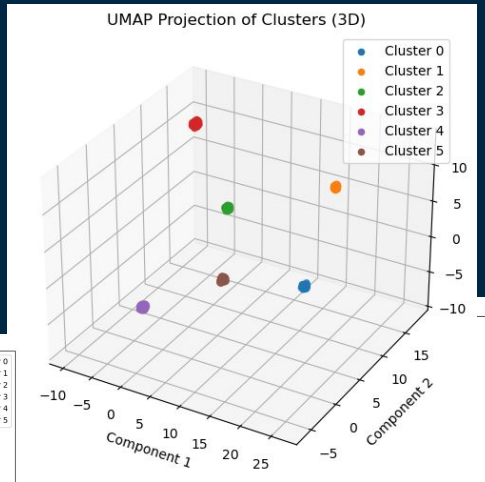


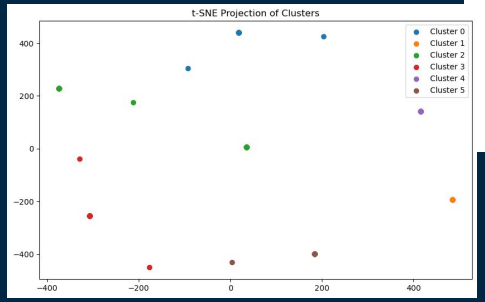
PROCESS

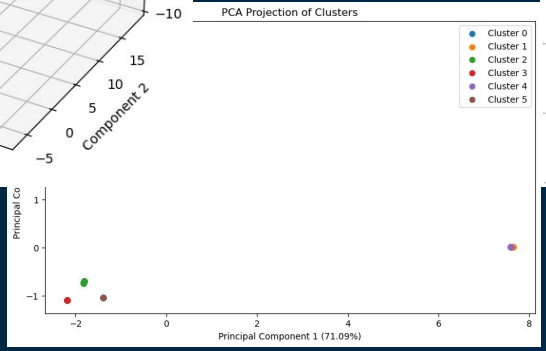
4. Raw Log Clustering Approach

K-Means Clustering

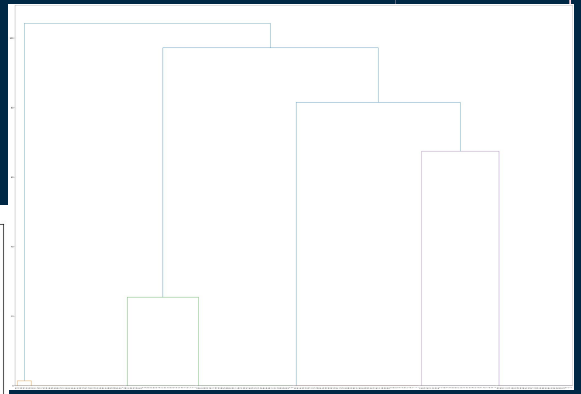






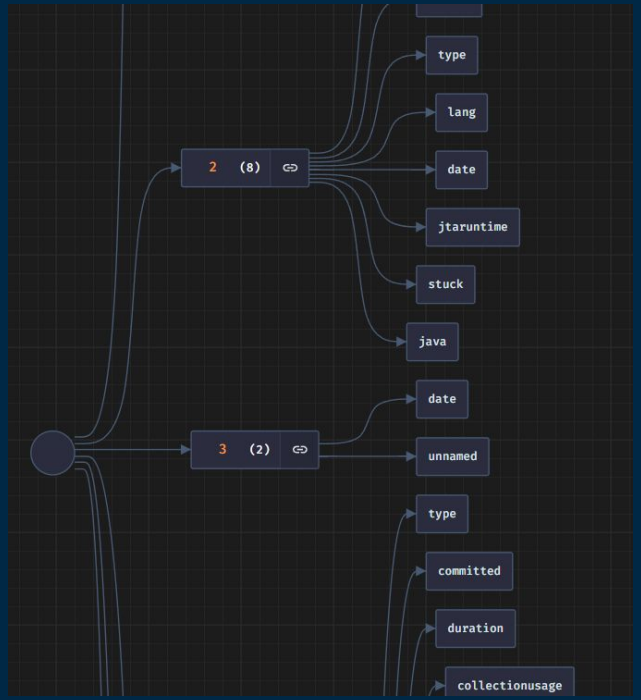


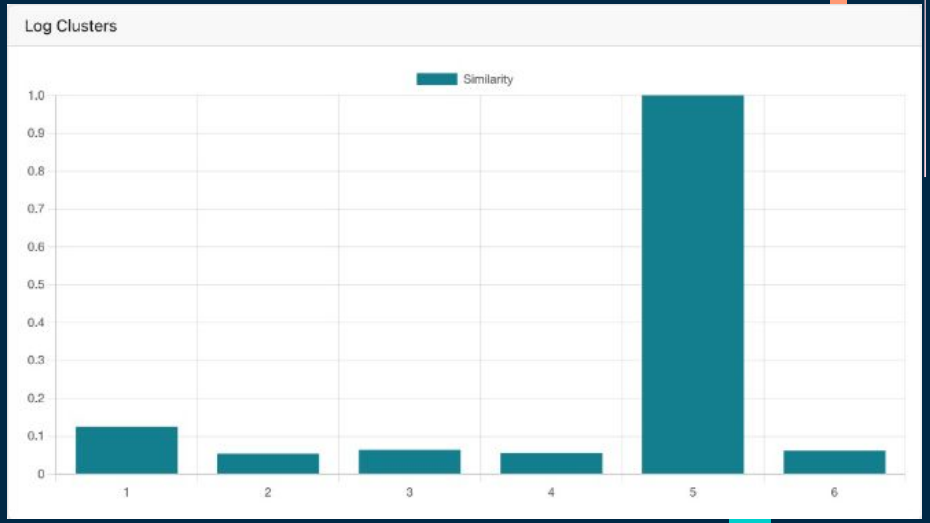
DBSCAN Clustering



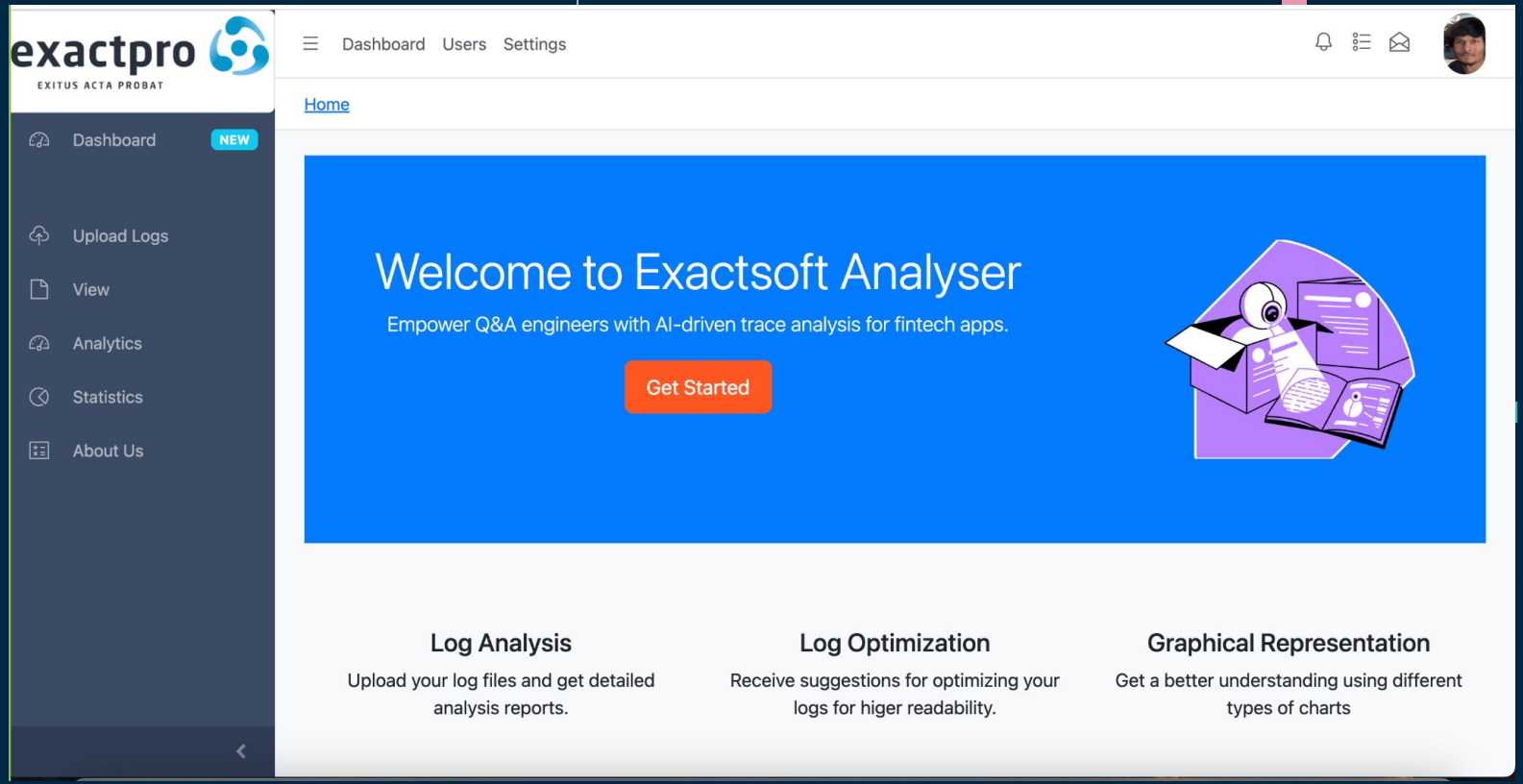
PROCESS

5. Template-Based Approach

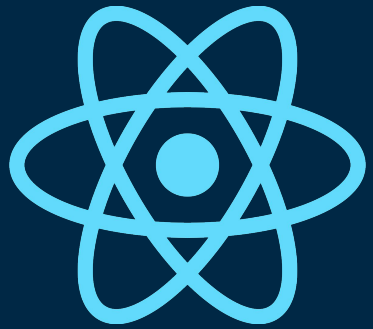


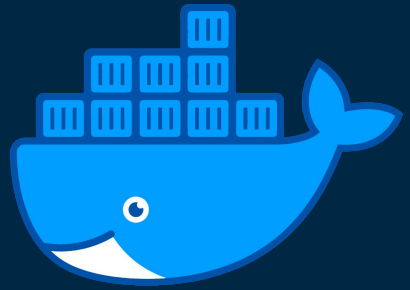


Website Development

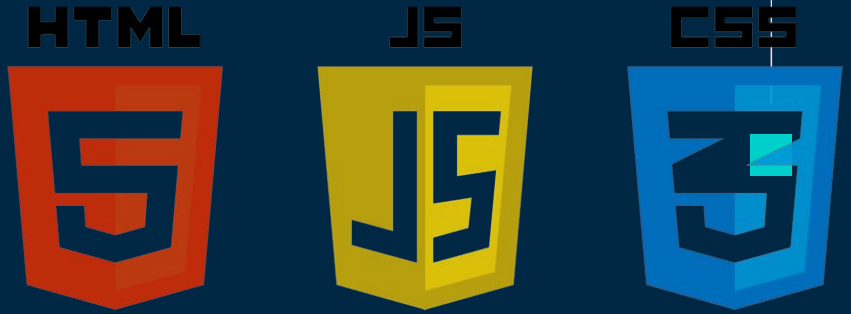


python™





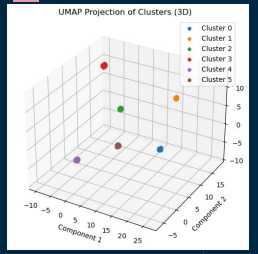
docker



System Architecture

LOG

FRONTEND (REACT)



BACKEND (PYTHON)

python

MongoDB

DATABASE (MONGODB)

MACHINE LEARNING MODEL (PYTHON)

NumPy

pandas

seaborn

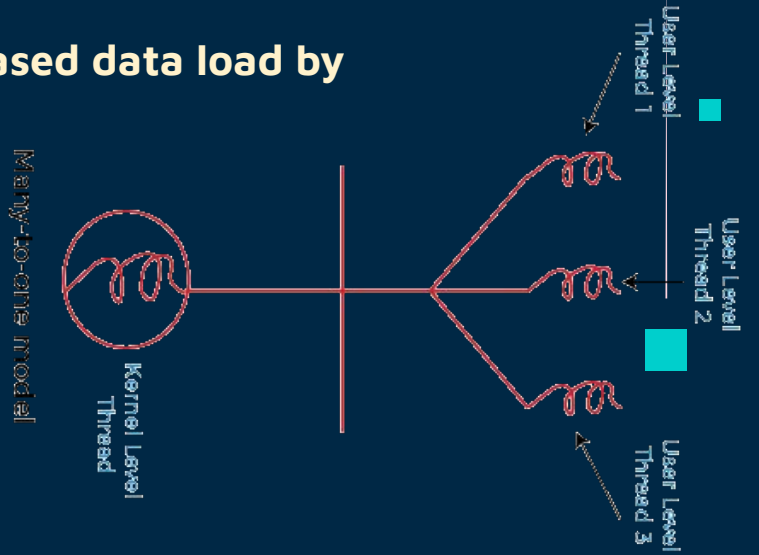
scikit learn

PyTorch

TensorFlow

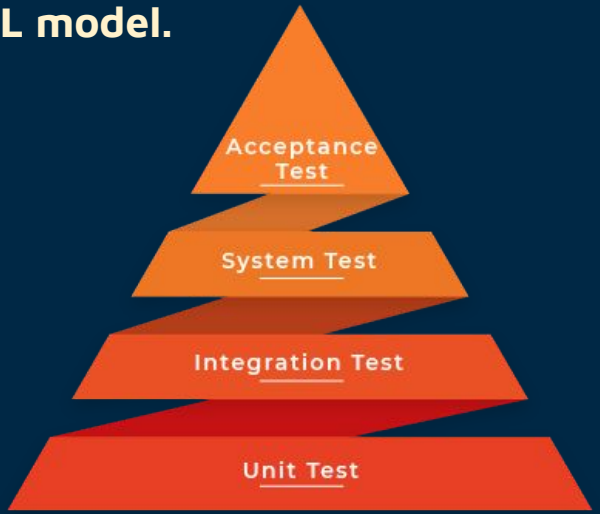
Multithreading

- Concurrent handling of requests and ML computations for faster data evaluation.
- Optimal utilization of system resources like CPU cores for improved performance.
- Easy expansion to handle increased data load by distributing tasks efficiently.



Testing

- Unit tests for the backend API's
- Regression testing for changes and updates in the code
- Integration testing to ensure dataflow from frontend to backend to ML model.



PART 02

DEMONSTRATION

THANK YOU!