

# Abhilash Sajjan

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## Professional Summary

- 8 years of total experience of which over 5 years in Machine Learning and Analytics in 4G/5G Network Management Systems and IT Infrastructure Management domains.
- Skilled professional in implementation of use-cases in Artificial Intelligence for IT Operations (AIOps) and building Intelligent Telecommunication Network Operations systems.
- Skilled professional in Data-Engineering and Data-science profile.
- Experienced in defining the Business problem, architecting the solution with Statistical analysis, Feature Selection, Feature Engineering, Exploratory Data Analysis, Modelling and Evaluation.
- Experienced in being an individual contributor and working remotely with little to no assistance as well as leading teams.
- Experience in handling different data analytics use cases from initiating, conceptualisation, design, and planning research projects with all the intermediary activities to reach the end state within the stipulated timelines in a sense to provide an End-to-End deployment of the use-cases.
- Create and present innovative solution, design proof of concept, and present findings with actionable recommendations and next steps to higher management.

## Technical Summary:

Techniques/ Algorithms	<b>Supervised Algorithms:</b> Decision Tree, Random Forest, Naive Bayes, K-Nearest Neighbour, Support Vector Machine, Logistic Regression, Linear Regression. <b>Unsupervised Algorithms:</b> Isolation Forest, Kmeans, Hierarchical Clustering, DBScan. <b>Dimensionality Reduction:</b> Principal Component Analysis, Linear Discriminant Analysis, T-SNE. <b>Pattern Mining:</b> PrefixSpan, Frequency Pattern Growth, Association Rule Mining, Apriori. <b>Statistical EDA:</b> Univariate, multivariate analysis, Correlation analysis, Regression analysis, Causation analysis, ANOVA, Chi-Square. <b>Time Series Analysis:</b> ARIMA, Seasonal-ARIMA, Facebook-Prophet, LOESS Regression.
Statistical Tools/ Programming/ Platform/ Packages	Python, Pandas, Numpy, Scikit-Learn, Matplotlib, Seaborn, SPSS Modeler, SQL, SourceTree (Version Control GUI for BitBucket Repo)
Big Data tools/ DevOps tools	Hadoop, PySpark, Spark-SQL, Spark-ML, Docker, Kubernetes
Cloud Platforms and services	AWS, AWS-S3, EMR, EC2

## Education

Post Graduate Program in Statistics and Machine Learning | 2017

INSOFE International School of Engineering, Bangalore, Karnataka

Master of Technology (M. Tech) in Communication Systems | 2012

R.V College of Engineering, Karnataka

Bachelor of Technology (B. Tech) in Electronics and Communication Systems | 2009

JSS Academy of technical education, Karnataka

## Experience

Netreo IT Service and Operation Management Systems

09/2019 - 06/2020

Technical Lead | Data Scientist

As a Lead Engineer my role here was to transform a legacy IT management product to one that is based on Machine learning. The goal was to implement use cases as per the concepts of Artificial Intelligence in IT Operations(AIOps).

I am tasked to understand customer pain points in large network deployments, conceptualise the solutions, design and develop the end-to-end Machine Learning pipeline, deployment, evaluation, presentation and reporting of the same to the stakeholders.

Nokia Networks

07/2015 - 09/2019

Technical Lead | R & D Lead

As a scrum mater my primary role here was to develop and co-ordinate the implementation of use-cases related to AI across Telecommunication Network Management Systems (Intelligent Operations Centre) for 5G/4G networks. Day to day tasks involved were to perform data exploration, data modelling, involving univariate and bivariate analysis along with model evaluation. I was also responsible for leading a team of 15 and oversee the smooth execution of the project.

Ericsson

07/2012 - 06/2015

Junior Engineer

My roles here revolved around the testing of protocols used in 4G VoLTE systems. Worked in optimisation of routing paths and development of lawful interceptions features of media gateways.

## Projects

Incident sequence analysis and predicting potential outages in Network:

Developed a tool in pyspark aimed at analysing and predicting the sequence of Incident events that tend to happen together given a particular time frame. This is a revolutionary idea taken from AIOps concepts, to take preventive steps by foreseeing the happening of an event.

The goal is to develop a Machine Learning module that would forewarn the management systems about a critical event and reduced the MTTR (Mean Time To Resolution)

Data: Traffic logs: Netflow, Logging: syslogs, SNMP traps, event logs. Metrics: SNMP Polling, configuration logs

Algorithms: Sequential Pattern Mining: FP-Growth, PrefixSpan

### Log Analytics: Anomaly Detection

The main idea is to provide a holistic view of the network to the end users and to reduce the number of events and as well as to improve their relevance. The use-case included Anomaly detection, automation of the Incident Resolution tasks, Root Cause Analysis and reduce MTTR.

The execution path anomalies, statistical anomalies, point anomalies were some of the use cases that were implemented.

The mid to less severity events which often go undetected were treated with temporal correlation algorithms like time bucketing, clustering, classification to find the cascading events and track the root cause of the cascade.

Data: Logs from Application, Database, Network and Syslog

Algorithms: Isolation Forest, Decision Tree, Random Forest, PCA, n-gram Language Modelling.

### Auto Insight Discovery:

The goal here is to provide the telecom service providers with insights to augment their view of the networks in the NMS, which enabled them to explore and drove focussed analysis of the reported issues.

Correlating the predictors with the network KPI's resulted in providing the endusers with a reasonable confidence of the root cause of an issue resulted in reducing MTTR.

The manual procedure to prepare the rules by ad-hoc data analysts and domain experts were automated by subjecting multi dimensional tabular KPI data, through mining frequent patterns, mining association rules, optimisation of the rules and insight generation.

Data: Network KPI's, alarms, syslogs, customer ticket data merged with diagnostic data.

Algorithms: Frequency Pattern Mining, Apriori, FPGrowth, Association Rule Mining.

### Customer churn prediction and Insight Discovery:

The telecom service providers seldom face the biggest problem is loosing of the customers. Dropped calls, mobility patterns, variety of demographic data are recorded at various levels of Radio Access, Core network, Backhaul and transport in 4G/5G networks . Data - mining techniques are applied on these data to reduce the customer churn and improve the customer experience.

The tasks involved were to discuss and understand the problem with the stakeholders, to collect and pre-process the data and finally to estimate the model and evaluation.

Data: KPI data from various eNodeB's from LTE Radio Access Network  
Algorithms: Decision Tree, Random Forest, SVM  
Dimensionality Reduction: Linear Discriminant Analysis (LDA)

#### Network analytics framework for next generation fault and performance big data analytics

The idea behind this use case is to obtain Fault correlation and analytics on the KPI's of the ENodeB's in 5G networks.

The goal of the project is to analyse and report the findings on multivariate data obtained from the Network elements. The use cases involved, were to find correlations among the incoming alarms and understand various KPI's of the elements along with suggestions to improvement.

Algorithms: K-Means, K-Medoids.  
Dimensionality Reduction: Principal Component Analysis (PCA)

#### Information retrieval engine for Self-care system in an Intelligent Operations Centre (NMS):

The use-case is an NLP problem, dealing with Information Extraction on the dataset of Jira tickets. The problem dealt specifically to reduce the SLA's in resolving the issues. Basically, a system to analyse the issues and propose the fix to the first level assurance technician. The System held a repository of workarounds, patches, assets which contained the details of fixes provided historically, based on the analysis of symptoms collected. The historical data is used to train the system and to prepare repository.

The problem involved pre-processing of textual data retrieved from Jira's, and building the corpus, after which various transformations were applied to reduce dimensions. Retrieval models were built using the Vector space modelling techniques (VSM). The obtained Similarity measures were used to obtain the retrieve and rank the relevant documents from the corpus

Problem kind: NLP and Information Extraction (Retrieval)  
Language and tools: Gensim, Python, NLTK, Scikit-learn  
Topic Modelling & Algorithms: Latent Semantic Analysis (LSA), Cosine similarity

#### Personal Details:

Nationality: Indian  
Language: English, Kannada and Hindi- Fluent in writing, reading and Listening  
Current residing city: Bangalore, India  
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