

ABSTRACTS

SL.NO	LIST OF PROJECTS	PAGE NO.
1	ANOMALY DETECTION IN AUTOMOBILE COMBUSTION ENGINE	2
2	AIRLINE SPARE PARTS DEFECT PREDICTION WITH AN EARLY WARNING SYSTEM	3
3	CAMPAIGN WATCH: A 360 DEGREE IMPACT MEASUREMENT FOR BRAND INVESTMENTS	4
4	CHURN ANALYSIS OF BROADBAND SUBSCRIBERS FOR A LEADING ISP.	5
5	CRYSTAL BALL - AN ENSEMBLE APPROACH TO FORECASTING & SCENARIO PLANNING	6
6	CALCULATING CUSTOMER LIFETIME VALUE IN THE SME BANKING CONTEXT	7
7	FORECASTING GROWTH OF SELECT SURGICAL SPECIALTIES	8
8	GEOSPATIAL OPTIMISATION FOR MARKETING ACTIVATIONS IN RURAL INDIA	9
9	HOLISTIC PARAMETER BASED APPROACH IN UNDERSTANDING NPA	10
10	IDENTIFYING CLAIMS MANIPULATION OF SECONDARY SALES SCHEMES THROUGH IDENTIFICATION OF PATTERNS IN THE DAILY BILLING BY DISTRIBUTORS IN FMCG SECTOR.	11
11	INTELLISCREEN - AUTOMATED AND INTELLIGENT SCREENING OF CANDIDATES FOR A JOB USING PREDICTIVE ANALYTICS.	12
12	INVENTORY OPTIMIZATION OF SPARE PARTS FOR FRANCHISE BUSINESS MODEL	13
13	OPTIMIZED OPERATION THEATRE SCHEDULING - A CONSTRAINT PROGRAMMING APPROACH	14
14	PREDICTIVE MODEL FOR EMPLOYEE ATTRITION FOR A LEADING TECHNOLOGY SOLUTIONS COMPANY	15
15	PROPENSITY MODELING TO IDENTIFY KEY OUTLETS FOR DISTRIBUTION OF SPIRITS BRAND	16
16	RECOMMENDATION ENGINE FOR RECOMMENDING ARTISTS BASED ON SOCIAL MEDIA PREFERENCES	17
17	REVENUE FORECASTING AND MARKETING BUDGET OPTIMISATION FOR AN AMERICAN MULTINATIONAL STORAGE & DATA MANAGEMENT COMPANY	18
18	SOURCING ANALYTICS: SUPPLIER COST OPTIMIZATION TO ENABLE STRATEGIC DECISIONS.	19
19	SPARE PARTS INVENTORY FORECASTING FOR AN AIRLINE	20
20	WARRANTY CLAIM FORECASTING FOR A TWO-WHEELER MANUFACTURER	21

1) Project Title: Anomaly Detection in Automobile Combustion Engine

Abstract: Inside an automobile combustion engine, an Engine Control Unit (ECU) is used to control a series of actuators viz. fuel injection system, ignition valve timing, air-fuel ratio, etc. The ECU senses data 1000 times every second from multitude of sensors, interprets the data and generates over 100 control signals per second to adjust the engine actuators for optimal engine performance. ECU data has the potential to flag anomalies in actuators. Currently, the ECU data is manually analyzed on demo engines inside test laboratories to flag anomalies before the engine is certified for production. However, this is a time-consuming process that requires high-skilled engineers.

Our project aims to develop a machine learning approach to analyze the data generated from ECU sensors and flag anomalies. Our approach would be to model the large number of data points from the ECU Sensors using Multivariate Gaussian Distribution. We will further utilize this model to detect anomalies and defects in the engine. The Gaussian distribution is the most widely used continuous distribution that provides a useful way to estimate uncertainty in a dynamic and changing system like an automobile combustion engine

By automating the data analysis from ECU sensors, we will reduce the time required to analyze the results of a combustion engine's test cycle. This allows for a consistent high-quality approach for all test cycles that is not dependent on the skill-set of the engineers. In addition, all combustion engines today need to meet the strict emission norms viz.BS-6 and EURO-5. Our project has direct application to ensure that all emission norms are fully met. The future potential of the project is to detect anomalies and monitor emission norms within the combustion engines in real time and outside the testing laboratories.

2) Project Title: Airline Spare Parts Defect Prediction with an Early Warning System

Abstract: The airline is facing major challenges due to unscheduled maintenances of aircraft caused by failure of spare parts which leads to heightened costs and increased operations disruptions. Problem complicates as not all the spare parts used behave in a generic way for all aircrafts and they usually fail due to unknowns.

The project hereby aims at looking for mechanisms that can help the company to preempt the defects and uncover factors currently hidden that would allow the engineering department to maximize the efficiency of a part before it becomes defective as well as minimize factors that lead to a part becoming defective faster. The project intends to uncover relationship of failures of spare parts with factors such as weather, aircraft landing, cycles served, aircraft age, flight route etc.

3) Project title: Campaign Watch- a 360⁰ Impact Measurement for Brand Investments

Abstract: Brands continuously invest in the market to increase their Brand awareness and its consideration among consumers which leads to improvement in the brands performance. Campaign Watch is a platform that provides continuous insights on brands and campaigns. Brands are looking for solutions that can help them optimize investments and Campaign Watch offers them actionable insights during and after the campaign. It also offers correlations between spends and outcome through campaign ratios and benchmarks that allows brand to evaluate campaign performance. This is done by reporting the data on a unified and intuitive dashboard which allows easy data interpretation and insight mining. Currently, reporting is done at a campaign level for each brand. The project aims to identify the norms/benchmarks for relative uplifts on the Brand KPIs basis Media spends. This needs to be analysed both at brand and campaign level as the same brand can have multiple campaigns running at the same time. In addition to this, the project also will aim to correlate results with actual consumption related to the household data. The main approaches we will be considering in understanding the uplift will be time series models and/ or regression techniques and for correlating the household data we will be using regression techniques. This will help understanding the campaign success or decline over period of time and how the brand investment could be optimised in terms of new campaign launches or the duration of a campaign.

4) Project Title: Churn Analysis of Broadband Subscribers for a Leading ISP.

Abstract: The Indian telecom industry is going through a major paradigm shift. With one of the lowest tariffs across the world, the industry crossed the billion connections mark in 2017. Although, both wireless and wired broadband users are increasing very rapidly, the industry is still struggling with a massive cumulative debt of around Rs. 4.6 lakh crore, while revenues have fallen to under Rs. 1.8 lakh crore. There is a constant urge from all ISPs to increase their market share by upgrading their infrastructure and lowering their tariffs to sustain the competitive environment. Currently, they are facing stiff challenges in terms of both operational and capital expenses.

This ISP has made large capital investments on wired internet infrastructure. They have a market share of 55 percent in wired internet segment in the country. In spite of their ubiquitous connectivity, robust infrastructure and huge workforce, they are constantly faced with customer churn issue, resulting in revenue loss and decline of market share. An ISP wishing to retain its subscribers needs to be able to predict which of them may be at-risk of changing services and will make those subscribers the focus of customer retention efforts.

This project aims to develop a data driven predictive model for the ISP that helps identify the causes of churn. The analytical model uses customer browsing patterns (IPDRs), CRM (Customer Relationship Management) data and complaints (grievances) details to deduce potential churn. A three months' time frame will be considered for the developing the model. By using this model, they will be able to identify potential churn customers and reduce churn by taking proactive measures which in turn will help them minimize their revenue losses and also strengthen their market position.

5) Project Title: Crystal Ball - An Ensemble Approach to Forecasting & Scenario Planning

Abstract: As for any insurance company, Renewal income and Persistency are the most critical KPIs that define performance and growth for Max Life insurance as well. As a result, having an accurate outlook into the upcoming financial year is as important as it can get in ensuring goal setting, efficient planning, optimal targeting and marketing strategies, resource allocation among many other initiatives.

However, the current crude mathematical approach limits the ability to achieve highly accurate forecasts and deep dive into granular dimensions, thereby posing multiple challenges to business planning and execution cycle. The complexity associated with highly fluctuating KPIs like Renewal income and persistency requires a cutting-edge solution framework that provides high accuracy. In addition, the ability to forecast at multiple dimensions and conduct scenario planning by evaluating the impact of change in levers on forecasts will enable business to optimize their entire operations.

The solution approach adopts an ensemble approach to iterate through the entire range of predictive models available from simple Naïve forecasting and ETS to advanced algorithms like ARIMA, ARIMAX and NNET. It also provides business the feasibility to forecast at multiple levels as well as change impactful drivers and conduct proactive scenario planning on an easy to use platform. The targeted success criteria is to proactively use the tool to make regular cadence business decisions based on the expected future predictions, course correct and maximize revenue through optimal renewal income and persistency.

6) Project Title: Calculating Customer Lifetime Value in the SME Banking context

Abstract: Customer lifetime value (CLV) can be defined as customer's potential monetary worth through the course of his or her relationship with a business. The aim of this project is to calculate CLV for Small to Medium Enterprises (SME) portfolio for one of the largest banks in the Middle East and use CLV to create a product propensity model to cross-sell banking products & services to the existing customers. With this project, the bank would like to examine how various banking products mesh with each other to encourage cross-sell and build long-term profitability in the SME banking sector. One of the main challenges of analyzing the SME Customers is that businesses can vary significantly from each other in terms of their size, risk appetite, industry, ownership, profitability etc. To deal with this heterogeneity, project team proposes to segment the customers into smaller groups having similar transactional behaviors, financial needs, firmographic attributes and banking preferences. Once customers are segmented, stochastic modeling techniques like Markov chains and Markov decision process will be used to understand how SME customers transition among various customer lifecycle stages. The project also involves building attrition model for SME customers, which is a critical component in estimating the CLV accurately.

Once CLV is in place, the bank is planning to use it as the basis for providing greater unity and co-operation across the business functions by establishing a common base for strategic decision-making. CLV will also be used to enable resource and investment allocation decisions and influence customer experience touch points.

7) Project Title: Forecasting Growth of Select Surgical Specialties

Abstract: Emerging infectious diseases, dynamic demographics of a region, fierce competition, and limited hospital budgets are enough to give hospital administration sleepless nights. It thus becomes imperative for them to have some sight into the future and prepare themselves to address the “need from the customer” and justify spends for procuring new equipment and hiring manpower.

This project aims to develop a forecasting model to predict the growth of surgical specialties by leveraging hospital data and social data of users in the vicinity of the hospital. This model will help the hospital administration plan for upcoming surgical specialties by allocating appropriate budget to upgrade/order surgical equipment and train/hire staff to equip the hospital to deal with this growth efficiently.

8) Project Title: Geospatial Optimization for Marketing Activations in Rural India

Abstract: Optimizing the use of available resources is one of the key challenges in activities that consist of interactions with many “target individuals”, with the goal of “winning” as many of them as possible, such as in marketing campaigns, political campaigns etc. Typically, the cost of interactions is monotonically increasing such that a method for maximizing the performance of these campaigns is required.

Therefore, this project aims to develop a methodology that can be used in route planning, to determine the best routes in the road network using different optimization criteria; incorporating a wide range of information from the road network database into the route planning; plan a strategic route quickly and efficiently. While planning the routes it will be taking care of all the requirements of GroupM

Goal programming will be used to optimize the routes for GroupM campaigns keeping in mind the halt place for the activation executives for the night and then minimizing the cost involved. The coverage/route plan for marketing activations will be displayed on map connecting with google map APIs.

9) Project Title: Holistic Parameter-Based Approach in Understanding NPA

Abstract: Non-performing Assets (NPAs) in the banking sector have increased tremendously in the last decade and have a direct impact on the lending capacity and sustainability of banks. According to Reserve Bank of India, overall gross NPAs reached 9.3% in 2016-17, with retail banking NPAs being around 3%. Since the debt recovery of NPAs is difficult, the best way to prevent NPAs is at the loan origination stage. There are institutions such as CIBIL which provide credit scores to individuals based on their credit history and help banks decide credit worthiness of a customer. However, the reliability of credit scores can be questionable and cannot alone be used to predict loan repayment behaviour. Also, they cannot help to evaluate the customers who do not have a credit history or a credit score.

The project's aim is to analyse various financial and non-financial parameters for a specific banking segment which could predict whether a loan could become an NPA or not. This will include customer profile data, transaction data and loan account data. We will employ various predictive modelling techniques to analyse the NPA data.

The end objective of the project is to develop a model for the client which can be implemented at branch level in different banks to predict NPAs at origination stage of a loan.

10) Project Title: Identifying Claims Manipulation of Secondary Schemes through Identification of Patterns in the daily billing by Distributors in the FMCG sector.

Abstract: In the FMCG sector trade schemes form a significant part of the Sales and Marketing expense. In conventional trade channels the flow of the scheme benefits to the trade is done through the Distributor Management Softwares that the company sets up at the channel partner locations. The DBMS facilitates the sales operations but has limitations when it comes to checking leakages in the schemes operated. These leakages happen when any distributor tries to club multiple sales instances to get benefit of higher slab Quantity purchase schemes or when bills are done only on the dates when Scheme is enabled in the system or when parallel systems are maintained and only the bills carrying schemes are billed on the DBMS. These kind of actions increases the trade spend costs of the companies to the tune of 0.25 % to 0.5% on the overall profitability. Wrong and excess claims can be identified through a rigorous check of the claim documents submitted by the distributors. In the case of our organization due to constraints on the manpower both in quantity and quality the focus tends to shift to clearing the claims rather than a rigorous check on the veracity of the claims. Moreover, since the DBMS is maintained and operated by the company, the claims raised through that are generally considered to be correct. Hence there is a need for an automatic check on the billing done by any distributor on a daily basis to find if the party has done any kind of manipulation. If any model can get this check done, we can automate the claims clearance process leading to significant benefits in manpower as well as investment stuck in claims process.

Basis of behaviour patterns the manipulation is generally done on bills in a cluster like all bills in the same day or many bills operating same schemes repeatedly in a serial order. The pattern identification will be done using Markov Chains in our study by assigning a state to each bill raised by a Distributor subject to set of conditions. One set of the states is identified as being manipulative states and the identification done through the variations in the retention probabilities for the given states. The classification will be done through a comparison of TPMs for each distributor in a given period of time.

11) Project Title: IntelliScreen – Automated and Intelligent screening of candidates for a job using Predictive Analytics.

Abstract: In the face of advances in technology and paradigm shifts in economy, the destiny of an organization is decided by its human capital. As such, talent acquisition is pivotal to secure the future success and competitive advantage of an organization and is a key activity that an organization engages in on a daily basis. Talent acquisition is a multistep process that involves going to the market with a detailed job description, approaching job seekers matching the profile, screening the applicants for their potential to enter the further process, conducting multiple rounds of technical and management interviews that involves a variety of internal staff, and finally selecting or rejecting the applicant. It can be seen that the process of getting the right person for the job is expensive and time consuming. IntelliScreen attempts to alleviate this problem by providing an automated predictive solution that can be used at the “Screening” stage of the recruitment process to classify applicants into potential recruits or not. We plan to create an evolving predictive model from the historical data about applicants and their selection status by applying advanced analytics techniques such as NLP, Markov Analysis and Regression. This model should then take an applicant’s profile as input and output his/her probability of eventually getting selected. The aim of the project is to speed up the process of recruiting the right person and reduce the overall costs involved by cutting down on the number of applicants sent beyond the “Screening” stage of the process.

12) Project Title: Inventory Optimization of Spare Parts for Franchise Business Model.

Abstract: The spare parts retail market in India is highly fragmented, largely unorganized, large supply chain inefficiencies and credit driven. Superior after-sales service is now widely accepted as a key driver of new vehicle sales in a consumer driven world of exploding choices and diminishing brand loyalties. As developing markets mature in terms of vehicle sales cooling down, the spare parts business will increase its strategic importance given the typical high profitability associated (76% higher than vehicle profitability) along with the higher revenue share over the years.

Franchise business model addresses retailers margin, investment, obsolescence, succession with assured, reasonable, minimal obsolescence and opportunity for the next generation. For the Fleet operators concerns on genuineness, inconsistent pricing, vehicle downtime and availability are addressed with assured quality of spares, uniform pricing, minimum downtime and anytime availability. For the Garage owners concerns like the above and technology know how, it addresses with continuous training and up gradation.

The project aims to optimize operational efficiencies by forecasting, optimizing and with better planning strategies by accurate demand modeling, sensing intermittent demand accurately at a granular level. Aims to manage entire SKU portfolio in an automated manner to generate forecast and optimize on monthly basis. Also, to bring down order-to-delivery lead time from franchise to retailer to 1-2 days. Bring down inventory and logistics costs down by 20 % by better management of orders.

13) Project Title: Optimized Operation Theatre Scheduling - A Constraint Programming

Approach

Abstract An operation theatre (OT) is one of the most important divisions of a hospital. As a result, OT scheduling becomes a critical daily operational task. Currently at Columbia Asia Hebbal (CAH), OT scheduling is undertaken manually. It is a time consuming and inefficient process, thereby resulting in a suboptimal usage of the available OTs/resources. Therefore, this project aims to develop a data driven scheduling model that satisfies all the specific rules/constraints which are essential or set by the management of CAH. The objective of CAH is to improve the utilization rate of OTs, after factoring in various constraints like emergency cases, clinical priority, availability of equipment/doctor, surgery difficulty, post-surgery maintenance time etc. The main approaches being considered in OT scheduling will be forecasting department wise surgery demand and mathematical constraint/goal programming models. In the end, the proposed solution will be tested and validated with simulated data, to ensure robustness of the solution. By automating the scheduling process, the aim is to minimize idle time between surgeries i.e. to compact surgery schedule after considering all constraints and to provide optimal surgery/OT/doctor wise schedule for a weekly planning horizon. This will eliminate multiple to and fro that currently happens between doctors and the scheduling team. The ultimate beneficiaries will be the doctors & customers (patients) who will become aware of an optimal plan i.e. exact date, OT & time of surgery, thereby, contributing towards the mission of CAH “To deliver the best clinical outcomes in the most effective, efficient and caring environment”.

14) Project Title: Predictive model for employee attrition for a leading technology solutions company.

Abstract: With the increasingly competitive market for skilled talent, retaining employees is the most dominant challenge for organizations, especially in the information technology industry. As per the industry trends, the average job tenure of employees in an organization has been steadily decreasing. This results in higher costs of finding replacement resources and loss of invaluable knowledge that the employees possess. Employee attrition also leads to financial and productivity loss. Organization's overall business performance is impacted by attrition.

Making an effort to keep top-performing employees satisfied will reduce the considerable expenses associated with high attrition. Therefore, this project aims to develop a data-driven analytical model to predict attrition.

The approach considered consists of using Logistic Regression Analysis to identify significant explanatory variables impacting attrition. Interesting and useful insights about attrition in the organization are found out through bottom up data analysis (Departmental to Organizational level). Various attrition myths that are prevalent in the organization are also checked using different statistical techniques. Descriptive analysis is used to identify trends and existing symptoms. This project also paves way for the usage of various statistical techniques such as Hypothesis Testing, Decision Tree Analysis etc.

The model developed shall help the organization to gauge the signs of flight risk long before an employee starts looking for a new position. Further, it helps the organization in workforce planning and in identifying any trend or symptoms that exist. Thus data driven techniques shall help organization in containing HR-related costs while optimizing business performance as well as employee engagement and satisfaction.

15) Project Title: Propensity Modeling to Identify Key Outlets for Distribution of Spirits Brand

Abstract: For a leading spirits manufacturer, the key problem is to understand which market and store (outlet) is best to push their brands. Until now there was no data driven way to decide on distribution of brands across the stores in various markets. Mostly it used to be based on historical sales and marketing team's understanding of the market. There was a need to come out of this gut feeling based decision making and use some advanced data modeling techniques to make better decision. The outcome will help the business to understand outlets where there is high potential for a particular brand to be sold.

To understand high potential markets and outlets, we will score the outlets (from highest decile to lowest decile) using below:

1. Velocity / Popularity – Volume Per Capita (assigned to proper catchment / trade area)
2. Importance - % of total state volume contribution (current)
3. Relevance / Propensity – Fit with profile of most popular outlets / markets
4. Organic Growth Opportunity – Market Growth
5. Distribution Growth Opportunity

Catchment/trade area is defined as area covering 10 miles radius around an outlet. This is done so as to normalize outlets in terms of coverage area. Profiling will be done using various demographic features like age, income, expenditure, retail demand etc. The data set is huge and there are around 200+ features available; so initial exploratory analysis and PCA needs to be done for dimensionality reduction. Clustering followed by Naive Bayes algorithm or logistic regression will be used for final scoring of the outlets. Current scope covers two states of US and two major brands in tequila and whiskey categories.

16) Project Title: Artist Recommendation System Based on Social Media Persona of The User

Abstract: In the world of music cluttered with exorbitant amount of film music, identifying the right independent artist of users interest/preference is extremely time consuming process. Majority of music platforms available today focus on film and sensational music and do not provide the artists/bands right exposure to target the audience. TVAlly provides the perfect platform for independent artists to connect with music enthusiasts and provides its users personalised music recommendations. Primary objective of this project is to build a recommendation system which uses artist and user information regarding geographic, demographic and social media persona to come up with personalised music recommendation to the users.

With limited knowledge on user Music preferences and music listening history, our primary focus is to develop user-music interests profile using their social media behaviour. Once user-music profiles are established, they are combined with artist attributes to come up with a content-based recommendation system. Model churns out metrics like lift, support and confidence values between users and different artist pages in specific metrics. Models are evaluated on hold out sample based on actual likes and preferences of the users.

17) Project Title: Revenue Forecasting and Marketing Budget Optimisation for An American Multinational Storage and Data Management Company.

Abstract: Forecasting business revenue and optimizing marketing budget is more of an art than science. To build a forecast model requires a significant amount of time and effort in understanding the underlying principle, backend systems, processes and operations. Business planning is a rigorous, yet important process for business owners. It incorporates key focus on long-term goals to be aligned with a defined strategy. Short-term planning is also vital to all businesses, as it usually takes into considerations of dynamic marketing situations. Thus, the ability to perform an accurate revenue forecast is crucial for effective planning.

Revenue forecasting today does not simply rely only on statistical techniques, but also on good judgement and strong intuition of business leaders. However, as the industry continues to evolve, businesses see that a data driven approach is becoming important. Data driven decision making is a way of working, that values the business decisions backed up by verified and analysed data.

Therefore, this project aims on providing a revenue and spend model using machine learning techniques that consumes actual past revenue data of the company's business and forecast revenue for the upcoming year. The proposed model is a Marketing plan that equips the business with recommended direction towards reaching the objective.

This model will help in coming up with the top-line forecast and optimizing marketing budget allocation across various channels in each region. The model will also help the business leaders to identify revenue flow across multiple dimensions and help them to understand potential drivers for their key products.

18) Project Title - Sourcing Analytics: Supplier Cost Optimization to Enable Strategic Decisions

Abstract: One of the key factors for the success of global retail chains has been its commitment of low prices to its customer. In order to keep up with the low price for customers even amidst the online shopping era, retailers rely heavily on the strength of its supply chain. This is achieved by procuring products from various suppliers at lowest possible price without compromising on quality, timely stock deliveries and functionality, thereby ensuring maximum profitability by selling large volumes to its huge customer base.

With growing price wars from other global eCommerce companies like Amazon, eBay etc., the pressure to reduce their price has further increased; as a result, the retailers are looking for innovative ways to negotiate with their suppliers to further optimize the cost.

Currently, for annual contracts and long-term commitments from the vendor, negotiation happens based on experience and intuition. If data driven insights are provided as an aid along with the negotiation skills of the sourcing team, it might result in more profitable means of decision making during vendor selection. The objective of this study is to improve the effectiveness of price negotiation with the supplier through data driven approach.

The analytical approaches, we will be using are - data mining to identify factors that influence cost, prescriptive analytics to distribute demand across various suppliers to optimize cost, and to explore various bilateral negotiation models used in supply chain, that could provide practical implications to price negotiations with the supplier.

Well conducted negotiations are critical for retail chains who strive to offer a low-cost proposition. Having comprehensive and reliable data analytics, enables informed & improved decision to empower the negotiation process that can be critical to increase the margin.

19) Project Title: Spare Parts Inventory Forecasting for An Airline.

Abstract: For an airline, it is extremely important to ensure that aircrafts are in good flying condition. Any disruption on account of bad condition of the aircraft can lead to delay or cancellation of the flights resulting in customer dissatisfaction and loss of revenue. To ensure good condition of the aircraft it is important to have right quantity of spare parts in inventory. Low levels of spare parts in inventory can impact the flight worthiness of the aircraft and in extreme condition lead to on the ground aircraft. Excess level of inventory of the spare parts leads increased warehouse costs.

The objective of this project is to forecast the quantity of spare parts required by SpiceJet. This forecast should not only cater to the needs of the current fleet but also to the increase in fleet size over next few years. Large number of components in an aircraft and sporadic nature of the requirement of the requirements makes it difficult to forecast the demand.

As part of this project SpiceJet, we intend to use FSN categorization for grouping of spare parts into three categories – fast moving, slow moving and non-moving parts. Different techniques will be utilized to forecast demand for each category of spare parts. Spare parts demand has many zeros which makes conventional forecasting methods less effective. Techniques that we plan to apply for forecasting would include but limited to Moving average forecast, Exponential smoothing forecast, Croston's forecasting method. Based upon the accuracy of the forecast from these techniques, more approaches would be evaluated.

20) Project Title: Warranty Claim Forecasting for A Two-Wheeler Manufacturer

Abstract: Expenses incurred due to customer warranty claims run into a significant sum of money every year for TVS Motors. The company has been witnessing rapid growth in the volume of claims on a year on-year basis even after accounting for a corresponding increase in its vehicle sales. At present, the forecasting of warranty claims is performed by the company with mostly prior experience & managerial intuition as inputs. This non-data driven approach has led to an insufficient understanding of the underlying factors driving the growth of warranty claims. The company is unable to quantify the effects of seasonal variations, business cycles and other factors on the upward movement of claims. The role played by the network of dealers, who are a crucial cog in the warranty claim process, is also not discerned in its entirety by the business. The project will employ various methodologies in the discipline of predictive analytics to unravel potential answers to these problems. The specific focus of the study will be on the usability of forecasting methods & tools to help the company predict the warranty claim amount at various time (daily/weekly/monthly) & business function (product family, engineering plant, zonal) aggregations, thereby enabling the business to plan & budget well ahead of events of interest. These tools will be deployed to gather the seasonal & business cycle effects on warranty claim variations. General statistical methods will be utilized to detect any patterns which trigger the occurrence of repeat claims among a large number of vehicles. The study also attempts to uncover the possibility of dealer deficiencies contributing to a spurt in warranty claims: Supply Chain inefficiencies, Ineffectiveness of technicians or an extreme rare case of dealer malpractice.