# Velu, CHINNASAMY SHANMUGAM

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## SUMMARY:


- Overall 19+ years of experience in data science, machine learning, and advanced analytics. Focused on applying data-driven analytics to challenging business problems and proven ability to translate high-level objectives into practical analysis and deliver actionable recommendations. Record of managing complex projects and creating solutions that work. Self-directed innovator searching for challenges.
- Delivering AI ML-based solutions for various domains and problems such as Customer Segmentation & Targeting, Propensity Modelling, Churn Modelling, Lifetime Value Estimation, Forecasting, Recommender Systems, Modelling Response to Incentives, Marketing Mix Optimization, and Price Optimization
- Applying probability theory, statistics, simulation, and stochastic modeling methodologies to model uncertainty in operational systems and using mathematical models to make robust business decisions and test proposed solutions.
- Built propensity models using advanced machine learning algorithms and profile analysis using Internal myQ App and External Acxiom attributes to predict customers more likely to connect Amazon Key. Improved Key conversion rate by **2.1 to 2.7X** using social media and email campaigns. Also, it reduced Customer Acquisition Costs by half
- Built a Propensity model using machine learning algorithms to identify the customer who is more likely to Upgrade myQ Free Trial to Paid Video Subscriptions. It helped +106% higher conversion rate when compared to High vs. Low propensity groups, and targeting the right audience helps to increase the open and click rate from 17.2% to 34.8%
- Migrations ML model helped identify high propensity-scored DirecTV customers with a 55% higher migration rate than medium propensity and 174% **higher rate** than low propensity. Also, the treatment rates have increased by over 200 BPS post-launch for high-propensity, the high-propensity group has a higher treatment rate showing the offer acceptance for this group
- Developing multiple Machine Learning (ML) models (using Random Forest Regressor, Facebook Prophet, and Regression-based ARIMA) to predict future Voluntary Churn and Sales volumes and identify the most important Macro indices impacting the business, predicting accuracy of **95%** and above a crucial component of managing business targets
- Developed predictive models to identify the most significant behavioral patterns that lead to sling/dish customers churn and the model helped to retain customers by 26%
- Built response models to predict the probability of a customer returning the set-top boxes
- Developed time series forecasting models using Advanced machine learning algorithms(Prophet, LSTM) & provided strategic analysis for the business demands and supply, in which the model predicted actual demand with 93% accuracy
- Built Market Mix Model (MMM) to identify sales drivers in price, promotions, distributions, and media spending such as TV, Print, Radio, and online. Also, defined effectiveness (volume generated by each unit of effort), Return on investment, and optimal marketing spend to maximize sales and/or profit
- Proven leader with outstanding relationship-building skills and strong communication abilities

# ADVANCED DEGREE:

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|---|---|---|---|---|
| Annamalai University | **Master of Philosophy(M.Phil)** | **Statistics** | India | 2010 |
| Bharathiar University | **Master of Science (M S)** | **Statistics with Computer Applications** | India | 2004 |
| University of Madras | **Bachelor of Science (B S)** | **Computer Science** | India | 2002 |

# TECHNICAL SKILLS:

**Analytics:** R, Python, PySpark, SparkR, R on Hadoop, H2O on Hadoop from R, Tableau, Power BI, QlikView, Minitab, SPSS Modeler, SAS EG/Forecasting, Base SAS Certified, XLSTAT

**Computer Science/Database:** Azure Databricks, AWS, Snowflake, Salesforce Core & Marketing Cloud, Google Cloud Platform (GCP), Hadoop, Hive, Impala, Oozie workflow, Autosys, Teradata, Netezza

**Utilizing techniques** such as Random Forest, Facebook Prophet, Gradient Boosted Models (GBM), Logistic regression, Multiple regression, Decision tree modeling (CHAID and CART), SVM, Neural Networks, Deep learning, CHAID, Principal Component Analysis, Factor Analysis, K-mean clustering, Discriminant analysis, Piece-wise Regression, ARIMA, SARIMA, Holt's methods, and Visualization

# WORK EXPERIENCE:

**DIRECTV** **Dallas, TX** **Apr'2022 – Till Date**

**Designation:** Principal, Marketing Advanced Analytics

**Type of Projects: ML** Propensity Models, Propensity to Migrate, Propensity to Reconnects, Propensity to Contact, Propensity to Upgrade, Campaign Performance and Churn Benefits Analysis, Churn Attribution/Analytics, App Adoption Analysis, Customer Churn Insights, DirecTV Headlines Insights

- Developing multiple Machine Learning (ML) models (using Random Forest Regressor, Facebook Prophet, and Regression-based ARIMA) to predict future Voluntary Churn and Sales volumes and also identified the important Macro indices that contribute to the DTV & IPTV Vol churn rates, GA(Sales), and Commercial (Vol & Invol) churn rate
- The Forecast models made a huge impact on business planning and budgeting, predicting accuracy of 95% and above is a crucial component of managing business targets at the company level. The new forecast tool is helping to drive business planning and is part of Week & Monthly headlines reporting.
- Built end-to-end statistical ML predictive models to identify the DTV customers who are more likely to migrate to Stream/IPTV service and also reduce the churn rate from migrations. The high propensity-scored customers have a 55% higher migration rate than medium propensity and 174% **higher rate** than low propensity. Also, The treatment rates have increased by over 200 BPS post-launch for high-propensity, the high-propensity group has a higher treatment rate showing the offer acceptance for this group. The overall model predicted accuracy is **85.2% and 73%** of the migration from the top deciles)

- Analyzing DTV App adoptions and built Data Science models for existing/new users to estimate the monthly Incremental churn benefits from the DTV Everywhere App users.
- Preparing Weekly/Monthly Headline churn impacts and insights for the executives
- **Key priorities for 2023:** Designing, developing, and deploying advanced analytics solutions, including predictive and prescriptive outputs, analytical tools, and visualization capabilities, to enable business users to make appropriate data-driven decisions. Developing a deep understanding of internal and external data and leveraging it for the development of innovative solutions.
    - Collaborating with stakeholders and Advanced Analytics business partners to identify and define advanced analytics solutions for business needs to reach company-level goals.
    - Developing brand new **Customer Sentiment Analysis** using Advanced Data Science methodology to identify areas for improvement in our products and services to improve sales, reduce churn, and increase customer satisfaction
    - Defines actions to scale the impact of churn insights at DTV, including using innovative methodologies and translating analytic results into actions that change the way the business executes. Working with business and helping them to learn how the Data-Informed Decision-Making Process and Go-To-Market Strategies helps our company to reach its goals

**Chamberlain Group** **Oak Brook, IL** **Jul' 2019 – Apr'2022**
**Designation:** Senior Applied Data Scientist
**Type of Projects:** Marketing Analytics, Profile Analysis, Propensity Model to Purchase Products/Connect Devices, Sales Forecasting at the Product Category level, Price Optimization, Marketing Campaign Analysis, Customer Experience Analytics, Customer Survey Analysis, Customer Churn Predictive Analysis

- Built multiple propensity models using advanced machine learning algorithms and profile analysis using Internal myQ App and External Acxiom attributes to predict customers more likely to connect Amazon Key. Improved Key conversion rate **by 2.1 to 2.7X** using social media and email campaigns. Also, it reduced Customer Acquisition Costs by 50%
- Built campaign-level model to predict the customer-level adoption of using the myQ app. It helped to test with multiple **Campaigns:** Holiday Campaigns, Paid Social live for Delivery (Mar'21), Holdout sample Validation (Aril'21), and Prime Day. **+106%** higher conversion rate when compared to High vs. Low propensity groups, and targeting the right audience helps to increase the open and click rate from **17.2% to 34.8%**
- Used Advanced ML algorithms to build the propensity model to identify the customer who is more likely to buy the Smart Garage Camera (neural networks and deep learning). Increased overall model accuracy from **66% to 81%**
- Model testing and results:
    - **Campaigns tested:** Labor Day, Prime Day'21, 2021 Dec Holiday Campaigns
    - **Outcome: 1.** High & Medium groups purchased at 2.7x higher conversion rate than Low group**. 2.** In LM.com, High & Medium purchased 2.6x higher conversion rate**. 3.** Targeting High & Med propensity groups reduced Customer Acquisition Costs by over 40%

- Worked on building multiple propensity models using advanced machine learning algorithms to identify the customers who are more likely to purchase new products/connect devices and recommend the right products at the individual customer level (Created propensity scores segmentations and recommended to target High & Medium groups)
- Customized our marketing strategy based on customer attributes (Internal and External)
- Analyzing and building customer behavior Model
- Developed forecast models (using Facebook Prophet, ARIMA, etc.) to forecast Residential product sales, commercial products, and orders level to help better business planning and demands supply
- To Gain insight into user churn trends for the myQ users and leverage the data to develop marketing messaging that will help prevent myQ app churn in the future
- Created new data requirement intake documents based on business problems and worked with the Data Engineering team to identify the relevant data from multiple sources

**Sears Holdings Corporation** **Miami, FL** **Sep' 2017 – July'2019**
**Designation:** Senior Data Scientist
**Type of Projects: 5321-Credit Card Spending Analysis, Customer Engagement Analysis, Forecasting by Sales**

- Understanding business context and strategic plans and developing a data-driven business plan to support the attainment of business goals
- Developed propensity models using advanced machine learning algorithms to identify the 5321 members likelihood of spending in each category level (Gas, Grocery, and Dining)
- Used Google Cloud Platform to develop propensity scoring models to help identifying the right members at the right time and increased the credit card spend earn rate from 1.5% to 3.6% ($1.3 to $2.6 million) per month
- Developed a predictive model to identify the members who are more likely to stop using the SYW card, and also it helped to increase the retention rate by 11%
- Developed time series forecasting models (ARIMA, Facebook Prophet, etc.) & provided strategic analysis for the business demands and supply by store/product level

**Wipro Technologies** **Denver, CO** **Oct' 2014 – Sep'2017**
**Client: DISH Network**
**Designation:** Lead Data Scientist
**Type of Projects:** Customer Churn Model (both Dish/Sling TV), Propensity to Pay Collections, Issuing Smarter Call Tags, SHS propensity to Buy cross-sell Products & Product recommendations, Text Mining, SlingTV subscription level Projections, and Customer Segmentation

- Built predictive models from start-to-finish (i.e., extract data, manipulate data, Data Profiling, develop and validate model) and then deployed the model on real data and tracked model performance/model accuracy
- Scheduled scoring model using big data platforms like Hadoop with R-Streaming, R on H2O, Autosys & Oozie jobs
- Identify the most significant behavioral patterns that lead to customer churn and build an attrition model to understand the probability of a subscriber staying or attrite after subscribing to DISH/SlingTV viewership

- Helped my client (Dish Network) to save the cost of $2-2.5 Million annually:
    - Built and delivered the response models to predict the probabilities of a customer returning set-top boxes
- Helped my client to do collections in fewer than 20 days rather than 180 days:
    - Built Propensity to Pay Model for Billing and Credit teams towards STB collections. Enabled Agency prioritization by account categories (Easy, Medium, Hard), immediate additional collections of **$150K** per month using the identified hard to collect accounts in the primary tier, and reduced agency commission from 30% to 8%

**Wipro Technologies** **Bangalore, India** **Mar' 2008 – Oct'2014**
**Client:** Workforce Management, HR, Talent Transformation, and MQ
**Designation:** Data Scientist/Senior Consultant
**Type of Projects:** Demand Forecasting, Employee Attrition, Revenue Growth Forecast, Demand Cancellation propensity, Quality & Learning Analytics, and Reporting

- Developed time series forecasting model(ARIMA) & provided strategic analysis for the business demands and supply, in which the model predicted actual demand with 93% accuracy
- Created Exploratory Data Analysis to identify trends, seasonality, outliers, etc.
- Managed team processes and deliverables for Ramp-up and Ramp down demand forecasts
- Responsible for providing reports, analysis, and insightful recommendations to business leaders on key performance metrics about employee performance
- Built predictive models to identify the most significant behavioral patterns that lead to employee churn
- Created Propensity model to identify the most influential attributes contributing to the Indent/Demand Cancellation

**Meritus Analytics** **Bangalore, India** **Oct'2007 – Mar'2008**
**Client:** Unilever (UL), ATG-India (Consumer Product), Volvo (Car)-Japan
**Designation:** Statistical Analyst
**Type of Projects:** Market Mix Modeling, Marketing, and Advertising

- Responsible for creating Exploratory Data Analysis (EDA) to identify trends, seasonality, and outliers
- Modeling the influence of individual factors like carryover after air date (adstock), media lag effects
- Defined effectiveness (volume generated by each unit of effort), Return on investment, and optimal marketing spend to maximize sales and/or profit
- Identified the Marketing drivers such as Price, Promotions, Distribution, Amount spent on different forms of media (TV, Radio, Press, Outdoor, etc.) that influence in enhancing or declining sales or awareness of brand/category through Predictive Modeling and Forecasted future sales using SAS, E-view software
- To recommend the future spending levels on each Marketing input based on the objective of maximizing returns within the available marketing Budget

- Provided ROI for each advertising and promotional campaign, including halo effects on related brands

**Dove Fine Chemicals (P) Ltd** **Bangalore, India** **Jul'2005 – Sep'2007**
**Designation:** Asst. Manager - Sales
**Type of Projects:** Marketing Sales, Reporting, Chemicals Manufacturing & Marketing

- Managing and leading the marketing team.
- Coordinated with the sales team to analyze monthly, quarterly, and annual production & sales reports to Manager
- Managed day-to-day activities with the sales team
- Motivating employees to give their best to the organization
- Report to the general manager regarding all the developments & marketing activities

**External Certifications & Training:**

- Certified **SAS Base** Programming for SAS 9 with **86%** score from SAS Institute
- Multiple linear Regression(**MLR**), Logistic Regression(**LR**) and Survival Analysis(**SA**)– at **CMC(Christian Medical College), Vellore, India**
- **SAS 9.1.3** Software Training Program – at **CMC (Christian Medical College), India**
- **Completed certified courses Base SAS, R-Programming & Adv. Analytics from Analytics Training Institute (ATI), Bangalore, India**

# Award:

**DIRECTV:**

1. **Q2 - 2022 DIRECTV Elite Best Performer Award** for implementing advanced modeling skills to help identify customers who are more likely to migrate Stream to Satellite and significantly reduced churn rate. Also, built V1 Macro Indices Vol churn model that is being leveraged to measure and attribute Macroeconomic impacts to Voluntary Churn Performance. The model was built at the right time to quantify the Macro Economic environment pressure on the business and was very well planned for future business pressure.

2. **Q1 – 2023 DIRECTV Best Performer Connection Award** for developing Prophet forecast model and framework for ongoing expectation setting of weekly/monthly/quarterly performance.

3. **Q2 – 2023 DIRECTV Best Performer Connection Award** for designing and measuring the Afiniti 50/50 call routing Impacts/Benefits. I was also instrumental in digging into the underlying data deltas that are impacting invoicing and tracking the benefits that Afiniti provides on customer churning.

4. **Q3 – 2023 DIRECTV Best Performer Connection Award** for measurement for two strategic initiatives – adopting DIRECTV Everywhere on various devices and assessing GEMINI acquisition benefits and a proactive campaign for high-risk NFLST subscribers and working cross-functionally to ensure data quality and generate findings.

5. **Q1 – 2024 DIRECTV Extraordinary Award** for developing and deployed several ML models for predicting the likelihood of customers reconnecting from Satellite service, another model to identify customers likely to migrate to streaming services. These models are used in various Win back and retention campaigns, with monthly updates and detailed reporting to optimize campaign effectiveness.

**DISHNETWORK:**

**Q2 – 2016 Best Transformer award** for contributing the "Best Insights" in the SlingTV churn "10 things" data exploration challenge.

**WIPRO TECHNOLOGY:**

**2016 – Wipro Best Performer doing Above and beyond** for technical excellence and hard work in the Data Science (Machine Learning) area and solving complex business problems in Dish network (Client).

## LinkedIn Article Published: The Combination of Algorithms for Variable Reduction Using R

**Link -** https://www.linkedin.com/pulse/combination-algorithms-variable-reduction-using-r-velu-shanmugam/?trackingId=wnBXBNl1Q%2B%2B7ndHqNc0ftg%3D%3D

## International Articles Publications:

1. **Velu Chinnasamy Shanmugam**., Swarnalakshmi R, Pradeepaveerakumari Kumarasamy, Vijayalakshmi C, "*Use of advanced Machine Learning Algorithms to identify and explore the development of Fetal Health based on Cardiotocograpghy Data*" Journal for Basic Sciences, 23(12), 91-103 (2023)

   Link: https://fzgxjckxxb.com/volume-23-issue-12-2023/

2. **Velu Chinnasamy Shanmugam**, Kannadasan Karuppaiah, Vinoth Raman Assessment of Common Risk Factors of Non-Communicable Diseases Using Semi Markov Model, International Journal of Medical Science Research and Practice Vol.10, Issue.3, pp.01-05, (2023) E-ISSN: 2349-3186 P-ISSN: 2349-3178

   Links:https://www.isroset.org/pdf_paper_view.php?paper_id=3274&1-ISROSET-IJMSRP-08872.pdf

3. **Velu Chinnasamy Shanmugam**., Swarnalakshmi R, Pradeepaveerakumari Kumarasamy, Vijayalakshmi C, "*An Exhaustive Empirical Statistical Analysis And Interpretation of Bitcoin Data"* Advances and Applications in Statistics, Pushpa Publishing House, Volume 91, Number 4, 2024, Pages 421-437, P-ISSN: 0972-3617
   Links:https://pphmjopenaccess.com/index.php/aas/article/view/1185

4. **Velu Chinnasamy Shanmugam**, Kannadasan Karuppaiah, Vinoth Raman, "*Understanding The Kaplan-Meier Estimate For Breast Cancer – A Retrospective Study*" Global Scientific and Academic Research Journal of Multidisciplinary Studies
   Vol – 2 Issue – 7 PP: - 09-13 (2023), ISSN: 2583-4088
   Link:https://gsarpublishers.com/wp-content/uploads/2023/07/GSARJMS692023-Gelary-script.pdf

5. Vijayalakshmi C **,** Subramani R, Pradeepaveerakumari Kumarasamy , **Velu Chinnasamy Shanmugam** *"An Extended Kalman Filter (EKF) Approach for Position Estimation of Autonomous Vehicles"* **Submitted for Publication**

6. **Velu Chinnasamy Shanmugam**, C.Vijayalakshmi, M.Mynarani, K.Pradeepa Veerakumari, *"A Study Untilizing Advanced Machine Learning Techniques to Analyze Gestational Diabetes Mellitus And Its Implementations"* **Submitted for Publication**
7. *"Emotion Extraction of Autism children through Art using Deep Learning Techniques "*– In-Progress
8. *"Advanced Machine Learning in Big Data for the Prediction of Customer Attrition in the Telecommunication Industry" – **Track name:** Artificial Intelligence, Data Science & Computing:* **In-Progress**

# International Conference:

**Conference-1:** An Extended Kalman Filter (EKF) Approach for Position Estimation of Autonomous Vehicles. Science and Engineering Research Board (SERB), International Conference on Artificial Intelligence of Things for Sustainability (AIoT4S-2024), 20th – 21st January 2024

**Conference-2:** Ninth International Conference on "Statistics for Twenty-first Century-2023" (ICSTC-2023) organized by the International Statistics Fraternity(ISF), Department of Statistics and School of Physical and Mathematical Sciences, University of Kerala, Trivandrum during 15 - 18 December, 2023 and delivered an Invited talk on "Advanced Machine Learning in Big Data for the Prediction of Customer Attrition in the Telecommunication Industry".

**Conference-3:** International Conference on Recent Trends in Mathematics, Statistics, and Engineering organized by School of Technology Management and Engineering SVKM's NMIMS (Deemed-to-be University), Indore, Madhya Pradesh, India on December 22 - 23, 2023, Presented a paper titled "A Critical Analysis of Exploration and Classification of Fetal Health Development Based on Cardiotocography Data Using Machine Learning Techniques" with Paper ID 059 in the ICRTMSE 2023

**Conference-4:** International Conference on Recent Trends in Mathematics, Statistics, and Engineering organized by School of Technology Management and Engineering SVKM's NMIMS (Deemed-to-be University), Indore, Madhya Pradesh, India on December 22 - 23, 2023, Presented a paper titled " A Comprehensive Statistical Insight and Analysis of Bitcoin Data" with Paper ID 060 in the ICRTMSE 2023

**Conference-5:** Ninth International Conference on "Statistics for Twenty-first Century-2023" (ICSTC-2023) organized by the International Statistics Fraternity(ISF), Department of Statistics and School of Physical and Mathematical Sciences, University of Kerala, Trivandrum during 15 - 18 December, 2023 and delivered an Invited talk on "Advanced Machine Learning Techniques Take Sales Forecasts to the Next Level".