

## SATYA PRAKASH BISWAL

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### Machine Learning | Data Science | Quantitative Research | Applied Math | Quant Finance

Skilled data scientist and machine learning engineering leader with extensive ML research and development experience. 8+ years of experience in building predictive models, developing business intelligence, and quantitative research. Achievements include developing industry's first personalized bot recommendation systems, improving Click-Through Rate model architecture and introducing new features that resulted in 7% ads revenue gain, implementing an adaptive paywall that resulted in \$1M annualized revenue gain, feature engineering that enhanced profitable trading signals, and developing a model to predict contributor performance with 20% more accuracy. Highly proficient in recommendation systems, machine learning, deep learning, NLP, statistics, time-series analysis, data visualization, programming, scalable system design, creative thinking and leading risky and greenfield projects.

#### SkillSet:

**Programming :** *Proficient: Python* *Familiarity:* R, Java, C++

**Libraries :** NumPy, SciPy, sk-learn, Tensorflow, PyTorch, Keras

**Areas :** Recommender Systems, Deep Learning, LLMs, NLP, Algorithms, Data Structures, System Design

**BigData/Tools :** Kafka, Spark, Docker, Kubernetes, Airflow, AWS, git, SQL, NoSQL

#### EXPERIENCE

Quora, Chicago

06/21/2021 – present

Engineering Manager/ Tech Lead, Ads Machine Learning Group

- **Tech Lead Ads Targeting:** Leading a team of 4 engineers on improving a range of targeting side components such as auto-bidding, auto-targeting, speed improvement, two-tower models, and brand safety etc.
- **POE Personalized Bot Ranking:** Developed one of the industry's first personalized large language model (LLM) bots recommendation systems from scratch based on semantic similarity score and context aware collaborative filtering using historical interaction data between users and LLM bots. This led to bot discovery and growth of the bot developer eco systems as well as improved user experience during bot interaction
- **Click-Through Rate (CTR) model Improvements:** Led several high-impact projects to bring CTR model architecture to industry standard, resulting in 7% (\$5M) in ads revenue gain and 10% model speed improvement
  - Implemented linear transformer module to consume sequential user activities in linear time
  - Implemented Deep and Cross network and Mixture of Experts (MMoE) layers to consume higher order sparse feature crosses effectively. Implemented Progressive Layered Extraction(PLE) architecture to tune model based on different placement types of the ads
  - Streamlined the continuous training pipeline that reduced the training time and resulted in AWS cost savings. It also helped reduce dev time in iterating on newer ML models
  - Worked extensively on feature engineering to introduce new features from feed and question page to better contextualize ads and add more signals to the model.
- **Adaptive Paywall for Subscription:** Implemented an adaptive paywall model using a GBDT(Gradient Boosting Decision Tree), that selectively shows the paywall to users with high probability of converting. This project led to a revenue gain of \$1M annualized. Also explored a bunch of causal ML approaches in this project to improve lift.
- **Stakeholder Management:** As a liaison between product and data science team, provided product leadership to our team by specifying requirements to the data science team as well as managing deliveries to the product team.
- **Collaboration:** Cross-collaborated with other ML teams to share our learnings and gain from their experience in similar projects. Worked closely with the ML Platform team to build a common feature store for easy sharing of features across ML teams. This also led to tensorboard integration, ML Flow, grafana dashboards, feature importance, and easy debuggability of ML models.
- **Mentoring:** Mentored an intern and 4 junior developers by designing high-level architectures for their projects and tracking their progress

CITADEL AMERICAS LLC Chicago

03/10/2016 – 02/10/2021

Quantitative Research Engineer, Data Science group

- **Sentiment Analysis on Financial Data:** Improved the accuracy of ticker tagging methodology from 30% to 60% using NLP (spaCy and Named Entity Recognition), word2vec, and TF-IDF methods on textual data sets such as Broker reports and company filings. Created and used BERT based embeddings on financial datasets and a neural network model for downstream sentiment analysis and NER tasks
- **ML Pipeline:** Built an end-to-end ML pipeline of the sentiment analysis project above and deployed the model on AWS using docker and kubernetes for scalability. As part of the pipeline built a real-time latency sensitive data pipeline that consumes and analyzes financial data sets and company filings using Kafka and indexes them on Elastic search with a Kibana frontend

- **Predictive Modeling:** Developed many broker specific features and designed machine learning models such as Generalized Linear Models, Random Forest and XGBoost to identify statistically significant traits predictive of the future performance of brokers and thus aiding in building a skill score model used in trading signal research
- **Feature Engineering:** Researched and generated multiple alpha factors(features) predictive of stock returns. Then applied various machine learning techniques and metrics to evaluate the performance of alpha factors and pick the best ones for the portfolio. Created a portfolio to track business metrics by optimizing weights of stocks with constraints such as risk models, leverage, market neutrality and limits on factor exposures
- **Metrics Dashboard:** Developed a dashboard in NodeJS that shows PNL and risk attributions to MSCI Barra equity risk factors and idiosyncratic components in real time
- **Data Analysis:** Analyzed a huge healthcare vendor data set using Spark to develop a model to predict KPIs for pharma and insurance companies leading to the discovery of major inadequacies in the data set and thus saved fees paid by canceling the subscription

SANDPOINTE LLC (Hedge Fund) West Palm Beach, FL

05/15/2015 – 08/15/2015

Quantitative Research Analyst Intern, Quantitative Strategies Team

- **Statistical Arbitrage:** Read and implemented various ideas in research papers to create a trading strategy to identify stock pairs using co-integration approach, and applied machine learning methods to optimize hyper-parameters for back-testing and dynamically relearn parameters based on new data

ACCELETRADE TECHNOLOGIES Bangalore, India

04/07/2012 – 06/30/2014

Quantitative Developer Lead/Manager, Proprietary Trading

- **Algorithmic Trading:** Developed an algorithmic trading engine for MCX Indian capable of processing billions of Tick by Tick and Multicast market data, and having one of the lowest latencies in India, and implemented various quantitative strategies, aiding the company's foray into a different market, and increasing revenue by 10%
- **Team Development:** Built a team from scratch and led the team of 5 developers

CUSTOMERXPS SOFTWARE LTD Bangalore, India

12/09/2010 – 04/06/2012

Technical Lead, Business Analysis and Solutions Team

- **Real-Time Fraud Detection:** Developed a classification model to detect fraudulent banking transactions in real-time. Used random forest, boosting and other ensemble methods to improve accuracy. Also did simulations to create training data sets using Monte Carlo simulations
- **Product Recommendations:** Built a banking product recommender system that recommends banking products based on previous transaction and user context. Used both memory-based (cosine similarity) and model-based collaborative filtering systems to improve accuracy
- **Leadership:** Led a team of ten developers, mentoring and reviewing their work on a range of critical projects
- **Client Management:** Worked with clients to understand their requirements and customize the product based on their needs, leading to sales of the product to 4 leading banks; spearheaded and implemented an onsite "Proof of Concept" project for an international bank within a span of just 2 weeks, well ahead of 1-month schedule

CYBRILLA TECHNOLOGIES Bangalore, India

03/15/2010 – 12/03/2010

Co-Founder, Head of Engineering

- **Entrepreneurship:** Co-founded a travel related start-up; conceptualized and created a web 2.0 product "bizkaro", a platform to be used by agents to showcase their services and improve customer conversion, from scratch using Spring and Hibernate frameworks

ONMOBILE GLOBAL LTD Bangalore, India

07/02/2007 – 03/12/2010

Senior Software Developer, Unified Messaging Platform (UMP)

- **Messaging Platform:** Developed a messaging platform in JAVA using Spring and Hibernate framework which sends thousands of multimedia messages to a 5 Million subscriber base daily. Developed an analytics framework and dashboard from scratch to track and improve end-user engagement

## EDUCATION

**THE UNIVERSITY OF CHICAGO BOOTH SCHOOL OF BUSINESS** Chicago, IL 01/01/2020 - 12/31/2023

Evening MBA Program in Business Analytics, Econometrics and Statistics

- Received the [2nd prize in New Venture Challenge](#) worth an investment of \$345K
- One of the highest scholarship recipients
- Co-chair of the chess club

**CARNEGIE MELLON UNIVERSITY** Pittsburgh, PA

07/28/2014 - 12/23/2015

Master of Science in Computational Finance

Coursework: Statistics, Probability, Machine Learning, Simulations, Time Series, Optimization, Linear Algebra

**NATIONAL INSTITUTE OF TECHNOLOGY (NIT), ROURKELA** Odisha, India

07/15/2003 – 04/30/2007

Bachelor of Technology in Mechanical Engineering

- Honors: Winner of programming, windows troubleshooting and Artificial Intelligence writing contests in college
- Leadership: Led the Institute Chess Team for national level chess competitions

## ADDITIONAL INFORMATION

- Awarded the “FAST-TRACKER” award: recognized by board of directors for excellent contribution in a short time span; Also was awarded “BEST-INNOVATOR” for ideating two new products at CustomerXPS

**Certifications:** Passed CFA Level 2, FRM, NISM Currency Derivative, 10+ Udacity and Coursera certifications

- A state level chess and badminton player – received top prizes at national level competitions

## RESEARCH, PUBLICATIONS AND MOOCS

**Papers:**

- “BertOdia: BERT Pre-training For Low Resource Odia Language” Submitted to **ICON 2020: 17th International Conference on Natural Language Processing**
- “[ODIANLP's Participation in WAT2020](#)” published at **AACL-IJCNLP 2020**

**[WAT 2020 Participation:](#)** Our submission topped in English-Hindi Multimodal tasks and Odia-English translation tasks. Our submissions performed well in the Indic Multilingual tasks as well. We used the state-of-the-art transformer model for the translation tasks and InceptionResNetV2 for the Hindi Image Captioning task.

**MOOCs:** 10+ MOOC certifications and 20+ projects from Udacity and Coursera hosted on [github.com/satyapb2002](https://github.com/satyapb2002)