**Naveenkumar I T.**

Data Science, Artificial Intelligence, Data engineering

Generative AI, MLOPs, NLP, Deep learning, Cloud, Agentic AI

HCLTech, Bangalore.

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**Summary:**

**An enthusiastic AI/ML professional passionate** about exploring innovative and challenging scenarios across different areas of Data Science/Engineering, Cloud, Analytics, & DevOps. Proven ability to architect and deploy scalable AI systems across edge, on-prem, and cloud environments by integrating third-party data sources, sensor data, and vision data to enable predictive, prescriptive, and autonomous operations.

**Platforms & Cloud Technologies**: AWS, Microsoft Azure, Google Cloud Platform (GCP), Databricks, Watson Studio, Watson Discovery, Watson Assistant, Watsonx.ai, Amazon Bedrock, Amazon Nova, Lambda, Docker, Kubernetes. Languages & Frameworks: Python, Java, Spring Boot.  
AI/ML Tools & Libraries: Scikit-learn, TensorFlow, PyTorch, Keras, NumPy, SciPy, Pandas, Hugging Face Transformers, spaCy, NLTK, CV, Object Detection, Deep Learning, Neural Networks (ANN, CNN, RNN, LSTM, Transformers, VAE), BERT, T5, XLNet, GPT-Neo, GPT-J, GPT-NeoX (EleutherAI), PaLM, Gemini Ultra. Advanced AI Concepts: Large Language Models (LLMs), LangChain, Agentic AI, AI Agents, Prompt Engineering, MLOps, GenAI (e.g., Deepfake, DeepSeek), Quantum Computing, Snowflake, Vector Databases. Big Data & Data Engineering: Hadoop, Spark, Kafka, Data Scraping, Data Mining, Data Cleansing, Data Extraction, Data Manipulation, and Analysis, Big Data Analysis.

**Generative AI and Agentic AI:** Skilled in designing, fine-tuning, and deploying LLMs using PyTorch, TensorFlow, and Hugging Face Transformers. Experienced in building RAG pipelines with FAISS, Pinecone, ChromaDB, and Weaviate, and integrating LangChain, LangGraph, and OpenAI APIs to develop intelligent agents and assistants. Proficient in prompt engineering (zero/few-shot, CoT), LLM optimization (LoRA, PEFT, QLoRA), and ensuring compliance with HIPAA, GDPR, and PII policies. Delivered scalable GenAI and agentic AI solutions using MLflow, Python, SQL, Docker & Kubernetes, Fast API, Flask, MLOps, Machine Learning, LLM’s, LangChain or similar orchestrator, Vector DB or similar, GCP, Google AutoML, Vertex AI & Build tools, DVC, Kubeflow, CI/CD (GitHub Actions, Azure DevOps), and deployed via Docker, Kubernetes, EKS/AKS, and Vertex AI. Built multimodal applications (text, vision, audio) and production-ready microservices using FastAPI, Flask, REST/gRPC. Integrated observability with Prometheus and Grafana for monitoring drift, latency, and hallucinations. Developed autonomous agents with vector DBs, memory, planning, tool use, and LLM function-calling (LangChain, AutoGen, CrewAI) for enterprise AI automation.

**Work Experience details:**

* **Apr 2022 – till date**

**Senior Tech Lead, Data science**

**Company: HCL, Bangalore.** 

**Clients:** [Lloyds Banking Group](https://www.lloydsbankinggroup.com/), [Novartis Pharma and Healthcare](https://www.novartis.com/)**,** [Travelodge Hotels Limited](https://www.travelodge.co.uk/)

**Clients’ nature:** Banking, online digital media, Retail, Manufacturing, Healthcare.

**Tools used:** AWS, Microsoft Azure, Generative AI, DataSource.ai, Numerai, Snowflake, DrivenData, Devops, MLOPs tools, Prompt engineering, RAG, LanngChain, Langraph, LLMs, Seaborn, PyTorch, PowerBI, Prompt engineering, VectorDbs, Prometheus, Grafana, Snowflake, Vertex AI.

#### **Lloyds Banking Groups: AI-Powered Anomaly Detection in Transaction Monitoring**

* **Overview**: Developed and deployed machine learning models for each kind of banking requirements including anomaly detection in financial transactions to enhance Anti-Money Laundering (AML) efforts.
* **Technical Details**:
  + **Data Sources**: Integrated data from various financial systems, including transaction logs, customer profiles, and historical fraud cases.
  + **Feature Engineering**: Extracted features such as transaction frequency, amount patterns, geolocation data, and device fingerprints.
  + **Modeling Techniques**:
    - Utilized clustering algorithms (e.g., DBSCAN) to identify outliers in transaction patterns. Implemented classification models (e.g., Random Forest, XGBoost) trained on labelled fraud cases.
  + **Real-Time Processing**: Leveraged Apache Kafka for streaming data ingestion and Apache Flink for real-time analytics.
  + **Deployment**: Containerized models using Docker and orchestrated with Kubernetes for scalability.
* **Achievements**:
  + Reduced false positives in fraud detection by 30%.
  + Improved detection rate of fraudulent transactions by 25%.
  + Familiarize with real-time data processing frameworks like Kafka and Flink.

#### **Novartis: Generative AI for Customer Support Automation:**

#### Integrated and fine-tuned large language models (LLMs) like ChatGPT to create conversational AI solutions, enhancing user interactions and automating customer support.

* **Technical Details**:
  + **Data Preparation**: Curated a dataset of historical customer interactions, FAQs, and support documents.
  + **Model Fine-Tuning**: Fine-tuned pre-trained LLMs using domain-specific data to improve response relevance.
  + **Retrieval-Augmented Generation (RAG)**: Implemented RAG to combine LLMs with a knowledge base for accurate information retrieval.
  + **Deployment**: Deployed the chatbot on cloud platforms using serverless architectures for scalability.
* **Achievements**:
  + Automated 70% of customer inquiries, reducing response time by 50%.
  + Enhanced customer satisfaction scores by 20%
  + Understand the concept of RAG and its benefits in combining LLMs with external knowledge sources and be prepared to discuss the challenges of fine-tuning LLMs for specific domains.

#### **Travelodge hotels UK: AI-Driven Demand Forecasting & Dynamic Room Pricing System**

* **Overview**: As part of a digital transformation initiative, Travelodge UK aimed to maximize occupancy and revenue per available room (RevPAR) across its 580+ hotel locations. I was involved in developing an AI-powered demand forecasting and dynamic pricing system that adjusted room prices in real time based on demand patterns, competitor rates, and local events
* **Data Sources Internal:** Historical booking data (check-in/out, lead time, room type, channel), Customer segmentation and loyalty status, Hotel capacity, inventory, and blackout dates **Data Sources External:** Competitor pricing (scraped from OTA platforms and third-party APIs), Local event calendars (sports, concerts, holidays), Weather forecasts, Google Trends and regional tourism statistics

**Feature Engineering:**

* Booking lead time distribution by customer segment and Event impact score (based on past booking spikes for similar events)
* Competitor price elasticity modeling (adjusted by region and star rating) and
* Seasonality factors: school holidays, weekdays vs weekends and Cancellation probabilities based on booking behaviour

**Modeling Techniques:** The project used a multi-model pipeline

* **Demand Forecasting:** LSTM-based time series models to predict occupancy, Prophet models for region-level forecasts and Ensemble averaging for stability across seasons
* **Dynamic Pricing Engine:** Reinforcement learning (Multi-armed Bandit with Contextual Policies) to optimize price points and Bayesian models to estimate conversion probabilities at different price tiers
* **Customer Behaviour Modeling:**
  + Clustering to identify high-ADR vs low-ADR customer groups
  + Uplift modeling to test personalized discounts/offers

**Technology Stack and Integration:** Data: Snowflake, Airflow for orchestration, ML: Python (scikit-learn, TensorFlow, Prophet), PyTorch, Deployment: AWS (Lambda, SageMaker, CloudWatch). Connected to booking engine via REST APIs; pricing updates published every 2 hours, Monitoring: MLflow, DataDog for model drift and price change audits

**Business Impact:**

* Revenue uplift: Increased average daily rate (ADR) by 11% in pilot regions
* Occupancy boost: 9% improvement during shoulder seasons
* Efficiency: Automated pricing led to a 95% reduction in manual price overrides
* Scalability: System now supports pricing decisions across 580+ locations in the UK.

**May 2020 – Jan 2022**

**Sr Soft Engineer, Datascience**

**Company:** Cignex Datamatix



**Clients:** [Fresenius Medical care](https://freseniusmedicalcare.com/), [HSBC Bank Middle East](https://www.hsbc.ae/)**,** [Deloitte](https://www2.deloitte.com/us/en.html)

**Clients’ nature:**  Banking, online digital media, Retail, Manufacturing, Healthcare.

**Tools used:** Docker, Kubernetes, MLOPs, Vertex AI, Kubeflow, AWS, Bitbucket, CherryPy, TurboGears, MLops tools like Kubeflow, MLflow, Amazon SageMaker, CometML, Azure machine learning and Data version control (DVC), Datadog.

#### **FMC: Real-Time Prediction of Intradialytic Hypotension**

* **Overview**: Developed machine learning models to predict intradialytic hypotension in real-time, enhancing patient safety during dialysis.
* **Technical Details**:
  + **Data Collection**: Gathered data from haemodialysis sessions, including blood pressure readings and ultrafiltration rates.
  + **Feature Engineering**: Created features representing patient vitals trends and treatment parameters.
  + **Modeling**: Implemented recurrent neural networks (RNNs) to capture temporal dependencies in patient data.
  + **Deployment**: Integrated models into clinical decision support systems for real-time alerts.
* **Achievements**:
  + Achieved an area under the ROC curve (AUC) of 0.89 in predicting hypotension events.
  + Enabled timely interventions, reducing adverse events during dialysis.

#### **Deloitte: Robotic Process Automation (RPA) for KYC Processes**

* **Overview**: Implemented RPA to automate repetitive, clerical processes within KYC functions, enhancing efficiency and reducing processing time.
* **Technical Details**:
  + **Process Mapping**: Identified manual tasks suitable for automation, such as data extraction and validation.
  + **Bot Development**: Developed bots using RPA tools to handle data entry, document verification, and compliance checks.
  + **Integration**: Integrated bots with existing systems to ensure seamless data flow.
* **Achievements**:
  + Reduced processing time for Level 1 alerts by 70%.
  + Improved accuracy and compliance in KYC processes.
  + Understand the role of RPA in automating rule-based tasks.

**3. Feb 2019 – Nov 2019**

**MLOPs Engineer**

**Company:** Yash Technologies



**Clients:** [Qatar National Bank.](https://www.qnb.com/), [Merck Group](https://www.merckgroup.com/)

**Tools used:** Chatbots, APIs, Unix, REST APis, Kaggles, Tablue, Nginix, Scikit learn, Python IDE, MongoDB, SQL, Numpy, Natural language processing.

#### **Qatar National Bank: Data Modernization for Enhanced Business Transformation**

* **Overview**: Modernized data infrastructure to improve agility, accessibility, and security, enabling better decision-making and operational efficiency.
* **Technical Details**:
  + **Assessment**: Evaluated existing data systems to identify bottlenecks and security gaps.
  + **Migration**: Moved data to cloud-based platforms, ensuring scalability and accessibility.
  + **Integration**: Implemented ETL processes to integrate data from various sources
* **Achievements**:
  + Improved data accessibility and decision-making capabilities.
  + Enhanced data security and compliance.
  + Understand the steps involved in data modernization.
  + Be ready to discuss the benefits of cloud-based data solutions.

#### **Merck GROUP: Predictive Maintenance Using AI**

* **Overview**: Developed AI models to predict equipment failures, reducing downtime and maintenance costs.
* **Technical Details**:
  + **Data Collection**: Gathered data from IoT sensors monitoring equipment performance.
  + **Feature Engineering**: Created features representing equipment usage patterns and environmental conditions.
  + **Modeling**: Implemented machine learning models to predict potential failures.
  + **Deployment**: Integrated models into maintenance scheduling systems.
* **Achievements**:
  + Reduced unplanned downtime by 30%.
  + Optimized maintenance schedules, saving costs.

4. **Jul 2014 – Oct 2018**

**Sr Soft Engineer, ML**

**Company:** Baxter.com

**Client:** [Baxter.com](https://www.baxter.com/)



**Tools used:** Tools used: Microsfot PowerBI, AWS, Docker, IBM Watson Studio, PyTorch, TensorFlow, Keras, Micrsoft Azure.Bitbuket, Google Cloud Platform, Amazon SageMaker, Apache Spark. Datadog.

#### **Project 1: AI-Driven Personalized Patient Care**

* **Overview**: Utilized AI to personalize patient treatment plans by analysing large datasets, including patient histories and treatment responses.
* **Key Contributions**:
  + Developed AI algorithms to predict patient outcomes more accurately.
  + Enabled healthcare professionals to tailor treatment plans to individual needs.
  + Improved the likelihood of successful patient outcomes.

#### **Project 2: AI in Clinical Decision Support Systems**

* **Overview**: Integrated AI into clinical decision support systems to assist healthcare providers in making informed treatment decisions.
* **Technologies Used**: AI Algorithms, Medical Literature Analysis.
* **Key Contributions**:
  + Analysed patient data and medical literature to offer evidence-based recommendations.
  + Aided in clinical decision-making for complex cases.
  + Reduced variability in care, leading to more standardized treatment protocols.

#### **Project 3: AI-Powered Remote Patient Monitoring**

* **Overview**: Leveraged AI to enhance remote patient monitoring services, analysing data from wearable devices to track patients’ vital signs continuously.
* **Technologies Used**: AI Algorithms, Wearable Devices, Real-Time Data Monitoring.
* **Key Contributions**:
  + Detected anomalies in patients’ vital signs in real time.
  + Enabled timely interventions, reducing hospital readmissions.
  + Improved overall patient management.

1. **November 2010 – March 2014**

**Machine learning developer**

**Company**: Tata consultancy Services (TCS, Bangalore).



**Clients:** [Target.com](https://www.target.com/) & Amazon.com **joint-migration-venture** project,

[Johnson & Johnson](https://www.jnj.com/), [USBank.com,](https://www.usbank.com/) [General Motors.](https://www.gm.com/)

**Clients’ nature:** Ecommerce, Retail, Manufacturing, Healthcare, Banking

**Tools used:** WCS, Prism, Python, Scikit-learn, Apache Mahout, Apache Hadoop, Apache Hive, Apache Sqoop, HDFS, SQL, Numpy, Pandas, REST APIs, GitHub, Tableau, SAS, Matlab, GraphPad Prism, Informatica, ETL, BeautifulSoup, NLTK, Theano, Torch, Memcached, Redis, Apache Storm, RabbitMQ, Apache Webserver, CherryPy, TurboGears, Python IDEs (IDLE, PyCharm, Eclipse + PyDev), Log4j, Nagios, CRON Jobs, Weka, SPSS, MapReduce, Lucene, ActiveMQ, Java (for Hadoop-based modeling), Perl (used in ETL pipelines), Bash/Shell Scripting, Amazon S3, EC2 (early AWS stack)

### ***1.* ***Target.com/Amazon.com joint project:***** *****AI-Powered Personalized Recommendation System***** Objective: Enhance online shopping experience and increase basket size through hyper-personalized product recommendations.

* **Data Sources:**
  + Customer browsing history, purchase patterns, cart abandonment logs, product metadata, and user reviews. Historical sales data
  + Real-time competitor pricing (web scraped + APIs), Inventory and logistics feed and Customer segmentation and online behaviour (clickstream, bounce rate).
* **ML Techniques:**
  + Collaborative filtering (Matrix Factorization, ALS)
  + Deep Learning (Neural Collaborative Filtering and Transformer-based models)
* Real-time personalization via contextual bandits and reinforcement learning.
  + **Modeling Approach:**
  + Gradient Boosted Decision Trees (XGBoost) for predicting optimal price
  + Reinforcement learning (Q-learning) for real-time price adjustment policy
  + Clustering for customer segmentation
* **Deployment:** Scalable APIs for integration with web/mobile; batch and real-time inference pipelines using API endpoints
* **Outcome:**
  + Improved conversion rates by 18% and increased average order value (AOV) by 12%
  + Reduced recommendation latency to <200ms using Redis caching

### 2. *****Johnson & Johnson*** *–* ***AI for Predictive Drug Supply Chain Optimization*****

**Project Overview:**  
Built a predictive analytics solution to forecast demand for pharmaceutical products, minimize stockouts, and reduce supply chain waste across global markets.

* **Data Sources:**
  + SAP ERP supply chain data, Hospital and pharmacy order histories
  + Real-time shipment data, public health event trends (WHO, CDC feeds)
  + IoT sensor streams (temperature, vibration, pressure), maintenance logs, SOP logs, ERP integration
* **Feature Engineering:**
  + Temporal features (seasonality, pandemic spikes)
  + Country-level logistic constraints
  + Product shelf life and storage constraints
  + Manufacturing cycle time
* **Modeling Approach:**
  + Time-series forecasting using Facebook Prophet and LSTM
  + Bayesian Optimization for safety stock estimation
  + Monte Carlo simulations for demand uncertainty modeling.
  + **ML Techniques:**
    - Time-series modeling using LSTM and Prophet
    - Anomaly detection using Isolation Forest and Autoencoders
    - Root cause analysis with SHAP-based feature attribution
  + **Deployment:**
    - Edge-to-cloud hybrid model with on-prem inferencing using Azure Stack Edge.
* **Outcome:**
  + - Reduced unplanned downtime by 40%
    - Increased Mean Time Between Failures (MTBF)
    - Cost savings of over $2M annually through optimized maintenance cycles.
    - 30% reduction in stockouts
    - 20% decrease in cold chain logistics costs
    - Enhanced global demand planning accuracy

### *****3. USBank.com*****Project: AI-Enhanced Credit Risk Scoring Engine and Implemented a machine learning pipeline to identify at-risk customers and proactively offer personalized retention strategies using predictive analytics. Objective: Improve accuracy and fairness of credit scoring models to align with new regulatory guidelines and reduce loan default rates.

* **Data Sources:** FICO scores, transaction history, credit bureau reports, alt-data (mobile usage, utility bills), fraud indicators
  + - Transaction history, Digital banking activity
    - Loan/mortgage application data
    - Support ticket logs and call center transcripts (NLP)
  + **Feature Engineering:**
    - Monthly transaction frequency and balance volatility
    - Sentiment score from call center interactions
    - Digital engagement rate, Credit card utilization ratio
* **ML Techniques:**
  + Ensemble models (Random Forest, Gradient Boosted Trees)
  + Explainability using SHAP, LIME
  + Bias and fairness audits using Aequitas and Fairlearn
* **Compliance:** Models audited for compliance with Fair Lending regulations (ECOA, CFPB)
* **Outcome:**
  + Reduced loan default rate by 22%, Improved approval rate by 15% without increasing risk and gained regulatory approval with complete model transparency and audit logs.

**Education:**

Bachelor of Engineering. University BDT College of Engineering, Kuvempu university.

**Achievements:**

* Client appreciation awards in 2010, “Star team” award and “Service and commitment" award in 2013.
* Client award for driving “Relentlessly driving results” at Baxter in 2015.
* Baxter IDC award of recognition for “Driving results with urgency and accountability” in Sep 2016, “Collaborate and play to win” in 2017 and 2018.
* Extramiles achievement awards at Yash technologies in the year 2019.
* Star performer award for delivering multiple business assignments at “Cignex Datamatics” in the year 2020.
* Promising new talent award at HCL Tech in the year 2024.