**Hari Krishna Prasad Manam**

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**Professional Summary**

AI Engineer with over 4 years of experience designing and deploying machine learning solutions that deliver measurable business value across domains such as healthcare, finance, and education. Proven ability to take projects from concept to production, including data preprocessing, model development, evaluation, and cloud deployment. Skilled in Natural Language Processing (NLP), Large Language Models (LLMs), and deep learning techniques for building intelligent systems such as chatbots, document summarizers, and sentiment analyzers. Adept at leveraging cloud platforms like Google Cloud Platform (GCP), AWS, and Azure to build scalable, cost-efficient AI applications. Passionate about solving complex, real-world problems using AI, with a strong focus on innovation, automation, and delivering actionable insights that help organizations make better decisions.

**Skills & Tools:**

**Programming Languages:** Python, SQL, HTML/CSS

**Libraries/Frameworks:** Scikit-learn, TensorFlow, PyTorch, Hugging Face, LangChain, CrewAI, Flask, Pandas, NumPy

**Machine Learning:** Regression (Linear, Logistic), Classification (SVM, Naïve Bayes), Decision Trees, Random Forests, Gradient Boosting, Dimensionality Reduction, Hyperparameter Tuning (Grid Search, Random Search)

**Deep Learning:** CNN, RNN, LSTM, Transformers (BERT, GPT), Autoencoders

**Natural Language Processing:** Tokenization, Lemmatization, POS Tagging, NER, Chunking, Text

Summarization, Sentiment Analysis, TF-IDF, Bag of Words, SpaCy

**Generative AI & LLMs:** GPT-3, GPT-4, Bloom, Falcon, RAG Pipelines, Prompt Engineering, LangChain Agents, OpenAI APIs

**Cloud Platforms & Deployment:** Google Cloud Platform (GCP), Azure (ML Studio, Cognitive Services), AWS (Lambda, S3, RDS), Cloud SQL, Cloud Run, Docker

**Vector & Semantic Search:** Pinecone, Azure Cognitive Search

**Database & Querying:** MySQL, Cloud Firestore

**AI Applications:** Conversational agents, document summarization, real-time recommendations, sentiment engines, forecasting models, churn predictors

**Professional Experience**

**Comcast Boston, MA**

**Generative AI Engineer May 2024 – Present**

**Project title: Virtual AI Support Agent using Dialogflow CX and Vertex AI for Comcast Xfinity**Designed and deployed an AI-powered virtual assistant to handle and escalate customer service queries across Comcast’s Xfinity platform. Built and deployed the system using Dialogflow CX, Vertex AI, and LLM-based pipelines to automate routine conversations, summarize past interactions, and generate real-time, personalized responses driving operational efficiency and improving the digital customer experience.

**Roles & Responsibilities:**

* Defined customer automation use cases with Comcast’s digital innovation team and mapped them to scalable **Dialogflow CX flows**, covering key domains like billing, service outages, and technical support.
* Developed modular LLM-based backend services using **Vertex AI** custom endpoints, enabling context-aware query resolution, summarization, and escalation detection
* Integrated Dialogflow CX with Vertex AI using secure **webhooks** to enable real-time handoff between rule-based and LLM-driven responses for open-ended user queries.
* Used **Google Cloud Functions** and **Cloud Run** to deploy inference services, while managing user sessions and chat logs with **Cloud SQL** and **Firestore**.
* Created reusable prompt templates and parameterized agent configurations in **Dialogflow** to support multiple use cases and user personas.
* Orchestrated end-to-end AI workflows using Vertex AI Pipelines, automating retraining of **LLM** models based on ticket outcomes and user satisfaction data.
* Collaborated with **UI/UX** and customer care analytics teams to build feedback dashboards using Looker Studio and **BigQuery,** enabling leadership to track usage, resolution metrics, and system performance.
* Achieved a 32% reduction in customer support resolution time and over 25% decrease in human agent workload in pilot markets.

**Skills & Tools:**

* **AI & NLP:** Vertex AI Endpoints, FinBERT, VADER, Summarization
* **Conversational AI:** Dialogflow CX, Intent Detection, Parameter Handling, Fallback Routing
* **Cloud Infrastructure:** GCP (Cloud Run, Cloud SQL, Firestore, Cloud Functions, BigQuery)
* **AI Workflow & Automation:** Vertex AI Pipelines, Custom LLM APIs, Prompt Engineering
* **Visualization & Reporting:** Looker Studio, BigQuery, Streamlit (for QA/Test Evaluation)

**Use Case Impact:** Support Automation, Resolution Acceleration, Real-Time AI Escalation

**Machine Learning Engineer San Francisco, California Grove Collaborative** Jan 2023 – April 2024

**Project title: AI-Driven Product Recommendation and Review Sentiment Engine**.

Led the design and development of a recommendation engine and sentiment analysis pipeline to improve product discovery and customer satisfaction across Grove Collaborative U.S. eCommerce platform. The system leveraged behavioral data, user-generated reviews, and NLP-based sentiment scoring to deliver personalized product feeds and highlight trending items with high approval ratings.

**Roles & Responsibilities:**

* Closely collaborated with Grove Collaborative data science, product, and digital marketing teams to identify pain points in customer journeys and model user behavior using browsing, purchase, and review data.
* Developed scalable product recommendation models using both collaborative filtering (user-user, item-item) and content-based filtering, enhancing personalization across web and mobile platforms.
* Built robust **NLP pipelines** with **VADER, TextBlob**, and **SpaCy** for sentiment classification on over 10 million customer reviews to surface top-rated products.
* Applied **TF-IDF** **vectorization**, **LDA-based topic modeling**, and **NER** to extract product attributes (e.g., battery life, screen size, material quality) that influence purchasing decisions.
* Engineered **real-time data pipelines** using **Apache Airflow** for ingestion of behavioral logs, product metadata, and review content into training and retraining loops.
* Exposed recommendation outputs via **RESTful APIs** built in **Flask**, integrating seamlessly into Grove’s frontend recommendation carousel.
* Implemented performance monitoring and retraining routines to fine-tune model precision, recall, and **click-through rate (CTR**) using feedback from real user sessions.
* Conducted large-scale **A/B testing** across multiple departments (electronics, apparel, home goods) to measure the effectiveness of the AI-powered engine.
* Visualized insights for business stakeholders via **Power BI dashboards**, tracking user engagement metrics, sentiment trends, and conversion patterns.
* Drove a measurable improvement in personalized product discovery, resulting in a significant boost in CTR and a 12% increase in category-level sales.

**Skills & Tools:**

* **Machine Learning:** Scikit-learn, Surprise, Collaborative Filtering, TF-IDF, LDA
* **NLP & Text Mining:** SpaCy, VADER, TextBlob, Topic Modeling, Sentiment Analysis
* **Deployment & APIs:** Flask, REST APIs
* **Data Pipelines:** Apache Airflow
* **Visualization & Reporting:** Power BI, Matplotlib

**Machine Learning Engineer Mumbai, Maharashtra**

**Axis Mutual Fund** Oct 2021 – Aug 2022

Project Title: **Investment Strategy Optimizer using ML**

Developed an AI-driven portfolio optimization engine aimed at assisting fund managers with smarter capital allocation, personalized investment suggestions, and improved risk diversification. The system used a blend of time-series forecasting and unsupervised learning to analyze sectoral trends and investor behaviors, helping financial institutions make data-informed decisions for better returns and reduced risk exposure.

**Roles & Responsibilities:**

* Designed and implemented **ARIMA and SARIMA models** to forecast sector-wise market trends, aiding fund managers in identifying high-performing investment opportunities across different time horizons.
* Utilized **K-means clustering** to segment investor profiles based on investment history, risk appetite, and financial goals, enabling personalized portfolio recommendations.
* Built **real-time data pipelines** to automate Net Asset Value (NAV) predictions and generate periodic performance reports with actionable insights.
* Developed and optimized data ingestion workflows using Pandas and NumPy to ensure seamless integration of live market data and historical investment records.
* Collaborated closely with financial advisors and product managers to translate model outcomes into user-friendly visualizations and decision-support tools for strategic planning.
* Performed model validation and back testing using historical data to assess the robustness of portfolio allocations and forecast reliability.
* Presented findings and recommendations to senior stakeholders using **Tableau dashboards**, helping align business objectives with AI-powered strategies.

**Skills & Tools:**

* **Generative AI & LLM Integration**: Azure OpenAI Service for RAG-based question answering, summarization, and response generation.
* **Frameworks & Agents**: LangChain (modular RAG pipeline, custom agent design), CrewAI (multi-agent coordination and task delegation).
* **Knowledge Retrieval & Vector Search**: Pinecone (semantic indexing and retrieval), integrated with RAG to fetch relevant content from embedded course materials.
* **Backend Development & APIs**: Python (core scripting, logic, integration), Flask.
* **Cloud Services & Deployment**: Azure (hosting LLMs, managing vector DBs, endpoint security), scalable deployment of agents and endpoints.
* **Prompt Engineering & Agent Logic**: Custom prompt templates for summarization, routing, feedback generation, and content extraction tasks.

**Innomax Hyderabad, India**

**Data Analyst**  Dec 2020 – Sep 2021

**Project title: Customer Retention Prediction for Insurance**

Led the development of a data-driven solution to predict customer churn for a major Indian insurance company. The project aimed to enhance customer retention by analyzing structured insurance claim data along with unstructured customer complaint texts. The key goal was to proactively identify high-risk policyholders likely to discontinue their insurance and empower the client’s customer service and marketing teams with actionable insights.

**Roles & Responsibilities:**

* Cleaned and preprocessed both structured and unstructured data to ensure high-quality input for model training, including null handling, outlier treatment, and categorical encoding.
* Engineered churn-specific features from time-based activity logs and customer demographics to improve model interpretability.
* Built and evaluated classification models using **Random Forest** and **Logistic Regression**, optimizing hyperparameters to improve model precision and recall scores.
* Extracted entities from customer complaint narratives using **SpaCy Named Entity Recognition (NER)** to derive complaint frequency, issue types, and resolution timelines as additional churn indicators.
* Created **interactive dashboards** using **Tableau** for business stakeholders to visualize churn hotspots, policy performance, and retention risk by geography and product type.

**Skills & Tools:**

* **Programming & Data Analysis:** Python for data wrangling, feature engineering, and exploratory analysis.
* **Natural Language Processing:** SpaCy NER for extracting named entities from unstructured complaint texts.
* **Data Visualization:** Seaborn for visual analytics and feature correlation insights.
* **Business Reporting:** Tableau dashboards to visualize policy churn, customer segments, and risk trends for stakeholder decision-making.

**Education**

M.S in Computer Science — University of Bridgeport, CT