# Birbal Kumar
Data Scientist

As a Data Scientist with over 3+ years of experience, I specialize in AI, Generative AI, LLM and Data Science with a strong Computer Science foundation. I hold a Bachelor's in Computer Science. At Pai Solution, I've led numerous Generative AI projects, including developing an AI Support Chatbot with GPT and Llama. I have also enhanced social media advertising capabilities at Camp Automation Private Limited. Proficient in Python, SQL, Django, Flask, and AWS, I excel in solving real-world problems with machine learning techniques. My passion for innovation drives me to leverage AI to tackle complex challenges and achieve meaningful business outcomes.

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## WORK EXPERIENCE

### Data Scientist
Metadrob  *12/2024* – Present  *Jaipur, IN*

Led and developed an AI-powered voice and chat assistant leveraging Generative AI for seamless customer interactions over Twilio calls and real-time website chat. Integrated OpenAI GPT-4o mini and Llama 3 for intelligent response generation, significantly enhancing user engagement and support efficiency. Designed a multi-modal data ingestion pipeline to process and enabling an LLM-driven Retrieval-Augmented Generation (RAG) system for context-aware responses. Developed high-performance vector search using FAISS and MongoDB, optimizing retrieval speed. Built a scalable, event-driven architecture using FastAPI, WebSockets, Celery, and Redis, ensuring low-latency AI interactions and parallel processing for real-time status tracking. Integrated AWS Polly & Google TTS for human-like speech synthesis, enhancing voice-based AI interactions. Consistently pushed the boundaries of Generative AI innovation, delivering impactful LLM-powered automation solutions.

### Data Scientist
Pai Solution  *03/2023* – 12/2024  *Delhi, IN*

Data Scientist at Pai Solutions, specializing in Generative AI, I led the development of an AI Support Chatbot that enhanced customer support efficiency. This project involved integrating advanced AI models, including OpenAI GPT-3.5-turbo and Llama, and deploying on AWS for scalability. I also developed a dynamic content capture system for extracting images from PDFs and videos, integrated into our Flask application. Additionally, I contributed to various other Generative AI projects, continuously pushing the boundaries of AI innovation.

### Product Developer
Camp Automation Private Limited.  *02/2022* – 02/2023  *Bengaluru, IN*

Product Developer at Camp Automation Private Limited, I played a key role in enhancing product functionality and user experience. I designed and implemented an improved dashboard with a refined UI, making product monitoring and management more efficient. Leveraging machine learning techniques like K-Means and DBSCAN, I optimized the Facebook Ads Manager by enabling predictive modeling, automated audience segmentation, and sentiment analysis to improve ad performance. I utilized Python, Pandas, and SQL to preprocess and structure data, ensuring high-quality insights.

## EDUCATION

- **Master's Program in Artificial Intelligence Engineer**
  Simplilearn Certified  Nov'23
  https://success.simplilearn.com/df110e96-6ab3-4f2f-9f38-3cbb0078b9a1#gs.b0ql5i
- **Bachelor of Technology in Computer Science and Engineering**
  JaganNath Gupta Institute of Engineering & Technology
  Rajasthan Technical University  Apr'21
- **High School (10+2)**
  Rana Pratap H/S cum inter college Rampur

## CERTIFICATES

- **Data Science Certification | Simplilearn**  Nov'22
  Certificate URL: https://success.simplilearn.com/f595d641-9812-49a0-aec8-4e2f32591f68
  Certificate ID: **61935232**

- **Artificial Intelligence Engineer | Simplilearn**  July'23
  Certificate URL: https://success.simplilearn.com/df110e96-6ab3-4f2f-9f38-3cbb0078b9a1#gs.b0ql5i
  Certificate code: **78309242**

## GENERAL SKILLS

Machine Learning, Deep Learning, Computer Vision, NLP, Lang Chain, LLM, Llama, GPT 3.5, Llama Index, Prompt Engineering, Fine-Tune, LLMOPS, MLOPS, Embeddings, MongoDB Atlas, AWS Bedrock, AWS Lambda Function, GCP, Azure, AWS S3 Bucket, AWS Document DB, AWS Event Bridge, Generative AI, FAISS, Pinecone, LoRa, QLoRa, PEFT

## TECHNICAL SKILLS

**Operating System:**

MacOS, Windows, Ubuntu

**Programming Language:**

Python, SQL & RDBMS, FAISS, Chromadb, Piecone, Django, Flask, FastAPI

**Libraries**:

Huggingface, W2V, Pandas, NumPy, Matplotlib, SciPy, Scikit-Learn, Beautiful Soup, Part-of-speech Tagging, Tokenization, Text Classification, LangChain, Openai, Keras, TensorFlow, PyTorch, TTS, STT

**Other Software/Tools:**

Tableau, Excel, Replit, Machine Learning, Deep Learning, AWS Server, Jupyter Notebook, VS Code, Google Colab, Git, Git Hub, WebSocket, SocketIO, Celery, Redis

## PROJECTS

**Telephone Conversation Agent | Tech Stack: Generative AI, RAG, GPT, FAISS, FastAPI, AWS**

– Engineered an LLM-powered voice assistant capable of real-time conversations over Twilio calls, leveraging multi-modal data sources for contextual responses.
– Integrated OpenAI GPT-4o for intelligent response generation and AWS Polly & Google TTS for human-like, high-fidelity speech synthesis.
– Designed a scalable event-driven architecture using FastAPI + WebSockets, enabling low-latency, bidirectional Twilio call streaming.
– Optimized asynchronous task execution with Celery & Redis, ensuring parallel processing of large datasets and real-time status tracking.
– Architected a distributed vector storage system using FAISS + MongoDB, facilitating fast semantic retrieval across large knowledge bases.
– **Key Skills:** LLM, Generative AI, RAG, FAISS, LangChain, OpenAI GPT-4o, QLoRa, WebSockets, Twilio Stream API, AWS Polly, Prompt Engineering, MongoDB, Redis, Celery, Async Processing, Parallel Computing, Distributed Systems.

**Knowledge Based Chatbot (RAG) | Tech Stack: Python, LLM, Generative AI, Llama**

– Created an LLM-powered chatbot to provide technicians with quick access to site manuals, significantly reducing troubleshooting time and enhancing on-site productivity.
– Enabled significant reductions in troubleshooting time and enhanced on-site productivity through intelligent query handling and context-aware responses.
– **Key Skills:** LLM, Generative AI, LangChain, AWS Document DB, LLAMA, OLLAMA, Prompt Engineering.

**Telco Feedback Sentiment Analysis | Tech Stack: Python, Deep Learning**

– Designed an NLP-based sentiment analysis system to analyse customer feedback, enabling actionable insights that drive targeted improvements in products and services.
– **Key Skills:** Sentiment Analysis, Text Pre-processing, Word Embeddings (Word2Vec, TF-IDF, etc.) Classification Models, XGBoost, Hyperparameter Tuning, Grid Search, Accuracy Evaluation.

**Automatic Document Creation Agent | Tech Stack: Python, LLM, LangChain, LLama**

– Developed an AI-driven system designed to automate the creation of project documentation by processing diverse data inputs such as media files, meeting recordings, audio, text, and other resources. The agent intelligently organizes and generates professional, comprehensive documents tailored to project requirements, significantly reducing manual effort and enhancing productivity in project management workflows.
– **Key Skills:** LLM, LangChain, MongoDB atlas, LLAMA 3.2, Prompt Engineering.

**Advanced Image Processing and Analysis System | Tech Stack: Python, OpenCV, PIL, NumPy, PyTesseract, Matplotlib**

– Developed an advanced computer vision project that integrates image preprocessing, edge detection, color extraction, and object identification using diverse machine learning and image processing techniques. The system leverages OpenCV and machine learning algorithms to automate tasks like background removal, text extraction, color analysis, and contrast ratio assessment. Enhanced performance through multi-step pipeline optimization for edge cases and gradient detection, enabling accurate object segmentation and visual data analysis.
– **Key Skills:** Image Processing, Computer Vision, Color Detection, Edge Detection, Text Recognition, Data Visualization, Algorithm Optimization.

## INTERESTS

Artificial Intelligence

Travelling

Surfing

Sportin