ASHUTOSH KUMAR MANDAL

AI Engineer

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EXPERIENCE

AI Engineer

Aug 2020 – Ongoing

Valuence Technologies

Tokyo, Japan (Remote)

Sensitive Data Redaction

- Crafted an innovative pipeline for automated redaction of personally identifiable information in product documents using OCR, multilingual BERT based text embedding model and SVM leading to 97.7% accuracy in sensitive data identification.
- Engineered an AI solution to mask sensitive information in product images using instance segmentation and image processing. Developed an image processing framework using pixelation to mask the sensitive area such that the edit blends naturally with the original image. Achieved an mAP(50-95) of 0.776 in masking sensitive areas.
- Implemented a diffusion model based on DDPM literature to generate high-quality images of watch dials. Fine tuned an inpainting stable diffusion model to edit specific parts of watch dials.

Conversational Chatbot

- Developed an agentic RAG system enabling dynamic question-answering and contextual interactions iterating over proprietary and open-source LLMs like OpenAI, Mistral and LLAMA. Integrated support for PDF and spreadsheet documents using Langchain and ChromaDB vector storage. Model deployed in production on Azure Cloud as part of Keiko Chatbot.
- Built a RASA-based AI chatbot assistant using transformer encoders and optimized its performance by tuning various hyperparameters leading to a 96.8% accuracy in intent classification. Configured bilingual support for English & Japanese language, enhancing system's accessibility and usability. POC deployed using containers on AWS ECS.

Auto-Assessment Platform

- Designed and developed an end-to-end AI workflow for product detection and classification using state-of-the-art CNN models. Implemented new architectures like Branched CNN on Resnet backbone to identify product details for luxury products.
- Fine-tuned an object detection model using transfer learning to detect target products from images in real-time. Achieved a precision of 97% resulting in a three-fold increase in efficiency and 50% faster response time for customer queries.

Employee Work Hour Management System

- Led a team of Software Engineers to develop a responsive web application to efficiently store and manage the working hours of over 150 remote employees. Added feature to generate monthly reports in PDF format.
- Proposed a role-based access control system to maintain operational efficiency and data security. Deployed in production replacing Google sheets, thereby reducing complexity and efficiency.

PROJECTS

Multi-Modal RAG Document QA — GitHub

- Built a multi-modal RAG LLM application for Document question answering for financial documents utilizing Google VertexAI Embeddings and Gemini models that can understand images, texts and tables. Implemented a persisted vector storage using **ChromaDB** on **LangChain**. Developed the UI using **Chainlit** to allow users to upload their own documents.

Abstract Classification — GitHub

- Fine-tuned DistilBERT model using PyTorch to classify each sentence of an abstract into Objective, Background, Methods, Conclusions and Research. Achieved an F1 score of 0.92 on test set.

PlantCLEF - Plant Genus and Species Classification — GitHub

- Engineered a Multi-View CNN architecture that integrates multiple images of the same plant to improve classification precision. Achieved a 10% increase in classification accuracy compared to traditional single-view CNN models.

EDUCATION

Indian Institute of Technology Guwahati

Jul 2016 – Jun 2020

Bachelor of Technology in Engineering Physics (7.76/10.0)

Assam, India

SKILLS & EXPERTISE

Area of Expertise: Generative AI, LLM, NLP, Image Processing, Computer Vision, Data Science, Predictive Modelling

Programming: Python, C++, SQL

Cloud Services: AWS SageMaker, AWS ECS, S3, AWS ECR, EC2

AI Tools/Libraries: FastAPI, Streamlit, Flask, PyTorch, Tensorflow, Keras, OpenCV, HuggingFace

Miscellaneous: OpenAI, Langchain, Docker, Git, DBMS