Narendra Kumar

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Summary

With over 5 years of experience, I have worked as a Senior Software Engineer {Lead Machine Learning Engineer} in a product-based company. I focused on developing real-time decision agents that can be retrained. My expertise lies in various areas, including Micro-service Architecture, container orchestration, computer vision, ML-Ops, large data handling, Advanced NLP, image processing, and image text extraction. I have consistently exceeded client expectations by delivering projects within the agreed timelines.

Work Experience

Senior Software Developer in Exponential AI Jan 2022 - present

As a Lead Machine Learning Engineer, I have successfully managed and motivated my team to achieve project goals and deadlines. I have effectively communicated project requirements and expectations, delegated tasks based on team members' strengths and expertise, and provided support and guidance throughout the project lifecycle.
I have designed and implemented an assisted extraction feature on the platform that facilitates the extraction of different types of documents. I have also integrated Git into the platform to run Functions-as-a-Service (FAAS) and implemented profiling to enhance the platform's performance.
My contributions have resulted in successful proof-of-concept (POC) deliveries to leading hospitals and healthcare service providers in the United States. These POCs were tailored to specific use cases, and the results were highly satisfactory.

Machine Learning Engineer in Exponential AI Jan 2019 - Dec 2021

As a developer, I have experience in creating directed acyclic graph (DAG) systems for executing tasks both sequentially and in parallel. My past projects include designing a DAG Executor to run task and model pipelines, as well as building ML pipelines for training, running, and evaluating machine learning models. I have a strong focus on developing accurate models, deploying them for production, and testing and scaling them appropriately.
In addition, I have designed a feedback loop model that is used to improve the accuracy of the platform's models. I have also worked on benchmarking the accuracy of the platform's extraction objects such as headings, tables, fields, and paragraphs. Furthermore, I have contributed to the improvement of the execution performance of large-scale models.

Trainee Machine Learning Engineer in Exponential AI Jan 2018 - 2019

As an Enso Platform Developer, I am responsible for creating a system that can analyze both digital documents and extract relevant information. This platform includes various microservices such as Image, Learning, Entity, NLP, and more.
It can process both structured documents (such as CMS1500 forms) and unstructured documents (such as invoices and resumes). The information extracted is then analyzed by the entity and NLP microservices to identify entities and the document's intent.
Additionally, the platform is designed to learn from user feedback on the accuracy of its extraction of headings, paragraphs, and intent.
Developed various microservice applications to clean the documents and implimented the fine-tuned OCR services.

Projects

Some Project Highlight

I built the Enso Platform, which is capable of extracting valuable information from both scanned and digital documents. It can process structured (e.g. claims like CMS1500, which have a fixed format) and unstructured (e.g. invoices, and resumes) documents.
Worked on microservice architecture to integrate various services into the platform.
Develop and integrate the OCR service into the platform.
Integrate the IDP capabilities to the platform to extract the information from documents like key-value, headings, tables, OMR, and paragraphs.
Develop and build the pipeline-like flow to run sequential or parallel services.
Develop Executor Engine to run pipeline services.
Built an ML-ops platform where users can deploy the models, and develop the model versioning architecture.
Build the Model to Extract Key-Value, Heading, etc. information from the documents. **Build** the deep learning Model to Identify and extract the tables from the document. **Build** the model to tag entities to the IDP outputs.
Designed and worked on benchmark accuracy of platform extraction objects like headings, tables, fields, paragraphs, etc.
Worked on the improvement of large-size model execution performance.
Designed and implemented assisted training for ML models on the platform Which helps accuracy improvement.
Designed and integrated FAAS(**Function as service**) to the platform.
Implement the profiling to the platform for performance improvement.
Designed a feedback loop to improve the accuracy of the ML model and IDP extraction used in the platform.
Worked on the improvement of large-size model execution performance.
Trained and deployed a Hugging Face question-answering pipeline for a client.
Built an NLP microservice that uses Spacy,and zero-shot text classification to extract entities from text and tag them to domain objects. Implemented an ontology service using Elasticsearch.
Implemented text classification using Keybert and Hugging Face's zero-shot text classifier.
Developed SVO combinations of sentences using parts-of-speech tagging and dependency parsing.
Implemented NER and negation concepts using Spacy.
Developed a rule-based question-answering system using parts-of-speech tagging, dependency parsing, and SVO.
Trained and deployed a Faster-RCNN model for handwriting and table detection.
Designed and developed an assisted extraction feature for the platform to retrain ML models as data changes.
Designed and developed feedback loops for ML models based on human review by business users.
Designed and developed a benchmark service to obtain accuracy, precision, and recall for all benchmark dataset elements.
Designed and developed a data augmentation tool to generate synthetic data for training models and integrated it into the platform's annotation tool.
Trained and deployed the LayoutLMv2 model as a custom function for a client to extract information from documents.
Improved heading accuracy from 50% to 85% by implementing an XGBoost model.
Trained and deployed a paragraph model with 73% accuracy using XGBoost.
Implemented an import/export feature for solutions on the platform.

Education

2015 - 2017 MTech., Aerospace Engineering at **Indian Institute of Technology Kharagpur, India** (GPA: 8.30/10)

2010 - 2015 BEng., Aeronautical Engineering **Aeronautical Society Of India , Delhi** (63.20 Percentage)

Course Certification

Web data analytics using Python, IIT Kharagpur Dec-2016

First module includes the text extraction process, pre-processing and text processing, and sentiment analysis of the web log file.
Second module Web log analysis using Python that has data pro- cessing, data collection, data cleaning, and modeling of user navigation behavior.

Machine Learning Dec-2016

– Analyzing datasets to identify patterns based on their behavior. Applying machine learning methods, principal component analysis, and logistic regression on the large dataset to build the predictive model. Python uses extensively for analysis and dimensional visualization.

– This course contains linear, logistic regression, classification problem, neural networks, etc.

Research

Master's Project 2015-2017

Detection of Delamination in the composite beam using ultrasonic wave propagation technique. Modeling of the beam is done using FEM and MATLAB were used for simulation.
Detection of crack in the beam using ultrasonic wave propagation method. Modeling of the beam is done using FEM and MATLAB used for simulation.

Key Skills

- **Machine Learning:** Data cleaning, EDA, Model selection, Model training, Ml-ops, Model Deployment, Data Versioning, Data cleaning, Model versioning.
- **Databases:** MySQL , MongoDB
- **Deep learning:** ANN, CNN, RNN, F-RCNN, GAN, Transformers, word embedding.
- **Software Engineering Skills:** Microservice Architecture, Debugging in container pods, Elasticsearch, Python with Clean architecture, Caching, Memory profiling, Improving performance with respect to time and memory, Git, Docker, Kubernetes.
- **Other technical skills:** AWS, Tensorflow, RabbitMQ, Minio, Redis.