Ankur Singh

TEAM LEAD | MACHINE LEARNING ENGINEER

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Summary

With over 4+ years of experience specializing in the domains of Product Management, Deep Learning, Computer Vision, and Software Development. I am passionately curious in solving business problems by building products and services from the ground up. A life long learner, tinkerer and a team builder. In my recent stint, I built a phenomenal team of 6 members and deployed 4 ML services in production in just 10 months. Before that, I developed 5 full-fledged courses on topics around ML/DL and mentored over 600+ students.

Skills

Languages	Python, SQL, Shell Scripting
Databases	Postgres, SQLite3, MongoDB, Redis
Web Development	Flask, FastAPI, Rest APIs, Web scraping
Software Development	CI/CD, Git, Docker, Pytest, Python Packaging
ML/DL Frameworks, Libraries & Git repos	Scikit-Learn, Pytorch, Pandas, Keras, Fastai, Pytorch Lightning, YOLOv5, YOLOR, U2net, Timm, Torchvision, Segmentation Models Pytorch (SMP), Hugging Face, MMOCR, MMDetect, PaddleOCR, XGboost, LightGBM, Catboost, Categorical Encoding, Spacy, NLTK.
Deep Learning Problems	**CV:** Classification, Regression, Object Detection, Segmentation, Keypoint detection. **NLP:** Classification, Text Generation, NER, POS tagging, Neural Machine translation (NMT). **Others:** OCR, Face Detection, Recognition, and Matching; Recommendation System, Similarity Search, Unsupervised Learning, Style Transfer, GANs, Tabular Data, Multi-Label, Multimodal Arch.

Work Experience

Zoop.One

Pune, India

TEAM LEAD - MACHINE LEARNING

Sep. 2021 - Jul. 2022

As a Founding Member of the ML team, built a phenomenal team of 6 ML engineers and led a large effort to scale up the use of ML across the company. In just 10 months, we successfully released 4 ML services in production.

- **OCR Service**
  - Developed a very sophisticated OCR service to extract relevant information from Indian Identity Cards like PAN, Aadhaar, Voter ID, Driving License & Passport. It served as the backend for multiple Sign-up, Verification & enrollment journeys in several products.
  - The service had more than 7 deep learning models to detect and extract cards, correct card orientation, enhance the image, identify card type, layout analysis, and OCR to extract textual information.
  - Our service was almost 4 to 6 times faster than other players in the market, and was much more accurate. Additionally, we provide support for multi-line names & addresses that no other player was offering.
- **Document Scanner Service**
  - This service enabled numerous front-end services to extract ID cards and documents from any given image.
  - Tried several different approaches for ID card / document extraction like edge detection using conventional CV, object detection, segmentation, keypoint regression & heatmap regression.
  - Developed Heatmap Regression based document extractor to facilitate auto-cropping in any ID card or Document.
  - Built a service around the above model, and deployed it so that it can be easily consumed by the front-end teams.
  - Also, compressed and exported the model to TFLite (4.4 MB) for edge deployment.
- **Liveliness Service**
  - This service provided features like face detection, face recognition, face matching, and other face details like age, gender, race, etc. Furthermore, it also had modules to check for eye glasses, face mask, liveliness and spoof detection.
  - Developed a config driven backend, allowing front-end teams to dynamically turn on/off any module on per request basis. There was also an option to save configurations. One can simply pass the unique config ID, with the request, to use it.
  - Low latency (~150 ms for liveliness & spoof detection) allowed us to do real-time inference on video feeds. While other competitors were using active liveliness techniques, we used passive liveliness for detecting liveliness, with very high accuracy.
- **Other Roles & Responsibilities**
  - Identify areas of improvement in existing services and investigate new technologies like MLflow model registry, CVAT, Label Studio, Weights & Bias, FiftyOne, torch serve, KF serve, Ray serve, etc.
  - Regularly conducted training sessions to help new and junior team members.
  - Developed frameworks to train classification, regression, object detection & segmentation models. Frameworks also had support for preparing & validating data, experiment tracking, model validation, exporting models, and publishing models to MLflow model registry. Furthermore, frameworks can be used either as scripts or CLI or python code.

AiAdventures LLP
Pune, India

CO-FOUNDER & CEO
Aug. 2018 - Sep. 2021

We provided AI/ML solutions to businesses, and also trained people in Data Science & Machine Learning.

- **Developed full-fledged courses** for Python, Data Science, Machine Learning, Deep Learning, & Computer Vision. Each course had at least 9 hrs of content in the form of Jupyter notebooks, assignments, quizzes, external reading, questionnaires, and projects.
- Built the tech-stack required for generation, deployment & distribution of all courses.
- Helped 600+ students get started with python & Data science.
- Conducted 25+ college and corporate workshops on SOTA Machine Learning and Deep Learning systems.
- Wrote 20+ blogs on topics related to python, data science, ML, DL, databases, etc.
- Managing and developing client projects.
- Other day-today activities like hiring, marketing, accounting, etc.

Credit Suisse
Pune, India

PYTHON WEB DEVELOPER - SUMMER INTERN
May 2017 - Jul. 2017

- Created REST APIs for an inhouse CLI tool using python and flask. Also, I create a beautiful Web front-end to send, receive and track client orders using bootstrap and JavaScript.
- Used Boost C++ to create python bindings for a C library

Extracurricular Projects

- Built a python package called "**colab-everything**" which lets you run web-apps on any jupyter notebook like environment. The library has over **20K+ downloads**.
- Have **contributed to** Fastai, MLflow, LazyPredict, Pytorch Lighting, Category Encoding, YOLOv5, etc.
- Build **Bank Cheque service** that allows one to extract bank and account details from canceled cheques.
- Used ULMfit to perform Aspect Based Sentiment Analysis (for Hindi text) for restaurant & product reviews (published by IIT Patna). **Achieved SOTA results** in both sentiment & aspect classification tasks. ULMfit was trained on Hindi text scraped from wikipedia.
  Technologies: BeautifulSoup, NLTK, Spacy, Fastai, Pytorch, XML, SemEval
- Trained YOLO & Faster-RCNN detection models to detect jewelries in images. Used **unsupervised learning** (triplet & contrastive loss) to find similar images in the database. The application was exposed as Rest APIs.
  Technologies: Pytorch, Faiss, Flask, Rest-API, OpenCV, React, MongoDB, Docker
- Implemented face recognition to detect and identify students, and mark their attendance. Deployed it using Raspberry Pi, Camera module, and Ultrasonic sensor. Also, integrated mask detection module during pandemic.
  Technologies: Threading, OpenCV, Bash, Pytorch, Google Sheets API, requests, colab-everything

Kaggle Competitions

Shopee- Price Match Guarantee
Bronze Medal (207th / 2426)

- Task was to identify similar products using product image, title, description, and phash.
- It was a similarity search problem with new unseen products in the test set.
- Used unsupervised and self - supervised learning techniques (like SIMCLR, SWAV, ArcFace loss), and **multi-modal model** to extract product features, followed by KNN (faiss & rapis) & ranking to find similar products.

Global Wheat Detection
Bronze Medal (191st / 2245)

- Task was to detect wheat heads from field images across the globe.
- It was an Object detection problem with extremely noisy data and numerous wrong labels.
- Used YOLOv5, EfficientDet-B5, pseudo labeling, knowledge distillation, mosaic augmentation, Test Time Augmentation (TTA).

Mechanisms of Action
Bronze Medal (318th / 4373)

- Task was to measure the effect of drugs on genes and cells.
- It was a **multi-label** classification problem with 897 input features and 207 output labels.
- Used an ensemble of LightGBM, Tabnet and Custom Pytorch models.

Education

San Jose State University (SJSU)
San Jose, California

MASTERS IN SOFTWARE ENGINEERING
Aug. 2022 - May 2024

- Major Area of Specialization in **Data Science**.

College of Engineering, Pune (COEP)
Pune, India

BACHELORS OF TECHNOLOGY IN INFORMATION TECHNOLOGY
Aug. 2014 - May 2018

- Cumulative Grade Point Average: **7.67**/10