# PRABHTAJ SINGH BHASIN

## Avid problem solver and ML/AI Enthusiast

*Results-oriented, highly adaptable Software Engineer, passionate about research and skilled in developing elegant and scalable solutions in the context of ML, focusing on CV and NLP. A quick learner with excellent problem solving and leadership skills*


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## Work Experience

### Senior Software Engineer (ML/AI), **Accolite Digital**

October 2020 – Present

- **E-KYC**

  Client - Prudential PLC

  *A project spanning across a set of backend ML/AI services and edge AI models driving decision metrics for a complete eKYC module for an insurance application*

  *Tasks-*

  - Developed edge AI models for Image Classification, categorizing images into ID / Non-ID and into known ID types and Heatmap Regression based Landmark Localizer for document auto-cropping
  - Implemented React Native component for Real-Time Blink Detection, Iris Tracking and Facial Orientation Estimation
  - Developed a React-Native component for inferencing Facial Recognition/Verification results using TensorflowJS and MobileNet architecture for matching faces between PhotoIDs and real-time Video

- **ID-OCR**

  Client - Prudential PLC

  *This project enables Information retrieval from Identity Cards and Documents of thirteen countries and a total of thirty distinct ID types, serving as backend for multiple Sign-up, Verification and enrollment journeys in three different applications*

  *Tasks-*

  - Developed a DL model using Transfer Learning to categorize input images into ID, Photocopy or Non-ID (ID-Detect)
  - Developed DL models using Transfer Learning to classify an ID image into known ID types for various countries (ID-Classify)
  - Developed Heatmap Regression based ID-card Landmark Localizer to detect the 4 corners of an ID / Document in an image to facilitate auto-cropping

- **Roles & Responsibilities**
  - Define API Architectural Design and Pipelines (end-to-end Solution Architecture) for AI/ML services
  - Identify areas of improvement in existing services and investigate new technologies for the same
  - Incorporation of developed models into scalable production-grade APIs and deployment on AKS
  - Owned full responsibility of developing CI/CD pipelines, migrating and modifying PROD and UAT clusters
  - Actively collaborated with stakeholders to improve the developed APIs and modules

### Software Engineer (ML/AI), **Accolite Software**

July 2019 – September 2020

- **ID-OCR**

  Client - Prudential PLC

  *This project enables Information retrieval from Identity Cards and Documents of thirteen countries and a total of thirty distinct ID types, serving as a backend for multiple Sign-up, Verification and enrollment journeys in three different applications*

  *Tasks-*

  - Developed a Config driven backend service to extract information from ID images of various countries using OCR
  - Implemented Redis Caching for updating API configurations, taking effect without the need to deploy the APIs
  - Implemented a Metric for Reference-less text quality in ID images as proposed in CG-DIQA '18 (Hongyu Li et al.)
  - Developed an Image Processing based ID Background removal algorithm for crop-aligned ID cards along with other image enhancement techniques to enhance OCR capture accuracy
  - Increased Image Processing API throughput by leveraging GPUs for number crunching, resulting in a multi-fold performance increase (Image-Match)

- **Side Projects**

  Clients - Prudential PLC / Fedex / Envision

  *Some Projects and POCs developed by me and delivered/proposed to various clients*

  - Developed a RESTful API (Face-Preprocess) implementing and incorporating common Facial Deep Learning features -
    - Face orientation detection and alignment
    - Image Matting
    - Facial Embedding generation
    - Face enhancement via Super Resolution
    - Age estimator and Gender Classifier
    - Landmark and Bounding Box detection
  - Developed a model using UNet architecture for generating Sketched Avatars from selfies (AI-Sketch)
  - Developed an article Recommendation System POC and Architecture Plan for continually evolving recommendations
  - Trained Deep Learning State-of-the-Art NLP models to develop a Radiology report criticality classifier
- **Roles & Responsibilities**
  - Incorporation of developed models into scalable production-grade APIs and deployment on AKS
  - Maintaining and improving existing codebases, Improving system quality, designing and implementing systems
  - Owned end-to-end responsibility including requirement gathering, resolving Jira tickets, CI/CD Pipeline creation and deployments of developed microservices

### Intern (Full Stack), **Accolite Software**

June 2018 – December 2018

- **MAP4**

  Client - Community Healthcare Systems

  *A live web app for tracking In-patient and out-patient records in real-time and providing a single access point to get physicians and staff up to speed on a patients historical and ongoing treatments, used by a sizable number of Healthcare facilities across the US*

  *Tasks-*
  - Implemented RESTful APIs (Java) and AngularJS modules to expand application scope
  - Identified areas impacting MySQL query turnaround time and developed performance enhancements for the same
  - Owned full technical responsibility of assigned modules and feature sets of the webapp
  - Developed “Nursing Assessments” module to facilitate logging/viewing records digitized the nursing process
  - Actively worked in Agile software development environments which utilized the Scrum process

## Education

### Master of Computer Applications, **Savitribai Phule Pune University**

2016 – 2019

- **CGPA: 8.4/10**
- **Academic Projects:**
  - **Grid Detection -** Implemented a 2D version of DBSCAN, a data clustering algorithm to separate lines and noise. Detected structures made up of a series of intersecting lines (continuous or broken) from an image
  - **Communicator.hs -** Wrote a Haskell module to enable Inter-Process Communication using either Sockets or Files.
  - **Image Similarity Index Calculator -** Built a Python Application to calculate a similarity Index between two images using SSIM and Hamming distance.
  - **Trapland -** A Multiplayer console code-game consisting of programmable bots which roam a grid attempting to cover the most area. Uses Communicator.hs and a custom interpreter for bot programs.
  - **P2P Ad-Hoc Chat -** Implemented a protocol to achieve synchronization among nodes (in ad-hoc mode) in a network. Implemented automatic node discovery, DFS for sending messages and message store for offline nodes
- **Achievements:**
  - Ranked 2nd in Batch
  - Actively participated in technical events and fests
- **Research:**
  - **AnakDHT -** Proposed protocol for implementing a highly scalable ($2^{128}$ nodes) Distributed Hash Table which improved upon the scalability of Tapestry DHT while remaining as efficient and retaining the self-healing properties

Bachelor of Computer Applications, **GGDSD College, Panjab University** 2013 – 2016

- **Final percentage: 70%**
- **Achievements:**
  - Won 3 IT Quizzes representing the college at different Inter college fests
  - Won 3rd prizes for Debugging, Web designing and Cricket while representing college

## Programming Skills

- **Languages**
  - **Over 5000 Lines:** Python | Haskell | Javascript
  - **Over 1000 Lines:** C/C++ | Java
- **Go-To Tech**
  - **ML Libraries** - Pytorch | Keras | Tensorflow | TensorflowJS | TensorflowLite
  - **Python Libraries** - Pandas | Numpy | OpenCV
  - **DevOps** - Docker | Kubernetes | Bamboo | Azure/GCP
  - **Other Tools/Frameworks/Technologies** - Django | FastAPI | Git | NodeJS | Typescript
- **Familiar Tech**
  - Redis | React Native/JS | AngularJS | Hibernate | MYSQL | Selenium

## Activities

- Represented District Cricket team in U-16, U-19 Age divisions for 4 consecutive years
- Member of Core team coordinating annual sports event at Accolite
- Participated in Kaggle competitions
- Keep up to date with the latest in the world of AI/ML and Blockchain/Cryptocurrencies