



RAHUL KUMAR SINGH

Bengaluru, India 560037

rahulsngh883@gmail.com / +91-7829276625

PERSONAL SUMMARY

Accomplished Senior Technical Specialist specializing in Generative AI, Artificial Intelligence, Computer Vision, and Machine Learning. Demonstrates a successful track record in leading data science initiatives that significantly improve customer experience and drive business solutions. Recognized for strong team leadership and adept problem-solving abilities, with a key achievement in optimizing project outcomes across various sectors.

SKILLS

- **Skills:** Generative AI, Artificial Intelligence, NLP, Model Fine-tuning, Computer Vision, Deep Learning, Pattern Recognition, Segmentation, Detection, Tracking Algorithms, Machine Learning, Data Preparation, Data Visualization, Data Analysis, Feature Analysis, MLflow, Docker, Depth Data Processing, Azure
- **Libraries:** Whisper, Spacy, LangChain, Streamlit, OpenAI, Anthropic, PyTorch, TensorFlow, Keras, NVIDIA GPU-TensorRT, Intel OpenVINO, Scikit-learn, NumPy, OpenCV, OpenNI, Dlib, Matplotlib, Pandas
- **Programming Languages:** Python, C++, C, Matlab
- **IDE:** VS code, Azure Studio, PyCharm, Jupyter Notebook
- **Vertical:** Automotive, Pharmaceuticals, Sports, Retail, Visual Quality Inspection, Content Creation
- **Camera Experience** - Realsense, Orbbec, CCTV Cameras, Drone Footages, Stereo Cameras

EXPERIENCE

Senior Technical Specialist / Sony India Software Centre - Bengaluru, India

11/2021 - Current

- Leading a team of experienced data scientists in developing advance deep learning models to solve complex business problems and improve customer-experience.
- **Automatic Speech Recognition** - Performed comparison of available SOTA Speech Recognition models. Selected the best multi-lingual ASR OpenAi Whisper model. Performed a thorough understanding of Whisper model. Explored the feasibility and limitation of Initial Prompt, Post Processing of output using GPT models, Model Fine-tuning. Highlighted the issue in evaluation of the the model using WER on Japanese data. Set Data preparation guideline for fine-tuning.
- **Medical Document Chatbot & Summarizer** - Prepared an RAG based document summarizer capable of Summarizing medical reports. The pipeline takes ASR model text output as context for output generation
- **Pig Body Condition Score Estimation** - Performed data analysis, feature analysis on RGB and Depth data to get features to estimate body condition score of pig. In depth analysis of features and automating the approach for data generation.
- **YURU Hackathon** - emerged as one of the winners of Sony YURU musical Hackathon 2023. Received the **Entertainment Award**. The idea was to generate music using facial expressions. Our Team got opportunity to demonstrate our musical instrument in Japan. Music graph representation got special appreciation from judges.
- **Auto Selection Engine** - Reduces the work load of content creator. The module is capable of detecting blurred/de-blur, noisy, exposure issue and drastic shakes in a video. The major usecase of this application is to highlight non usable content and usable content.

- **Graphic Detection** - Score Board Detection, Text Recognition Module, Numeric Text Recognition Module, Graphic region detection in a sports broadcasting videos
- **Video Grouping** - Used Transformer models to perform video grouping. The approach is to use models to summarize the content of videos. Use the video summary to compare for similarity and group the videos

Technical Specialist / Robert Bosch Engineering & Business Solution - Bengaluru, India

02/2017 - 08/2021

- **PAI Device Gesture Recognition (In Air Gestures & Touch Gestures)** - Architected, developed, and owned the core machine learning feature for hand gesture recognition to control an android device in a Kitchen.
- Developed a mobilenetV2 classification model capable of handling sequential data. Achieved real time processing speed by implementing batch process using snapdragon neural process engine - <https://www.youtube.com/watch?v=mg09pRI0YIo>
- Filed a patent for Gesture Recognition Approach.
- **3D Pose Estimation** - Conceptualized, architected, and implemented a keypoint detection-based 3D pose estimation for cars. The estimated pose is used to automatically lock a visual aid CAD model to the target vehicle for further use as part of AR/VR application.
- Collaborated with cross-functional teams by giving technical inputs to generate synthetic data from Unity3D with annotation for key-points. Training a deep-learning network to predict key points based on Convolutional Pose Machine (CPM). 3D.
- Conceptualized, architected, and implemented a deep learning-based algorithm for face mask and social distance violation detection using camera sensors, significantly improving pandemic safety measures for factories and automotive plant units.
- **People Analytics** - Performed People Counting, analysis of the path taken, heatmaps for crowded area for a mall. Worked on actual CCTV footages. Helped them in figuring out flaw in their parking systems.
- **Visual Quality Inspection** - Developed and deployed a Visual Quality Inspection module for a pharma company. Developed a deep learning and classical image processing based hybrid technique to identify defective plastic moulds.
- The solution deployed on-site has increased the inspection throughput 6 times with 15% increase in defect detection. The defects classes can be broadly classified into color based defect, presence of hair and impurities, printing defects and filter breakage.
- **Yarn thickness Monitoring** - Developed a POC to monitor the thickness of a Yarn using Soliton cameras. Travelled to actual factory location to check for feasibility of Deployment

System Engineer - Research & Development / Tata Consultancy Services - Bengaluru, India

09/2013 - 01/2017

- Worked on development, enhancement, optimization and porting of ADAS (Vehicle Detect, Pedestrian Detection and Lane Detection) algorithms.
- **Development** - Developed a detection window approach to manage varying object sizes for detection at one shot without rescaling the image.
- **Enhancement** - Modified the existing tracking implementation to optimize the performance.
- **Optimization** - With complete codebase knowledge was able to restructure the existing data storage pattern to achieve 3 to 4x performance improvement and filed a **patent** for same. With data storage restructuring the images could be split into 4 halves and could be processed in 4 different cores of our intel machines.
- **Porting** - With data restructuring 3 to 4x improvement was achieved on TDA2x board from Texas Instruments. Optimization resulted in real time performance of all 3 algorithms on the hardware for an image size of 300x240.

EDUCATION

Instrumentation And Control Engineering - 8.7/10
SRM University - Chennai

05/2013

ACCOMPLISHMENTS

- Entertainment Award in Yuru Musical Hackathon 2023.
- Our Team got opportunity to demonstrate our musical instrument in Japan.
- Music graph representation got special appreciation from judges.

CERTIFICATIONS

- Patent granted for "Method And System To Detect Objects Using Block Based Histogram Of Oriented Gradients" - **US Patent Application 2017016930**
- Patent pending for "METHOD OF CLASSIFYING HAND GESTURES FOR CONTROLLING AN ELECTRONIC DEVICE" <https://patents.google.com/patent/DE102020209938A1/en?inventor=Rahul+Kumar+Singh>
- Filed 2 patents (status pending) in the area of Computer Vision and AI during 2019-2021