Parag Jain

An engineer and a researcher who cares about product, people and profitability

Contact Information

Mobile :	+1 438-979-4083
Email :	paragjainpes@gmail.com

Research Publications

July, 2020 **Microsoft Lab, India**	**A Novel Approach to Classify Cardiac Arrhythmia Using Different Machine Learning Techniques** at ICICC, 2020
	A system designed to predict and classify arrhythmia into one of 16 categories from ECG data using ensemble of ML algorithms. This is a SCOPUS-indexed publication. **Role :** Team lead and Mentor **Responsibilities :** To pitch the project to a batch of engineers and recruit a diverse team for this task. To mentor them in accomplishing this task within a specified duration of time. To supervise and track team's and individual's progress based on the set milestones. To present the work in a roadshow hosted by the Lab.
	• **Domain:** Healthcare • **ML Task:** Classification • **Dataset type:** Structured columnar data with labels • **ML Type:** Supervised • **ML Algorithms:** Naive Bayes, SVM, VFI • **System details :** Both front and back ends were implemented using Python

June, 2020 **Microsoft Lab, India**	**Heart Rate Monitoring System** at ICEES, 2020
	A biomedical wearable to transmit heart rate readings from patient to the doctor in real-time using cloud. This is a SCOPUS-indexed journal publication. **Role :** Research Engineer **Responsibilities :** To work along with a team consisting of Electronic and Computer Science engineers. Teaching, learning and collaborating to create a solution consisting of both HW and SW components. To present the work

	in a roadshow hosted by the Lab.
	● **Domain:** Healthcare ● **Technology category :** IOT ● **System details :** A system consisting of both hardware and software component ○ **SW :** A dashboard built using HTML, CSS, Javascript, PHP and SQL ○ **HW :** Microcontroller (LinkitOne) with Wifi module, GSM module and buzzer

Founding Experience

June, 2020 Intel Corporation, India	**getSeatStatus at Emerging Growth and Incubation Group**
	A cloud based SaaS product designed and developed keeping end-to-end travel requirements of employees of multi-national-corporations in mind. It was deployed in Intel, India and conversations to deploy in China and US was in progress. There were also discussions around integrating the solution with Intel's Advanced Driving Assistance System (ADAS). Zero-to-one experience with capability to go to one-to-hundered/thousand. **Features available in the employee application can be viewed here :** a) Hassle free discovery of the nearest pick up stop provided by the corporation to their location : https://youtu.be/E_H5KCz_dw4 b) Providing real time updates of seat availability : https://youtu.be/YIZ-UwrfMLs c) Real time tracking of shuttle : https://youtu.be/p0GRtCj9nU4 **Role :** Founder and CTO **Responsibilities :** To identify a problem in the real-world. Rapidly create a prototype to validate if problem really exists (finding Product-market fit). On validation, designing, developing, architecting, validating, and deploying the product. Interacting with end-users to understand their pain-points and expanding the features that the product has accordingly. Recruiting and leading a team of engineers, designer and product manager to conduct various activities associated with developing a product, identifying business model to generate revenue and assessing its viability for the market. Working with stakeholders across various groups within the organization to make the vision come true. Deploying in India with a plan to deploy in various other countries (China, US).
	● **Domain:** Mobility ● **Technology category :** Software ● **System details :** ○ **MVP :** A system consisting of Google form for registration, webpage for viewing information about the available seats in the registered shuttle and mass SMS service for receiving

	real-time updates about the shuttle. HTML, CSS, Javascript (with Ajax), PHP and SQL were used for design and development. 000webhostapp.com was used for cost-effective deployment. ○ **Product :** A system consisting of 2 mobile applications (one for passengers and another one for drivers) and dashboard for corporate services team to simplify their operations. Based on survey, it was found that most of the people in the target demography had Android mobile phones. Therefore, Android application was built. **Technical details :** XML for front-end, and Java for back-end was used. Appropriate data-structures, algorithms, design-patterns were used. Multi-threading was used to handle network operations and keep the user experience smooth. Combination of monolith and microservices architecture was used for development. Cloud functions and No-SQL database (GCP) were also used. RESTful APIs were created for remote communication. Publisher-subscriber architecture was also used. Geo-location services were used for providing various services to the users. Event-driven programming paradigm was used. Overall, we are dealing with a dynamic and distributed system here. Value created for the following stakeholders : Corporate employees, driver and corporate services team.

Work Experience

Nov, 2020-Aug, 2022 **Intel Corporation, India**	**Deep Learning Software Engineer at IOT Group**
	Enabling ISV and SI with development, deployment, and optimization of industry-oriented deep learning end use cases on CPUs, GPUs, and accelerators. Assessing and selecting the most appropriate precision levels for models (FP32, FP16, INT8) based on workload requirements, acceptable performance KPIs (accuracy vs throughput trade-off), and cost-effectiveness. ISV and SI were located across APJ, EMEA and Americas regions.

Jan-Oct, 2020 **Intel Corporation, India**	**Software Engineer at Client Computing Group**
	System integration and validation of a Linux based laptop. Worked on building Linux kernel and OS from its source code and enabling and validating interaction of BIOS with OS using ACPI.

Aug-Dec, 2019 **Intel Corporation, India**	**Software Engineer at Client Computing Group**
	Responsible for validation, automation and debugging of features as per the requirement of Chromebook customers across various stages of Chromebook development.

July,18-July,2019 **Intel Corporation, India**	**Firmware Engineer at Communication Devices Group (acquired by Apple)**
	Emulating hardware and developing firmware and driver to interact with the RF Subsystem (5G Modem).

Internship Experience

Apr-Dec, 2023 **Dreeven Technologies, Canada**	**Data Scientist (Research)**
	A system designed and developed to understand the user-adoption path on the Dreeven platform. Performed analysis and visualization of historical and live clickstream data of the users of the platform.
	• **Domain:** Digital Platform • **ML Task:** Identifying similar users based on their activity on the platform • **Dataset type:** Click-stream data • **ML Type:** Unsupervised • **ML Algorithms:** Divisive Hierarchical Clustering on similarity graph using Chi-Square test of association

Jan-July, 2018 **Intel Corporation, India**	**RF Driver Engineer at Communication Devices Group**
	Working with Communication Processor and Radio Access Technologies. Involves hardware emulation, interaction with firmware, and working with SoC.

Jan-July, 2018 **PES University, India**	**Subject Matter Expert at PESU I/O**
	Machine Learning Hands on Using Python : The course consists of tutorial videos, online content, hand-written notes, and offline group. Discussions for enhanced understanding of Machine Learning concepts by implementing algorithms in Python.

Jan-July, 2018 **PES University, India**	**Member at Centre of Data Science and Applied Machine Learning**
	Scene Understanding : A system designed using combination of recent advances in CV and Machine Translation to produce image captions. Uses CNN, RNN and Transfer Learning.

Jan-July, 2018 **Mantra.AI, India**	**Data Scientist**
	Implemented CNN, GAN, RNN, and LSTM using TensorFlow and NumPy.

Jan-July, 2018 **KaNoE, India**	**Research Intern at Centre of Knowledge Analytics and Ontological Engineering (funded by World Bank)**
	A system designed to rank politicians to assist citizens in choosing better representative.

Jan-July, 2018 **Ordell Ugo, India**	**Member Technical Staff**
	Understanding and implementing computer vision concepts using OpenCV.

Teaching and Mentoring Experience

May, 2019 **Intel Corporation, US**	**Presenter** at **Design,Test and Technology Conference 2019, Portland, Oregon**
	Presented and taught machine learning by taking real-world problems solved within Intel using machine learning **Target audience :** A stadium full of technology professionals from all across the world.

Jan-July, 2018 **PES University, India**	**Subject Matter Expert at PESU I/O**
	Machine Learning Hands on Using Python : The course consists of tutorial videos, online content, hand-written notes, and offline group discussions for enhanced understanding of Machine Learning concepts by implementing algorithms in Python. **Target audience :** Undergraduate engineering students (~70 in size)

Aug, 2016 **Microsoft Lab, India**	**Mentor at Microsoft Lab**
	Conducted 2 days of workshop on OpenCV on behalf of Microsoft- Lab **Target audience :** Undergraduate engineering students (~50 in size)

Education

Sep, 2022 - Present	Professional Masters in CS and AI at **University of Montreal and MILA (Quebec AI Institute), Canada**
2014-18	Bachelor of Technology in Computer Science, **PES University, India** **CGPA :** 9.47/10

AI Projects

May-July, 2023	**Building Language Applications - Conversational AI**
	Experimenting with langchain and large language models (LLMs) to create context specific conversational agents to answer questions. Pipeline also consisted of converting speech of one language to another and then passing it to the langchain for interpretation and response.
	• **Domain:** NLP • **NLP Task:** In-context understanding, retrieval and answering • **Database used for experiments :** Vector database • **Implementation language:** Python

Jan-Mar, 2023	**Character Region Awareness for Text Detection**
	Detecting text region of any language present in any real-world image one character at a time.
	• **Domain:** Computer Vision • **ML Task:** Text extraction • **Dataset type:** Images with text having character-level annotation • **ML Type:** Supervised • **CNN Network:** VGG16 network with batch normalization (pre-trained) + UNet • **Implementation framework:** PyTorch

July-Aug, 2020	**Cricket players detection and tracking - Drone footage**
	A computer vision and deep learning based solution to detect and track players of Indian Women Cricket Team in real-time. Drone footage taken at the international stadium is used as input. Intel OpenVino is used for optimal performance on Intel hardware while inferencing.
	• **Domain:** Computer Vision • **ML Task:** Object detection and tracking • **Dataset type:** Images with text having character-level annotation • **ML Type:** Supervised • **CNN Network:** SSD framework with tuned MobileNet v1 as a feature extractor • **Implementation framework:** OpenCV • **HW Optimization:** OpenVINO

May-June, 2020	**Real-time face mask detection**
	A deep neural network based solution to detect if a person is wearing a face mask. The real-time video feed is obtained from an IP camera over the network and multi-threading is used for over-coming producer-consumer problems.
	• **Domain:** Computer Vision • **ML Task:** Object detection and tracking • **Dataset type:** Images with text having character-level annotation • **ML Type:** Supervised • **CNN Network:** SSD framework with tuned MobileNet v1 as a feature extractor • **Implementation framework:** OpenCV • **HW Optimization:** OpenVINO

Aug-Dec, 2017	**Scene Understanding**
	Combination of advances in Computer Vision and Machine Translation to produce image captions. Uses CNN, RNN and Transfer Learning.
	• **Domain:** Computer Vision and NLP • **ML Type :** Transfer Learning, Supervised Learning • **System Architecture :** Encoder(CNN) - Decoder(LSTM) • **CNN Network :** Inception V3 (as feature extractor) • **Implementation framework :** Tensorflow

Jan-May, 2017	**Finger-print recognition**
	A systematic approach to extract features from finger-print for their recognition. • **Domain :** Digital Image Processing • **Techniques used :** Histogram equalization, binarization and various morphological operations

Jan-May, 2016	**Content-Based Image Retrieval System**
	An image based search engine

Jan-May, 2016	**Four-Point Perspective Transform Scanner**
	An application of Canny-Edge detection, Contour-detection, and four-point transform to make scanning of any document a delight.

Aug-Dec, 2015	**Face Recognition**
	An OpenCV based project to train on Yalefaces dataset and recognize faces using Principal Component Analysis.

Data Science Projects

Aug-Dec, 2015	**Analysis of historical and live games played in National Hockey League in North America**
	An end-to-end data pipeline was created (from acquiring cleaning, visualizing, modeling, analyzing, to presenting data) to gain insights about the series of ice-hockey game played as part of NHL in North America.

Feb-Apr, 2017	**Empirical Analysis on Dating Patterns**
	A study conducted to determine the science behind dating.

Software Projects

Jan-May, 2017	**C Compiler**
	Mimicked nested if-else construct and variable scope of C compiler using ply of Python.

Jan-May, 2017	**Battle of the Brains**
	Web Application for quizzes.

Jan-May, 2016	**Home Secure**
	Smart home to facilitate safe passage of user in case of emergency.

Jan-May, 2016	**Hotel Management System**
	A complete front and back end solution for managing hotel.

Aug-Dec, 2015	**Soduku Solver**
	Android application to solve Sudoku Puzzles.

Technical Proficiency

Programming Language	Python, Java, C, C++, R
Data Analysis Tool	Tableau, Jupyter Notebook

Data Processing Library	Pandas
Data Visualization Library	Matplotlib, Seaborn, NetworkX
Image Processing Library	OpenCV, Numpy
Deep Learning Library	PyTorch, Tensorflow, Keras, Scikit-learn, NLTK, Langchain
Experiment Tracking Tool	Comet.ML
Deep Learning Model Optimization Tool	Intel OpenVINO
Deployment Tool	Docker
Cloud Services	Google Cloud Platform - Cloud Function, Firestore Db
Web Technology	HTML, CSS, Javascript
Front End Library	Tkinter, Flask, Streamlit
Database	MySQL, PostgreSQL, MongoDB, HiveQL, Firebase Firestore (NoSQL)
Mobile App Development	Android Studio IDE
Microcontroller	Linkit One, Arduino UNO, Intel Gallileo, Raspberry Pi 2
System Tools	PuTTY
Operating System	Windows, Ubuntu, ChromeOS, Android

Scholarships and Honors

2022-2024 University of Montreal, Canada	**University of Montreal Exemption Scholarship for International Students**
	Scholarship conferred to international students pursuing Masters at University of Montreal, Canada

May, 2019 Intel Corporation, India	**Best of Design, Test and Technology Conference 2019 Award**
	Confered for teaching Machine Learning for Everyone at Oregon Convention Center, Oregon. Event was conducted by Intel Corporation

March, 2019 **Intel Corporation, India**	**2019 MPSG Division Recognition Awards**
	Confered for developing an intelligent PCT search in Host test framework which automatically validates 7000+ PCT table entries. Found critical issues in PCT which could have blocked use cases covering multi-band combinations.

2014-2018 **PES University, India**	**C.N.R Rao Merit Scholarship**
	Felicitated consecutively for 4 years for outstanding performance during engineering

2012 **Vivekananda Yuva Vedik Society, India**	**Best student in Academics Award**
	Felicitated with Swami Vivekananda Educational Award by Vivekananda Yuva Vedik Society for prolific performance in All India Secondary School Examination

Organizing and Judging Experience

2016 **Microsoft Lab**	**Roadshow 2k16**
	Organized roadshow in the MRD Auditorium to demonstrate the work done by the engineers of Microsoft Lab

2016 **Microsoft Lab**	**Incito 2k16**
	Organized ideathon sponsored by Microsoft Lab

2015 **Microsoft Lab**	**Hashcode 2k15**
	Organized and judged the participants of the 24 hour inter-college hackathon sponsored by Microsoft Lab

Open Source Contribution

Author of python module named utilities. A module to make image processing easier.