Parth Modi

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Education

Technical University of Darmstadt, Germany **November 2020 - September 2023**
Master of Science in Information and Communication Engineering
Specialization: Data Science and Machine Learning
Data Science-only 4.0/4.0; Master Thesis: 3.7/4.0; GPA: overall 3.0/4.0

Gujarat Technological University, Ahmedabad, India **September 2015 - May 2019**
Bachelor of Engineering in Information and Communication Engineering
Specialization: Digital Signal Processing, Machine Learning
GPA: overall 3.4/4.0

Publications

P. D. Modi, K. Arshi, P. J. Kunz and A. M. Zoubir, *A Data-driven Deep Learning Approach for Bitcoin Price Forecasting*. 2023 24th International Conference on Digital Signal Processing (DSP), Rhodes (Rodos), Greece. (2023) link

Patent

Filed a patent application for: Deep Learning-based auto Overlay Generation using CAD images - incorporation with Atlas Copco group Pvt. Ltd.

Teaching (2017 - Present)

Helping students and working professionals to get better at theoretical concepts of machine learning, data science and coding via YouTube – 3.5k community.

Create lectures on machine learning and data science concepts.

Research Experience

Atlas Copco Research and Development *with Dr.Zoubir, MSc.Pertami Kunz October 2022 - Now*
Developed Neural Network-based GAN models for generating surface inspection overlays, enhancing defect detection accuracy - **Master Thesis and AI Software Developer**.

- *Investigated the role of multiple discriminators in GAN training, concluding that multi-level discriminators enhance the robustness of image generation.*
- *Developed a Generative AI model using 2D and CAD images for surface inspection, reducing process time by 80% compared to manual methods.*
- *Implemented a trained model in the production environment, enhancing operational accuracy by 90%; successfully filed a patent application to protect the proprietary technology and its algorithms.*
- *Benchmarked object detection models on AI acceleration platforms, including Nvidia Jetson, to use low-cost embedded devices as compared to high-end GPUs for inference in industries, reducing 50% hardware costs.*
- *Fine-tuned and improved a U-Net deep learning model, boosting 70% structural similarity index (SSIM) between ground truth and predicted images for precise car surface inspection; effectively reducing 90% labour cost.*

Data Science Seminar at Technical University of Darmstadt *with Dr.Debes March 2022*
Worked on Developing a Data-Driven Bitcoin Price Prediction project.

- *Developed and implemented advanced deep learning models, including RNNs, LSTMs, and hybrid architectures, to accurately forecast Bitcoin prices by leveraging historical price data, trading volumes, and macroeconomic indicators.*
- *Achieved a significant reduction in forecasting error, with models demonstrating up to 20% improvement in Mean Absolute Error (MAE) and Mean Squared Error (MSE) compared to traditional methods like ARIMA. The LSTM-based model, in particular, excelled in capturing long-term dependencies and non-linear patterns in Bitcoin price data.*
- *Published findings in a peer-reviewed conference (International Conference on Digital Signal Processing (DSP)), highlighting the practical applications of deep learning in financial forecasting.*

Student Research Assistant *with M.Sc. Alexander Breunig* *November 2020 - March 2021*
Worked on Designing the Optimal Algorithms for Deep Drawing.

- *Implemented optimal algorithm for image file and STL point cloud analysis using Python data structures and algorithms, enhancing processing efficiency by 50%.*
- *Developed visualization tool for test data analysis of deep drawing thickness measurements, enhancing data interpretation and decision-making processes.*

Student Research Assistant *with M.Sc. Enno Lang* *April 2021 - September 2021*
Worked on Developing a Machine Learning models to predict wear and tear in machine parts.

- *Developed methods to synchronize time series data of different frequencies.*
- *Achieved 20% reduction in MSE (Mean Squared Error) in forecasting as compared traditional methods.*

Academic Projects

Technology Transfer with AI - Seminar *with Dr. Michels* *August 2023*

- *Conceptualized and pitched an AI-driven startup for precise ovulation prediction, earning recognition as one of the top 3 innovative ideas in a technology transfer seminar.*

AI in Medicine Challenge *with Dr. Christoph Hoog* *August 2022*

- *Secured 3rd place in AI competition by implementing GANs for dataset balancing, achieving 0.85 F1 score in ECG abnormality detection, reducing 90% workload of healthcare specialists.*

Industry Experience

Atlas Copco, Research and Development, Germany *May 2022 - October 2022*
Student Research Assitant and Global Industrial Internship Candidate

- *Engineered Defect Detection models using Resnet architectures, incorporating Adaptive Gamma Correction for image enhancement, resulting in 10% improvement in test data accuracy.*
- *Presented comprehensive project outcome to the international presidential panel at company headquarters, detailing a 15% increase in efficiency and savings of €300K annually through strategic process improvements.*

Spryfox, Darmstadt, Germany *October 2021 - March 2022*
Data Science Intern

- *Trained a machine learning model for predicting pet diseases using Logistic Regression and XGBoost, improving age-based risk assessment accuracy by 20% and breed-based by 10% for a pet insurance provider client.*
- *Engineered an advanced autoencoder-based defect detection system for textile images, achieving a 20% improvement over existing methods and successfully implementing it in production environments.*

Other Experience

Founder of Robotics Club at university clubs *January 2019*
Smart India Hackathon, Finalist *August 2018*

Awards

2021-2022 Germany Student Scholarship (top 2%) – $4,000
2019 Student Startup and Innovation Council Ideathon Runnerup – $2,500
2019 Fastest Growing Machine Learning Youtube Content Creator – $500
TCS Coding Challenge Qualifier

Community Involvement

DAAD Info Session 2022, University Representative, Taiwan *April 2022*
Technical University of Darmstadt Department Orientation Program, Mentor *October 2021*
Event Manager at Robotics Club, Volunteer *March 2019*
Blind Student Exam Writer, Volunteer *September 2018*
Gujarat Technological University Regional Science Fair, Volunteer *April 2017*

References

Dr. Abdelhak M. Zoubir
Professor and Head of Department Signal Processing at TU Darmstadt, **Email:** *zoubir@spg.tu-darmstadt.de,* **Tel:** *+49 (6151) 1621341.*

Dr. Oliver Stolz
Vice President of Machine Vision Division at Atlas Copco Group, **Email:** *ostolz@isravision.com*, **Tel:** *+49 (6151) 948-378.*

Dr. Dominik Michels
Professor of Computer Science at TU Darmstadt, **Email:** *michels@cs.tu-darmstadt.de*, **Tel:** *+49 (6151) 16-20802.*