SANGAMITHRA PANNEER SELVAM

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LinkedIn | *GitHub* | *Portfolio*

EDUCATION

University of Stuttgart - *CGPA – 2.4 (5th semester)* — Stuttgart, Germany
Master of science in Electrical Engineering — October 2019 – Present

Advanced mathematics for signal and information processing, Deep learning with probabilistic models, Detection & Pattern recognition with Machine learning, Statistical & Adaptive signal processing, Statistics and Business Analytics.

Anna University – *CGPA – 1.8 First Class with Distinction* — Chennai, India
Bachelor of Engineering in Electrical and Electronics Engineering — August 2015 – May 2019

Automation projects, Machine learning, Research assistant at Zion ML & Robotics, IEEE member & organiser.

EXPERIENCE

Ferdinand Steinbeis Research Institute — Heilbronn, Germany
Research Intern — November 2021 – April 2022

- Developed NLP-Content Based Recommender System architecture to find business ecosystem partners and traits leading to 95% reduction in manual effort and provides 360° business value.
- Enriched company profiles with web-scraping and unstructured data processing using TensorFlow and NumPy.
- Conceptualised a new trait prediction idea of companies with clustering algorithm and data visualisation on Tableau.
- Modelled Ontology, Knowledge graph on Neo4j graph databases to map company profiles. Formulated Cypher Query to get top ranking of companies with evaluating metrics of 83% precision and 86% recall.
- Created an automated recommend system with model pipeline by deploying trained deep neural networks, language models and ML algorithms with 85% accuracy.

Ferdinand Steinbeis Research Institute — Heilbronn, Germany
Student Research Assistant — September 2020 – September 2021

- Aided as a research student for the Vice President co-innovation at Bosch.
- Collaborated closely on AIoT framework and worked in AIoT Lab on Pneumatic System research project.
- Co-ordinated the launch of AIoT playbook by Bosch connected world as a member of Expert Network.
- Acted as front-end developer of AIoT Framework, Agile Scrum master & Machine learning research engineer for AIoT lab, Miro Board -AIoT masterclass organiser, LeanIX modelling and handled procurement department.

Institute of Aircraft Design (SWE), University of Stuttgart — Stuttgart, Germany
Scientific Research Assistant — September 2020 – March 2021

- Undertook wind turbine Force - Torque coupling model using Simpack tool to reduce electro-mechanical interactions.
- Built first time C user routine from Fortran with faster computation of 1.5× times and contributed to first level documentation of C framework on Simpack. Implemented Java Native Function to call Java method from C program.

Michelin Tyres — Chennai, India
Automation Intern — September 2018 – February 2019

- Performed data analysis using data engineering techniques on spare parts for purchase department.
- Optimized stock on hand and cost using python for drives, rollers & motors by component level mapping of machines.
- Detected duplicate codes on electrical spare parts among 17000 parts and achieved an efficiency of 80%, thereby contributing to cost savings by 20% (confidential) in annual expenditure.

PROJECTS

Automated analysis of requirements for testing of autonomous vehicles — Stuttgart, Germany
Artificial Intelligence — June 2022 – Present

- Analysis of the requirements and developing architecture for automated test case generation through NLP pipeline, validating through software engineering tools, guidelines and data modelling.

- Employing end-to-end AI solutions using language models like Bert or word2vec with neural network for classification. Feature engineering by extracting of RDF triples from structured data to model parameters using OWL ontology.

Distributed Training of Neural Network Stuttgart, Germany
Deep Learning April 2021 – October 2021

- Analysed distributed training of ResNet18 CNN model on GPU and CPU Linux HPC machine clusters to reduce computational intensity and memory demands of DNN.
- Trained the model by parallelism techniques with PyTorch and Message passing interface with relevance of batch size and average gradients using DP & DDP PyTorch packages.
- Observed result includes overhead in communication, training time & training accuracy over 95% and reduction in training times by 3× times on CPU and 54.5× times on GPU.

Pneumatic System Use case Heilbronn, Germany
Artificial Intelligence - AIoT lab May 2021 – September 2021

- Built a system that utilizes AI-based sound analysis to detect leakages in pneumatic systems with a goal to evaluate Holistic DevOps and AI/Machine learning model reuse with cost reduction of over 96%.
- Designed architecture stack on LeanIX tool including data flow, domain overview and digital twin overview diagrams.
- Analysed 1.7 million sound data by data engineering techniques and with Mel - frequency cepstral coefficients.
- Trained multiple deep neural network models by data ingestion through a hyperparameter tuning system.
- Created model repositories for MLOps execution with detection accuracies over 90%, and deployed on RPi.

Automatic Power factor Correction and Harmonic Reduction in Commercial Systems Chennai, India
Automation (Team size: 3) October 2018 – April 2019

- Implemented a system to minimize effects of deteriorating power factor and harmonics on an induction motor.
- Designed an automated system to switch on compensation devices to ensure maximum power transfer.
- Attained improvement in efficiency of over 50% by reaching 0.9 PF with PIC microcontroller 16F877A and Ardiuno IDE for implementation.

PUBLICATIONS

- Lüdecke, F.D.; Schmid, M.; Rehe, E.; Panneer Selvam, S.; Parspour, N.; Cheng, P.W. "*Numerical Aspects of a Two-Way Coupling for Electro-Mechanical Interactions - A Wind Energy Perspective*". Energies 2022, 15, 1178.
- P.Sangamithra, M. Kishore Abishek, "*Modeling And Analysis Of Touch Screen Based Wireless Control Of Four Motor Robotic Vehicle Employing Knowledge-Based System And Ensemble Machine Learning*". IJEET, Volume 9, Issue 2.

SKILLS & INTERESTS

Languages – English | German B1 | Tamil.

Programming Languages & Libraries– C | C++ | Java | Python | R | React | SQL | MPI | Html | CSS | Linux | LaTeX | Cypher Query | JNI | Pandas | NumPy | Matplotlib | Seaborn | Scikit-learn| PyTorch| Tensorflow | Keras | SpaCy | CoreNLP | Standford parser| HuggingFace | NLTk

Tools & Technologies – PSpice | MATLAB | Tableau | Protégé | Neo4j | Arduino IDE | AWS | Docker | Git | Jupiter | Kubernetes (Basic) | Hadoop with Spark | Anaconda | Visual Studios | MS Office.

Interests – Formula 1 enthusiast; Loves travelling, history documentaries and strum guitar in my free time.

LEADERSHIP AND ACHIEVEMENTS

Deutschlandstipendium - *Robert Bosch GmbH and Wagner Stiftung* April 2020 – April 2022

General Co-ordinator, National Service Scheme March 2015 – April 2018
Managed 100 volunteers and 10 department coordinators. Conducted 35 events including coast line clean-up, Road safety campaign. Organized blood donation camp securing a state level award.

CERTIFICATIONS

- The Ultimate Hands-On Hadoop **|** DevOps with CI/CD - Beginners to Advanced Udemy 2022 - Present
- Data Science with ML, NLP, DL and RL **|** Ultimate AWS Certified Cloud Practitioner Udemy 2022
- Business Model Development Facilitator AIoT Masterclass 2021