

Naga Sai Pranay Modukuru

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EDUCATION

- **Fachhochschule Südwestfalen** Soest, NRW, Germany
Master of Science in Systems Engineering and Engineering Management *Apr. 2018 - Present*
 - **Focus areas:** Machine Learning and Artificial Intelligence, Signal Processing, Microprocessor-Based Systems, Business in Engineering
- **Jawaharlal Nehru Technological University** Hyderabad, India
Bachelor of Technology in Electrical and Electronics Engineering *Sep. 2013 - Apr. 2017*
 - **Focus areas:** Microcontrollers and Microprocessors, Neural Networks and Fuzzy Logic, Control Systems, Power Electronics, Analog Electronics

EXPERIENCE

- **Fachhochschule Südwestfalen** Soest, NRW, Germany
Master Thesis *Dec. 2019 - May. 2020*
 - **Title:** "Enabling Lifelong Learning in Neural Networks with Gradient Monitoring and Dynamic Architectures"
 - Developed a novel regularization technique to reduce catastrophic forgetting in Sequential Multi-Task Learning
 - Devised an algorithm to train Multi-headed Neural Networks for Process Monitoring and Computer Vision tasks

Research Assistant - Department of Automation Technology *Aug. 2019 - present*

 - **Research:**
 - * Developed and Implemented a novel Nonlinear-Convolutional layer for robust feature extraction
 - * Evaluating performance of the developed layer on Process Monitoring and Remaining Useful Life estimation
 - **Data Analysis:**
 - * Analysing raw industrial data to depict relationship between different operation regimes of a metal production process
 - * Visualizing feature interactions to understand effects of one process on another

Teaching Assistant - Control Systems and Neural Networks *Feb. 2019 - Jul. 2019*

 - Prepared course content for modules 'Control Engineering' and 'Machine Learning'
 - Conducted 'Control Engineering' Lab sessions for undergraduate students
- **Freelance - Application Developer** Soest, NRW, Germany
Worked as part of start-up project *Sep. 2019 - Dec. 2019*
 - Developed a Deep learning Application for an insurance firm to predict future costs for the firm and probable diseases for the customer
 - Performed Data Analysis to determine important features for making predictions

FURTHER EDUCATION

- **Machine Learning Engineer Nanodegree** Mar. 2020 - Apr. 2020
Udacity *Soest, NRW, Germany*
 - **Focus areas:** Deep Learning, Machine Learning, Cloud Computing, Amazon Web Services (AWS - SageMaker, Lambda, API Gateway)
- **Deep Learning Specialization** Jan. 2020 - Mar. 2020
deeplearning.ai, Coursera *Soest, NRW, Germany*
 - **Focus areas:** Neural Networks and Deep Learning, Structuring Machine Learning Projects, Convolutional Neural Networks, Sequence Models

SKILLS

- **Industry Knowledge:** Deep Learning, Machine Learning, Computer Vision, Signal Processing, Image Processing, Natural Language Processing (NLP), Microcontrollers
- **Programming Languages:** Python, C/C++, MATLAB, SQL, HTML, CSS
- **Tools and Technologies:** Git, Github, Cloud Computing (AWS - SageMaker, Lambda, S3), Docker, LabVIEW, Arduino, Raspberry Pi, AVR Studio, PSpice
- **Operating Systems:** Windows, Linux (Ubuntu)
- **Languages:** English, German, Hindi, Telugu
- **Python Libraries and Frameworks:** PyTorch, TensorFlow, Keras, PySpark, Scikit-Learn, SciPy, XGBoost, OpenCV, Numpy, Pandas, Matplotlib, Seaborn, Plotly, Flask, SQLAlchemy, Tkinter

PROJECTS

- **Customer Segmentation and Acquisition:** Used Unsupervised Learning approach to segment general population and customer population in Germany to determine similarities. Used Supervised Learning Algorithms to predict future possible customer. Participated in a Kaggle competition (top 30 percentile). Tools: *Python, Scikit-learn, XGBoost*
- **Sentiment Analysis Model Deployment:** Trained and deployed an LSTM-based sentiment analysis model on AWS SageMaker as a Lambda function to interacted it with API Gateway through a web-app. Tools: *Python, PyTorch, AWS SageMaker, Lambda*
- **PMSM Rotor Temperature Prediction:** Trained a Convolutional Neural Network (CNN) on Time-Series sensor data of a Permanent Magnet Synchronous Motor (PMSM). Achieved an R2 Score of 0.98 in predicting the rotor temperature under different operating conditions. Tools: *Python, PyTorch*
- **Soft Sensor Development:** Used Machine Learning to predict process variables in Tenesse Eastmann Process, which are usually measured with sensors. Trained Support Vector Machines, Decision Trees and Deep Neural Networks to predict the component measurements. Tools: *Python, Scikit-Learn, Keras*
- **Denoising Autoencoder:** Removed coffee stains, folds, footprints and wrinkles from scanned documents using a Convolutional Neural Network (CNN)-based Autoencoder. Trained a CNN-Autoencoder on Noise Office Dataset. Tools: *Python, PyTorch, OpenCV*
- **Hand Gesture Detection:** Trained a Convolutional Neural Network (CNN) on hand gestures by collecting training data using OpenCV and a laptop's webcam. Tools: *Python, PyTorch, OpenCV*
- **Morse Code Decoder:** Designed a Digital Filter to remove noise from a modulated signal and implemented an algorithm to decode the filtered signal. Tools: *C, MATLAB, LabVIEW*
- **Microcontroller-based Temperature Controller:** Used an AVR ATmega128 Microcontroller to control the temperature of an oven. Designed an algorithm in C to control the nonlinear behavior of the temperature. Tools: *C, AVR Studio, AVR ATmega128, LabVIEW*