Naga Sai Pranay Modukuru

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Education

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

Experience

- **Master Thesis** Dec. 2019 - May. 2020
  Fachhochschule Südwestfalen *Soest, NRW, Germany*
  - **Title:** "Enabling Lifelong Learning in Neural Networks with Gradient Monitoring and Dynamic Architectures"
  - Devising an algorithm to train Multi-headed Neural Networks for Condition Monitoring on Industrial Datasets
  - Developing a novel regularization technique for reducing catastrophic forgetting in Multi-Task Learning
    Tools: *Python, PyTorch*
- **Research Assistant - Automation Technology** Aug. 2019 - present
  Fachhochschule Südwestfalen *Soest, NRW, Germany*
  - **Research**:
    * Implemented a novel Nonlinear-Convolutional layer for Time Series feature extraction using PyTorch
    * Evaluating performance of layer on Condition Monitoring and Useful Life estimation
  - **Data Analysis**:
    * Analysing raw industrial data to depict relations between different stages of production processes
    * Visualizing feature interactions to understand effects of one process on another
    * Developed a framework to automate feature extraction from large scale industrial data

    Tools: *Python, PyTorch, Pandas, Numpy, Matplotlib, Seaborn, Plotly*
- **Teaching Assistant - Control Systems and Neural Networks** Feb. 2019 - Jul. 2019
  Fachhochschule Südwestfalen *Soest, NRW, Germany*
  - Preparation of course content for modules 'Control Engineering' and 'Machine Learning'
  - Conducted 'Control Engineering' Lab sessions for undergraduate students
    Tools: *Python, Keras, MATLAB, Simulink*
- **Application Developer (Freelance)** Sep. 2019 - Dec. 2019
  Continuum (Worked as part of start-up project) *Zambia, Africa*
  - 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
  - Developed a web-based desktop application to deploy the model
    Tools: *Python, Keras, Flask, Tkinter*

Further Education

- **Deep Learning Specialization** Jan. 2020 - Present
  deeplearning.ai, Coursera
  - **Focus areas**: Neural Networks and Deep Learning, Structuring Machine Learning Projects, Convolutional Neural Networks, Sequence Models
- **Machine Learning and Data Science with Python** May 2019 - Dec. 2019
  DataCamp
  - **Focus areas**: Machine Learning, Data Analysis, Data Visualization, Python

Skills

- **Industry Knowledge**: Deep Learning, Machine Learning, Computer Vision, Signal Processing, Image Processing, Microcontrollers
- **Programming Languages**: Python, C/C++, MATLAB, SQL, HTML, CSS
- **Tools and Technologies**: Git, Github, 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

- **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 and achieved a test accuracy of 100 percent. Collected hand gestures using OpenCV from 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*