

# Naga Sai Pranay Modukuru

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## EDUCATION

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- **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

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- **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 ANNs on fault classification, image recognition
    - Working on developing algorithms for Predictive Maintenance and Automation using Machine Learning Tools: *Python, PyTorch*
  - **Research Assistant - Automation Technology** Aug. 2019 - present  
*Fachhochschule Südwestfalen* *Soest, NRW, Germany*
    - **Research:**
      - \* Implemented a novel Nonlinear-Convolutional layer using PyTorch
      - \* Evaluating performance of layer on fault classification and image recognition tasks
    - **Data Analysis:**
      - \* Analysing raw industrial data to depict relations between different stages of production processes
      - \* Visualizing various features to understand effects of one process on another
      - \* Developed a framework to automate feature extraction from large amounts of data
  - **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
  - **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 web-based desktop application to deploy the model
- Tools: *Python, Keras, Flask, Tkinter*

## SKILLS

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- **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

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- **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*