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Shankar Kumar Jeyakumar

Applied Machine Learning Enthusiast
Interested in Data Science, Autonomous Systems,
Computer Vision and Embedded Intelligence

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Stuttgart 70567

Professional Experience

September 2019
February 2020

Robert Bosch GmbH

Intern at the Bosch Centre for Artificial Intelligence (BCAI)

Lead AI Enabler for Classical Machine Learning and Deep Learning

- Designed the platooning demonstrator of self-driving cars, presented at the Bosch AI Conference of 2019 and headline of the German newspaper *Handelsblatt*
- Implemented Deep Neural Networks for image classification, object detection, object tracking and segmentation and Logistic Regression for lane planning
- Designed an Auto Regressive Integrated Moving Average (ARIMA) and Facebook's Prophet model for time series analysis, forecasting and backcasting of solar irradiance data
- Designed a Deep Q-Network based Reinforcement Learning demonstrator with 12 degrees of freedom for industrial robotic applications (ongoing)
- Researched on Bayesian Optimization and classical machine learning model demonstrators

[Python] [C/C++] [TensorFlow] [PyTorch] [OpenAI Gym] [NVIDIA Jetson] [Arduino] [Raspberry Pi]

March 2019
August 2019

Weidmüller Interface GmbH & Co. KG

Working Student in Hardware Development, Device and Field Connectivity

- Simulated and designed a wireless power transmission prototype for high voltage systems
- Qualitative and quantitative analysis of circuit parameters and components

[C/C++] [Python] [CAD]

May 2018
November 2018

Robert Bosch GmbH

Internship in Corporate Research, Flight-Capable Systems

- Designed an embedded controller for speed and phase control of a drone rotor
- Designed a high-speed rotor synchronization system for an octa rotor configuration
- Performed Particle Image Velocimetry for analysis of aerodynamic statistics of the system

[Python] [C/C++] [Matlab] [Simulink] [Arduino] [Raspberry Pi]

February 2018
April 2018

University of Paderborn

Research Assistant at the Dept. of Computer Engineering, Approximate Computing

- Designed a Monte Carlo Tree Search (MCTS) machine learning algorithm for synthesis and approximation of circuit components in reconfigurable systems
- Ported the algorithm from C++ to Python to integrate into a machine learning pipeline consisting of an Auto Encoder for design space exploration

[Python] [C/C++] [Verilog] [Matlab]

December 2014
August 2016

Infosys Ltd.

Systems Engineer, Oracle Applications

- Software developer responsible for production environment support and maintenance
- Designed an embedded medical diagnostics system based on integration of Natural Language Processing and Google speech recognition with an accuracy of 96%

[Java] [SQL] [Python] [C/C++]

August 2014
November 2014

Pramati Technologies Pvt. Ltd.

Associate Systems Engineer, Oracle Applications

- Software developer in Scrum methodology in a globally distributed team environment

[SQL] [C/C++] [Java] [Docker]

Academics October 2016 August 2019	Master of Science, Computer Engineering University of Paderborn, Grade: 2.9 Focus areas: Pattern Recognition, Machine Learning, Embedded Systems Master's Thesis: Incremental Machine Learning using Support Vector Machines <ul style="list-style-type: none"> Designed an embedded machine learning system with Support Vector Machines for tackling Classification and Regression problems on Big Data with accuracies from 82% to 96% Implemented various incremental learning methods for batch and online training with approximations to reduce run time (-65%), memory (-25%) & computational complexity (-15%) Implemented PCA, t-SNE and Parallel Coordinate plots for visualizing high dimensional data and K-Means and Nearest Neighbor clustering methods as a test of classifiability Accelerated training and inference phases by 500% using reconfigurable hardware [Python] [C/C++] [Verilog] [Scikit-Learn] Master's Project: Autonomous Driving on Reconfigurable Hardware <ul style="list-style-type: none"> Designed a 1:10 scale self-driving car that can navigate using Computer Vision, aided by sensor fusion of LIDAR and Sonar for Simultaneous Localization and Mapping (SLAM) System implemented on reconfigurable hardware to emulate over the air firmware updates and designed strategies for protection against external software and hardware attacks [Python] [C/C++] [Verilog] [OpenCV]		
August 2010 June 2014	Bachelor of Engineering, Electronics and Communication Visveswaraya Technological University, Grade: 2.3 Bachelor's Thesis: Intelligent Embedded Myoelectric Controller for Prosthetic Fingers http://youtu.be/fClnG4zWepo , https://ieeexplore.ieee.org/document/7899218/ <ul style="list-style-type: none"> Inter disciplinary project in association with Texas Instruments and IEEE Designed a combined Classification and Regression based model for finger movement prediction [C/C++] [Python] [CAD] [Matlab]		
Industrial Projects	Electric Drive Optimization for Self-Driving Cars Electrification Challenge, Continental Hackathon <ul style="list-style-type: none"> Designed different driving strategies prioritizing longest travel distance by Regression curve tuning for optimum acceleration to torque transfer ratio [Python] [Scikit-Learn] [Raspberry Pi] Environment Modelling for Autonomous Driving Automotive Cloud and Connectivity Challenge, Continental Hackathon <ul style="list-style-type: none"> Designed a combined point cloud and scene segmented environment model around the self-driving car, based on fused sensor data and infrastructure interaction Implemented DBSCAN and K-Means Clustering techniques to label sensor data and bandwidth optimization methods for over-the-cloud transfer from Raspberry Pi to AWS [Python] [Scikit-Learn] [Raspberry Pi] [Arduino]		
Skills	<table> <tr> <td> Programming Python, C/C++, Java, basic R, SQL, HTML, XML Embedded C, Verilog, VHDL Software Git, PyCharm, Eclipse, Microsoft Visual Studio Xilinx Vivado Suite, Matlab, Simulink Operating Systems Windows, Linux, ROS </td><td> Frameworks Numpy, Scikit-Learn, TensorFlow, PyTorch, Keras, Pandas, OpenAI Gym, OpenCV, Jupyter Notebooks, Amazon Web Services Hardware Platforms NVIDIA Jetson, Arduino, Raspberry Pi, Xilinx FPGAs </td></tr> </table>	Programming Python, C/C++, Java, basic R, SQL, HTML, XML Embedded C, Verilog, VHDL Software Git, PyCharm, Eclipse, Microsoft Visual Studio Xilinx Vivado Suite, Matlab, Simulink Operating Systems Windows, Linux, ROS	Frameworks Numpy, Scikit-Learn, TensorFlow, PyTorch, Keras, Pandas, OpenAI Gym, OpenCV, Jupyter Notebooks, Amazon Web Services Hardware Platforms NVIDIA Jetson, Arduino, Raspberry Pi, Xilinx FPGAs
Programming Python, C/C++, Java, basic R, SQL, HTML, XML Embedded C, Verilog, VHDL Software Git, PyCharm, Eclipse, Microsoft Visual Studio Xilinx Vivado Suite, Matlab, Simulink Operating Systems Windows, Linux, ROS	Frameworks Numpy, Scikit-Learn, TensorFlow, PyTorch, Keras, Pandas, OpenAI Gym, OpenCV, Jupyter Notebooks, Amazon Web Services Hardware Platforms NVIDIA Jetson, Arduino, Raspberry Pi, Xilinx FPGAs		
Hobbies	Sketching, painting, craft and origami, football and weight training. Can sing, play the guitar, keyboard and drums. Avid reader and gamer. Love travel and photography		
Languages	English, German (B1), Sanskrit, Kannada, Hindi, Tamil, Telugu, Malayalam and Arabic		