NEHA DAS

Graduate Student

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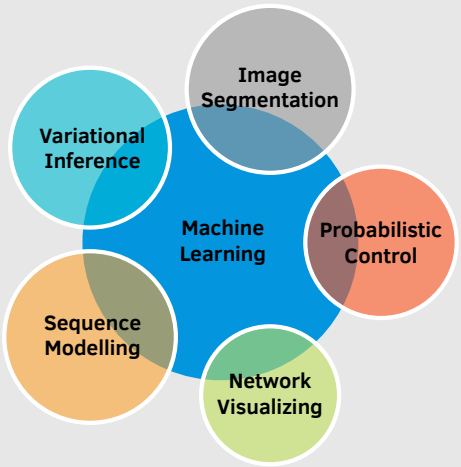
Technical Skills

Research Experience and Interests



Programming

Python • Tensorflow • Pytorch

C • C++

Javascript • Django(Python) • Docker

OpenCV • MATLAB • Simulink

Education

Oct 2016 - Present — **MSc. Informatics** — Technical University of Munich
Running Grade - 1.4

Aug 2009 - May 2013 — **BTech. Software Engineering** — Delhi Technological University
Avg. - 75.48, First Division with Distinction

Research

Sep 2018 - Present — **Master Thesis** — TUM, Volkswagen Group AI Research
Learning state-space models of camera based drones for intrinsically motivated control

Work till now includes:

- Implementation and extension of Deep Variational Bayes Filter to incorporate high-dimensional image data.
- Preparation of custom synthetic image-based datasets for intermediate testing and tuning of the model before it is actually applied to the drone.
- **Tools**: Python, Tensorflow, OpenCV, Matplotlib

June 2017 - May 2018 — **Inter Disciplinary Project** — Chair for CAMP@TUM
3D Human Body Segmentation

This work was part of a collaborative effort to provide a virtual view into a patient's body for assistance during diagnosis and surgical procedures. My contributions included:

- Devising and implementing a fast segmentation architecture for a 3D model of the human body constructed using KinectFusion SLAM from depth maps. The segmentation architecture was based on U-Net with Depthwise Separable Convolutions for added speed (50% increase over normal CNNs).
- Preparation of a synthetic dataset of Depth-Segmentation Map pairs using the Blender software and python scripts. The segmentation model was trained on synthetic data and tuned to work for real depth images.
- Implementation of the inference pipeline in C++ for integration with the rest of the project.
- **Tools**: Python, C++, Tensorflow, OpenCV, Matplotlib, Blender

Oct 2017 - Mar 2018 — **Advanced Practical Course** — Computer Vision Group@TUM
Neural Network Visualization using Guided Backpropagation

In a team of two:

- Implemented Guided Backpropagation for visualization of the internals of a neural network. This was used to analyze and hypothesize about the workings of a neural network that used for protein structure prediction.
- Implemented a web interface that predicts the tertiary structure of a given protein.
- **Tools**: Python, PyTorch, Flask, Matplotlib

Oct 2017 - Feb 2018 — **Lecture Project** — Chair of Computer Graphics@TUM
Iterative Closest Point Analysis

In a team of two:

- Implemented and analyzed several variants of the Iterative Closest Point algorithm, comparing them on the basis of execution speed and quality of the result.
- **Tools**: C++, OpenCV

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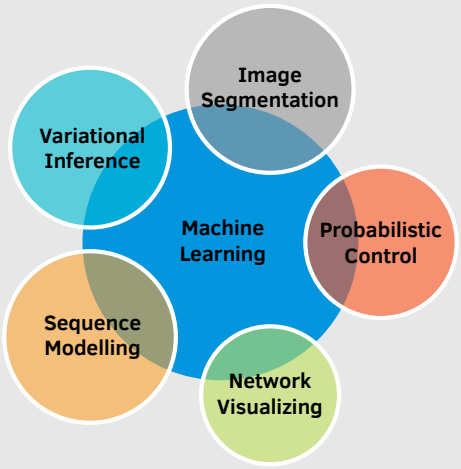

Programming

Python • Tensorflow • Pytorch

C • C++

Javascript • Django(Python) • Docker

OpenCV • MATLAB • Simulink

June 2017 - Oct 2017 **Advanced Practical Course** TUM, Volkswagen Group AI Research
Modelling a dynamical system using Inverse Autoregressive Flow

In a team of three:

- Proposed and implemented Inverse Autoregressive Flows for determining the state space (latents) in a dynamical system model.
- Obtained comparative results to the (then) state of the art on Pendulum data with reduced sampling complexity.
- **Tools**: Python, Tensorflow, Matplotlib

Apr 2017 - June 2017 **Advanced Practical Course** TUM, Volkswagen Group AI Research
Reimplementation of Importance Weighted Autoencoders (IWAE

- Reimplemented IWAE and trained the architecture on MNIST.
- Presented a theoretical and a comparitive analysis of the technique.
- **Tools**: Python, Tensorflow, Matplotlib

June 2017 - Oct 2017 **Lecture Project** Computer Vision Group@TUM
Synthesis of Depth images from RGB images

In a team of four:

- Implementation of an architecture that learns a supervised pixel to pixel mapping from an RGB image to its corresponding depth image.
- **Tools**: Python, PyTorch

Experience

June 2018 - Aug 2018 **Intern (Non Mandatory Internship Position)** Volkswagen Group AI Research

- Setup the inference model for unsupervised control in an embedded system (Jetson TX1) using Tensorflow C APIs.
- Wrote a module for retrieving and appropriately formatting data from the IMX219 cameras attached to the Jetson Module using Video4Linux APIs

June 2017 - Mar 2018 **Working Student** Chair of Robotics and Embedded Systems, TUM

- Modelled various example Cyber Physical Systems using MATLAB and Simulink for class tutorials.
- Set up a website for one of the projects for the Chair (Django-python, Bootstrap CSS).

Oct 2014 - Sep 2016 **Software Developer** Epic Systems

- Developed front-end (Javascript, CSS) and back-end (CSharp, Cache) code for Web-based applications.

July 2013 - Sep 2014 **Software Developer in Test** McAfee

- Debugged and Fixed critical issues including operating system crashes, performed white box testing for critical issues,
- Created a framework in C++ for stress testing the product

Technical Reports

July 2018 Development of a system that allows for the semantic segmentation of a 3D model of a human body into its constituent parts

Jun 2018 Seminar Report: Deep Learning Sequence Modelling (Natural Language Processing)