Harinandan Teja Katam

MASTERS STUDENT AT TUM

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Education

Indian Institute of Technology Bombay

Mumbai, India

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING - **GPA: 7.83/10.0**

April 2012 - Aug 2016

- Secured all India rank 35 in IITJEE (Indian Institute of Technology Joint Entrance Examination) 2012 among 470,000 people

Technische Universität München

Munich, Germany

MASTERS IN INFORMATICS - **GPA: 1.639/4.0** (BEST POSSIBLE GRADE - 1.0)

Oct 2018 - present

- Specializing in Machine Learning, Deep Learning and Computer Vision

Skills

Languages and Frameworks	Python, Java, c++, Bash, Cuda | TensorFlow, Pytorch, OpenCV, Pytorch3D, Django, Spring, Kafka
Machine Learning	Linear and Logistic regression, Decision trees, Random forests, Boosting, Bagging, SVM, Variational Methods
Deep Learning	CNN, Generative Models, Recurrect Neural Networks, Transformers, Tracking, Detection, Segmentation, Graph Neural Networks, Reinforcement learning, 3D Segmentation, Optical Flow
Spoken Languages	English, German (A1), Hindi, Telugu(Mother tongue)

Experience

Deutschen Zentrums für Luft- und Raumfahrt (DLR)

Oberpfaffenhofen, Germany

WORK STUDENT

June 2019 - Feb. 2020

- Developed an algorithm to compress a **TSDF(Truncated Sign Distance Field)** volume of a 3D scene by 64 times using **generative models**
- Experimented with different generative model architectures and training methods using **TensorFlow**
- Designed various **loss shaping strategies** to improve the reconstruction from the encodings
- Added semantic information to the encodings to further improve the reconstruction
- Helped writing code to generate segmentation data for the TSDF volumes from 3D meshes efficiently using c++

Flipkart

Bangalore, India

SOFTWARE DEVELOPMENT ENGINEER I

June 2017 - August 2018

- Developed a **Django** based web application for the support team to automate the debugging of an issue raised by the customer.
- Built a **Spring** application to process huge files and queue the tasks using **Apache Kafka** and then use the spring batch framework to distribute the workload to different slave servers.

Dolat Capital

Mumbai, India

QUANTITATIVE ANALYST

July 2016 - May 2017

- Helped developing various strategies to trade Stock Options, Futures and Equity at very high frequency profitably.
- Built a linear regression model with features generated using various technical indicators like Bollinger Bands, Z-score, Weighted average price.
- Used multiple feature and model filtering techniques such as p-value, t-test, z-test, R-Squared, Variation Inflation Factor.

Microsoft India Development Center

Hyderabad, India

SOFTWARE DEVELOPER INTERN

May. 2015 - July. 2015

- Developed an Android app which enables the user to explore and obtain all required details about attractions nearby, or in any other city
- Extended the app to provide popular phrases pertaining to that region that could be useful along with their translation, transliteration and possible responses
- Worked on both front-end and back-end making use of Model-View-Controller (MVC), Entity Framework, ASP.NET, Azure Web Service and Python scripts to insert data

Academic Projects

Master Thesis - 3D Mesh Segmentation using Transformer Based Graph Operations

DLR Oberpfaffenhofen, Germany

Prof. Rudolph Triebel — *March 2020 - Nov 2020*

- Designed a new a graph convolution operation based on the famous **transformer** architecture using attention mechanism
- Tested the effect of positional encoding on the convolution layer for the task of 3D mesh segmentation
- Implemented a custom **c++/cuda extension** to **PyTorch** to dynamically calculate neighbors upto certain depth on GPU, to apply the concept of atrous conovlution.

Articulation aware Canonical Surface Mapping

TUM Munich, Germany

Prof. Thies Justus — *April 2020 - July 2020*

- Implemened the algorithm from the paper to predict canonical surface mapping to map pixels of an object from an image to a 3D template
- Used the latest **PyTorch** and **PyTorch3D** libraries for the rendering of 3D template

Deep Building Design Assistant

TUM Munich, Germany

Jimmy Abualdenien, PhD Student — *June 2019 - Jan 2020*

- Implemented an algorithm inspired from **Pix2Pix** to generate realistic looking 3D building plans with just the shape of the building as an input
- Built an end to end pipline involving data generation, model training **(GAN, FCNN)** in **TensorFlow 2.2**
- Wrote scripts using **OpenCV** to generate vectorized form from the output of the model and using Blender to generate the 3D building plans from the vectorization

Visualizing and understanding Network Topologies

TUM Munich, Germany

Vladimir Golkov, PhD Student

- Helped designing a visual language for neural network topologies which is simpler, easier to understand and compare with other topologies
- Designed multiple famous network topologies using the visual language.

Machine Learning on Building data

TUM Munich, Germany

Zahedi Ata, M.Sc. — *June 2019 - Aug 2019*

- Using dynamo extracted various features such of the area of the walls, distribution of area in different directions, from a building model imported into revit.
- Trained a machine learning model to predict the type of the building using the extracted features

3D Reconstruction via Direct Semi-Dense Visual Odometry using Stereo Camera

TUM Munich, Germany

Prof. Thies Justus

- Helped implementing an algorithm to estimate Odometry from stereo camera setup in real time at 30fps.
- Implemented a block matching algorithm to generate depth from stereo images.

3D Scanning and Motion Capture

TUM Munich, Germany

Prof. Thies Justus

- Implemented **Iterative Closest Point(ICP)** algorithm in c++ to align two bunny point clouds
- Implemented a simpler version of the bundle adjustment to **reconstruct a 3D scene**

Key point prediction on face using CNN

TUM Munich, Germany

Prof. Dr. Laura Leal-Taixé and Prof. Dr. Matthias Niessner

- Implemented a Fully Convolutional Neural Network to detect keypoints on a face using PyTorch.

SAFE (QuizApp)

IIT Mumbai, India

Prof. Bhaskaran Raman and Prof. Kameshwari

- Developed an iOS application in swift which can be used by instructors to conduct examinations in classroom for students in a secure way

Open Source Contributions

BlenderProc

DLR, Oberpfaffenhofen, Germany

https://arxiv.org/abs/1911.01911

- Implemented texture randomization feature which when used for training makes sure the model learns from the geometry rather than from the textures
- Github: https://github.com/DLR-RM/BlenderProc