# Harinandan Teja Katam


MASTERS STUDENT AT TUM

*Karl-Köglsperger-Straße 5, München, 80939*

(49) 173-6903319 | hari.katam@gmail.com | harinandan1995 | harikatam | harikatam


## 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

**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 and Computer Vision

## Skills

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|---|---|
| **Languages and Frameworks** | Python, Java, c++; TensorFlow, Pytorch, Pytorch3D, Django, openCV, 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 |
| **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 encode and decode a TSDF(Truncated Sign Distance Field) volume of a 3D scene using generative models
- Experimented with different generative model architectures and training methods using TensorFlow
- 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 speed up the time to debug 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 concept of spring batch to distribute the workload to different 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 - Mesh Segmentation

*DLR Oberpfaffenhofen, Germany*

Prof. Rudolph Triebel

*March 2020 - Current*

- Experimenting on improving 3D mesh segmentations using different Graph Convolutions methods
- Testing different convolution and pooling strategies to improve the prediction accuracy

### Articulation aware Canonical Surface Mapping

*TUM Munich, Germany*

Prof. Thies Justus

*April 2020 - Current*

- Implementing the algorithm from the paper to predict canonical surface mapping which is basically mapping pixels of an object from an image to a 3D template using pytorch and pytorch3D rendering

### Deep Building Design Assistant

*TUM Munich, Germany*

Jimmy Abualdenien, PhD Student

*June 2019 - Jan 2020*

- Implemented an algorithm using Deep Learning 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, writing scripts using opencv to generate vectorized output and using Blender to render the 3D building plans

### 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 (like area of the walls, distribution of area in different directions.) from a building imported into revit. These features were then used to train a ML model to predict the type of the building.

### 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.

### Iterative Closest Point

*TUM Munich, Germany*

Prof. Thies Justus

- Implemented Iterative Closest Point(ICP) algorithm in c++ to align two bunny point clouds

### 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

### Star Wars droids animation

*IIT Mumbai, India*

Prof. Parag Chaudari

- Implemented a hierarchical model of two famous star-wars droids R2D2 and pit droid using **OpenGL** and **GLFW** and created an environment to put droids in and made an animation using them

## 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