Mohit Gupta

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EDUCATION

Doctor of Philosophy in Civil & Environmental Engineering *Aug 2021 - Aug 2025 (Expected)*
Arizona State University, United States Advisor: Dr. Thomas Czerniawski

M.Tech. in Design Engineering (*GPA: 9.62/10*) *Aug 2019 - May 2021*
Birla Institute of Technology and Science (BITS) Pilani, India

B.E.(Hons.) in Civil Engineering (*GPA: 9.19/10*) *Aug 2011 - May 2015*
BITS Pilani, India

RESEARCH PROJECTS & HACKATHONS

Person Re-identification for Bicyclist Flow Analysis (Ongoing) *(Fastai, Pytorch)*
- Deployed motion-sensitive camera traps at 80 locations in the city of Tempe to gather street imagery. Goal is to create a cheap and smart street camera for traffic engineers using computer vision and person reid algorithms.

Semi-supervised Symbols Detection in Piping and Instrumentation Drawings *(Pytorch)*
- Developed a Siamese Network for symbol retrieval and with K-means coreset sampling the developed algorithm achieved nearly the same performance to using the full dataset, while utilizing only 30% of the data.

3D reconstruction by NeRF and SfM from 360°camera images
- Compared geometrical accuracy of NeRF (via Nerfstudio) and SfM (via Colmap) in 3D scene representation of a construction site reconstructed from its 360°camera imagery .

Detecting Visual Discomfort due to Daylight Glare *(Pytorch)*
- Trained an LSTM-network with 73% test accuracy to detect visual discomfort caused by sunlight glare. Dataset comprised of facial videos of occupants and their subjective responses (for training).

Automated 2D Building Plans to 3D Digital Model *(Pytorch, Dynamo)*
- Trained a Yolov3 model to recognize building components (walls, doors & columns) in 2D CAD. Linked the output of Yolo model with Dynamo to create 3D models in Revit.

Kaggle DFL Bundesliga Data Shootout *(Pytorch)*
- Implemented an LSTM network achieving 76% test accuracy to recognize different types of soccer passes in Football tournament videos.

Polyp Segmentation in the Colonoscopy videos *(Pytorch)*
- Developed a 2-stage method for polyps locating polyps in colonscopy examination. Stage-1 examines the video frame quality, and; Stage-2 localises polyps using a U-Net architecture.

PUBLICATIONS

- **M. Gupta**, T. Czerniawski, Semi-supervised symbol detection in Piping & Instrumentation drawings, Automation in Construction, 2023 (In review).
- **M. Gupta**, A. Borrmann, T. Czerniawski, Comparison of 3D reconstruction between Neural Radiance Fields and Structure-from-Motion based Photogrammetry from 360°videos , ASCE International Conference on Computing in Civil Engineering 2023.
- C.Wei, **M. Gupta**, T. Czerniawski, Interoperability between Deep Neural Networks and 3D Architectural Modeling Software: Affordances of Detection and Segmentation, Journal of Computing in Civil Engineering (In review).
- **M. Gupta**, C. Wei, T. Czerniawski, Automated valve detection in Piping & Instrumentation drawings, ISARC 2022.
- C. Wei, **M. Gupta**, T. Czerniawski, Automated wall detection in 2D CAD drawings to create digital 3D models, ISARC 2022.

EXPERIENCE

Research intern, Technical University of Munich, Germany *May 2022 - June 2022*
Chair of Computational Modeling and Simulation, Advisor: Prof. Andre Borrmann
- Compared geometrical accuracy in 3D reconstruction of NeRF and SfM for construction sites captured via 360 cameras.

Teaching Assistant, CON453 - Construction Technology *Spring 2023*
- Organized lab sessions to cultivate students' hard skills in construction software: Revit, Navisworks, Sketchup, and AutoCAD.

Senior Engineer, THDC India Limited, India *Oct 2018 - July 2021*
- Analysed spatio-temporal rainfall data to predict flood and check the suitability of 3 different catchments for constructing a new hydraulic dam.

BIM Engineer, Vconstruct Private Limited, India *May 2015 - July 2016*

- Team Lead for the Structural modelling; developed Revit workflows and interfaced with clients, defining the scope of work and deliverables' schedule.

ACADEMIC ACHIEVEMENTS

- Rank-1 in the graduate program (out of 120 students).
- All India Rank of 88 out of 153,000+ applicants in GATE 2018, India's most competitive engineering exam with 13% passing rate.
- Recipient of Merit Scholarship in the undergraduate degree program for being in top 1%.

LEADERSHIP EXPERIENCE

- Captain, Table Tennis team at THDC India Limited.
- Joint coordinator of APOGEE 2013 (BITS Technical Festival), and successfully organized one of the four kernel events.
- Project Leader at Nirmaan (100+ members), an NGO working to improve education standards in impoverished communities of India.

SKILLS

Languages	Python, Matlab, C
Tools and Frameworks	PyTorch, Tensorflow, Keras, Git
3D Modelling	Autodesk-Revit, AutoCAD, Navisworks, Sketchup

CERTIFICATIONS

- AWS Cloud Practitioner
- Machine Learning Specialization, Coursera
- Deep Learning Specialization, Coursera

INVITED TALKS AND PRESENTATIONS

- **AI and Construction** *May 2023*
  Georg Nemetschek Institute Artificial Intelligence for the Built World, TUM, Germany