Mohit Gupta

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EDUCATION

PhD in Machine Learning & Civil Engineering   *Aug 2021 - Aug 2024 (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

Bicyclist Re-identification for Non-Motorist Traffic Flow Analysis   *(Fastai, Pytorch)*
- Curated a dataset of more than 400,000 street imagery photos at 45 locations in Tempe city. Developed a Bicyclist Reidentification algorithm using object detection algorithm and contrastive learning.

Automated Odometer Text Recognition for Car Inspection   *(Pytorch)*
- Engineered a streamlined 2-stage process for rapid odometer text recognition, integrating initial object localization followed by training a custom OCR Transformer model.

Semi-supervised Symbols Detection in Piping and Instrumentation Drawings   *(Pytorch)*
- Designed and implemented a self-supervised network to distinguish symbols, achieving a notable Top-1 accuracy of 85.39% and an impressive Top-5 accuracy of 95.19% across 102 symbol classes.

Polyp Semantic Segmentation in Colonoscopy videos   *(Pytorch)*
- Trained a semantic segmentation model, U-net with Dice loss to segment polyps in colonoscopic examination, especially challenging due to their similar color to surrounding organs and small dimensions.

Conversion from 2D Building Plans to 3D Digital Models   *(Pytorch, Dynamo)*
- Established a connection between YOLOv3 model outputs for identifying building elements (walls, doors, and columns) in 2D CAD and Autodesk's 3D drafting software - Revit by using the Dynamo API.

EXPERIENCE

Computer Vision Intern, Technical University of Munich, Germany   *May 2022 - Aug 2022*
Chair of Computational Modeling and Simulation, Advisor: Prof. Andre Borrmann
- Registered 360°images of a construction site using Structure-from-Motion for automated progress monitoring.
- Conducted 3D reconstruction with Structure-from-Motion and Neural Radiance Fields, evaluating geometric and spatial accuracy.

HACKATHONS

Kaggle: Predict CO2 Emissions in Rwanda
- Attained 6th position among 1453 teams in developing a regression model for predicting CO2 emissions in a time-series dataset.

Kaggle: ICR-Identifying Age-Related Conditions
- Achieved Bronze medal, ranking in the Top 7% among 6430 teams. Developed a multi-class classifier for predicting health conditions using 56 anonymous health markers in an imbalanced dataset.

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 I3CE 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.

CERTIFICATIONS & RELEVANT COURSEWORK

- **Certifications** - AWS Cloud Practitioner; ML Specialization (Coursera); Deep Learning Specialization (Coursera)
- **Coursework** - Machine Vision & Pattern Recognition, Image Processing, Image Informatics & Analytics, Embedded Machine Learning

TECHNICAL SKILLS

- **Languages**- Python, MATLAB, C++
- **Frameworks** - Pytorch, Fastai, Tensorflow, Keras