# Vardhan Dongre

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## EDUCATION

**University of Illinois — Thomas M. Siebel Center for Computer Science**, *Urbana-Champaign, IL*
*Master of Science in Computer Science*            *Aug. 2020 – Aug. 2022*
GPA: 4.00 / 4.00

**University of Illinois — Grainger College of Engineering**, *Urbana-Champaign, IL*
*Master of Science in Civil Engineering*            *Aug. 2018 – Aug. 2020*
GPA: 3.76 / 4.00
**Coursework:** Adversarial ML, Computational Photography, ML for Networks, Systems & Security, Machine Learning, Deep Learning, Applied Machine Learning, Autonomous Decision Making, Statistics and Probability II, Database Systems, Finite Element Method, Topology Optimization

**National Institute of Technology**, *Bhopal, India*
*Bachelors of Technology in Civil Engineering*            *Jul. 2013 – Apr. 2017*
GPA: 8.92 / 10.00
Awarded Medal of Excellence for Academic Performance

## WORK EXPERIENCE

**University of Illinois**, *Champaign, IL*
*Graduate Teaching Assistant*            *May. 2019 – Present.*
- Assisted in course evaluation, handling student queries and partial instruction of course content
- Designed homework problems, exam content and course review materials
- Assisted undergraduate students in learning fundamental programming skills

**Illinois Solar Decathlon**, *Champaign, IL*
*Structural Engineer & IOT Developer, Build Team*            *Aug. 2018 – May. 2019*
- Developed structural designs for Gravity framing, lateral load resisting system & connection details of a modular building
- Developed state of the art IOT home automation system to be installed in solar smart home
- Developed design documentation and presentation of design for showcase at NREL, Golden, Colorado which won seed funding of $130,000 from NREL

## TEACHING EXPERIENCE

**Graduate Teaching Assistant**
*May. 2019 – Present.*
- **CS 598, Data Curation**, Fall 20
  Lead TA for Data Curation course, assisted in instructing students on abstraction in data management, strategies for data transformation, transcoding and management of heterogeneity.
- **CEE 201, Systems Engineering & Economics**, Spring 20, Fall 19
  Instructed students on topics related to Integer programming, Dynamic Programming, Graph Theory, Optimization, Uncertainty & Decision theory
- **BADM 275, Fundamentals of Operations Management**, Fall 19
  Instructed students on topics related to decision making frameworks and techniques for effectively and efficiently managing operations
- **BADM 588, Business Practise Immersion**, Summer 19
  Instructed students on problem solving in an industry project based coursework.

## RESEARCH PROJECTS

**Deep Learning based Structural Topology Optimization**,
*University of Illinois,, Urbana-Champaign*            *Jan. 2019 – May. 2019*
- Curated and processed binary image data obtained from Finite Element Solvers for developing a database of images
- Developed a fully deployable Autoencoder and U-Net based architecture for segmentation and predicting topologies

**Developing Engineering Designs for Solar Smarthome, DOE Project**,
*University of Illinois, Urbana-Champaign*            *Sept. 2018 – Dec. 2019*
- Developed structural designs and home automation features for the solar smart house in Champaign city
- Working with a team of 100+ students on constructing structure in Champaign city and deploying smart technology

# ACADEMIC PROJECTS *

**Deep Learning Assisted Camera Pose Estimation for Visual Odometry** [Code] [Report] ,
*python, pytorch*                                                              *Aug. 2020 – Dec. 2020*
- Implemented the classical SIFT and RANSAC algorithms for estimation of camera pose for KITTI dataset
- Compared the classical approach with Deep Learning model for pose estimation based on SuperPoint

**Detecting Deepfake Videos by Exploiting Spatio-Temporal Information** [PPT] [Report],
*python, pytorch*                                                              *Aug. 2020 – Dec. 2020*
- Implemented 3D CNN based ResNets to learn spatio temporal features from video volume for detecting deepfakes on DFDC dataset as benchmark
- Achieved a 0.92 F1 score outperforming several baseline detectors

**Full stack web development: UIUC MarketPlace** [Code],
*mysql, php, javascript, apache, html, css*                                    *Jan. 2020 – Feb. 2020*
- Built an e-commerce website for UIUC students for trading and purchasing commodities on campus
- Designed the relational database of users and developed the client database on server
- Developed the front-end and back-end of the sign-up and user login system for the website

**Cloud Detection and Masking on NASA's Terra MODIS satellite images using Deep Learning** [Code] [Viz],
*pytorch, sckit-learn, fastai*                                                 *Feb. 2020 – Mar. 2020*
- Explored binary pixel labelling and image segmentation approaches for developing baseline models
- Developed U-Net based novel architecture for detecting clouds in NASA's MODIS cloud mask product
- Model achieved 0.95 F1 score and was winning entry in NCSA-NVIDIA AI Hackathon

**Performance Predictors for Meta-Learning and AutoML** [Kaggle],
*python, tensorflow, keras*                                                    *Aug. 2019 – Dec. 2019*
- Developed a performance predictor model for a competitive deep learning challenge
- Developed a RNN using tf and keras that takes as input model architecture and hyperparameters and predicts its final performance with 97% accuracy.

**Distributed Training of Deep Learning Models on Supercomputer** ,
*pytorch, cuda*                                                                *Aug. 2019 – Aug. 2019*
- Implemented a deep ResNet to train for CIFAR100 based on transferring weights obtained from ImageNet
- Performed synchronous and asynchronous distributed SGD training on Bluewaters supercomputer

**Deploying GAN for synthetic image generation using ACGAN & Wasserstein GAN**,
*pytorch*                                                                      *Sept. 2019 – Sept. 2019*
- Trained discriminator/generator pair on CIFAR10 utilizing techniques from AC GAN and Wasserstein GAN for learning synthetic images that maximized class output scores.

**Sentiment Analysis of IMDB Movie Reviews** [ NLP ] [Code],
*pytorch, NLTK, word2vec, GloVe, LSTM*                                         *Oct. 2019 – Oct. 2019*
- Trained Language Models for sentiment analysis & fake review generation of IMDB Large movie review dataset

**Forecasting AAPL stock prices using Time series analysis in R** ,
*R, astsa*                                                                     *Sep. 2019 – Dec. 2019*
- Developed an ARIMA model to forecast Apple stock prices using data from Yahoo Finance.
- Performed multiple statistical checks for parameter estimation and model diagnostics to predict for stock prices for future time steps in RStudio.

\* Check website/Github for other works

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# SKILLS

**Mathematics**: Graph Theory, Probability Theory, Optimization, Statistical Modelling, Calculus and Finite Element Method
**Machine Learning**: XGBoost, PCA, Clustering, GLM, Ensembles, E-M, GMM, HMM
**Deep Learning**: Segmentation, NLP, Transfer Learning, CNN, VAE, Sequence Models, DDQN, A3C
**Programming Languages\***: Python(4), Shell Scripting(4), SQL(3), R(3), C++(3), PHP(3), Java(2)
**Tools & Libraries**:  Scikit-learn, Pytorch, Tensorflow, Pandas, Matplotlib, NumPy, Jupyter Notebook, Google colab
**Github** : Github
\* Proficiency on a scale of 1 (lowest) to 4 (highest)

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# AWARDS / HONORS

**Graduate Assistantships (University of Illinois, Urbana-Champaign)**: Awarded full tuition waiver with stipend for Graduate Research and Teaching Assistant positions
**Department Medal of Excellence (National Institute of Technology, Bhopal)**: Awarded Silver Medal for achieving rank 2 in class of 2017

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# WEBSITE *Link*↗