

# SHANTANU GHOSH

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<b>OBJECTIVE</b>	<i>To secure a PhD position in the area of Machine Learning/Deep Learning with a focus of Causal Inference and Computer Vision</i>
<b>RESEARCH INTERESTS</b>	<i>Deep Learning, Causal Inference, Computer Vision</i>
<b>EDUCATION</b>	<p><b>University of Florida</b>, Gainesville, FL, USA <i>Master of Science, Computer and Information Sciences</i> <i>Advisor: Dr. Mattia Proserpi</i> Aug, 2019 - May, 2021 <b>GPA: 3.85/4</b></p> <p><b>West Bengal University of Technology</b>, West Bengal, India <i>Bachelor of Technology from Institute of Engineering and Management</i> <i>Computer Science and Engineering</i> Aug, 2008 - June, 2012 <b>GPA: 8.38/10</b></p>
<b>PUBLICATION</b>	<ol style="list-style-type: none"><li><i>Deep Propensity Network using a Sparse Autoencoder for Estimation of Treatment Effects</i> - <b>Shantanu Ghosh</b>, Jiang Bian, Yi Guo, Mattia Proserpi. Journal of the American Medical Informatics Association (JAMIA) (<b>In press</b>)</li><li><i>Causal AI with Real World Data: Do Statins Protect From Alzheimer's Disease Onset?</i> - Mattia Proserpi, <b>Shantanu Ghosh</b>, Zhaoyi Chen, Marco Salemi, Tianchen Lyu, Jiang Bian. Journal of Artificial Intelligence in Medicine (<b>Under review</b>)</li><li><i>Propensity Score Synthetic Augmentation Matching using Generative Adversarial Networks (PSSAM-GAN)</i> - <b>Shantanu Ghosh</b>, Jiang Bian, Mattia Proserpi. Journal of Computer Methods and Programs in Bio-medicine Update (<b>Under review</b>)</li></ol>
<b>RESEARCH EXPERIENCE</b>	<p><b>Data Intelligence Systems Lab (DISL)</b>, Gainesville, FL, USA <i>Graduate Student Assistant</i> <b>March 2020 - Present</b> <i>Advisor: Dr. Mattia Proserpi, Dr. Jiang Bian, Dr. Yi Guo</i></p> <ul style="list-style-type: none"><li>• Currently working on to improve PSSAM-GAN framework by incorporating Adversarial Autoencoder and InfoGAN.</li><li>• Developed Deep Propensity Network - Sparse Autoencoder(<b>DPN-SA</b>) - a sparse auto encoder based neural network model to calculate propensity score, outperformed logistic regression and LASSO by <b>36-63%</b>, and DCN-PD (baseline models) by <b>6-10%</b> across all datasets. Paper is accepted at <b>Journal of the American Medical Informatics Association (JAMIA)</b>. [Code]</li><li>• Using Pytorch, reproduced the model DCN-PD proposed in the paper [Paper](<i>ICML 2017 - Workshop on Principled Approaches to Deep Learning</i>), that has been utilized in the research study whether usage of Statins is useful toward the onset of Alzheimer disease. Paper is under review at <b>Journal of Artificial Intelligence in Medicine</b>. [Code]</li><li>• Developed Propensity Score Synthetic Augmentation Matching using Generative Adversarial Networks (<b>PSSAM-GAN</b>) - an algorithm to generate synthetic treated samples to remove imbalance within a observational dataset for Propensity score matching (PSM). The model improved the performance by <b>38%</b> and <b>5%</b> over DCN-PD and TARNET(baseline models) respectively. Paper is under review at <b>Journal of Computer Methods and Programs in Bio-medicine Update</b>. [Code]</li></ul>

**Multimedia Communications and Networking Laboratory (MCN)**, Gainesville, FL, USA

*Independent Researcher*

**Feb 2020 - May 2020**

Advisor: Dr. Dapeng (Oliver) Wu

Developed a Deep Convolutional Multitask Neural Network(**MTL-TCNN**) to classify textures under the supervision of Dr Prof Dapeng Oliver Wu of the Department of Electrical & Computer Engineering in the University of Florida. **[Report]** **[Code]**

## **PROFESSIONAL EXPERIENCE**

**Lexmark International India Pvt Ltd**, Kolkata, West Bengal, India

*Software Engineering Professional II*

**Oct 2016 - July 2019**

Developed the ISP component of the product Publishing Platform for Retail(PPR) with active participation in 2 major releases. Also, worked on Lexmark Digital Media Platform, a multi-tenant enterprise video content management platform hosted in Amazon Web Services.

**Cognizant Technology Solutions India Pvt Ltd**, Kolkata, West Bengal, India

*Associate, Projects*

**March 2013 - September 2016**

Developed WCF web services in the Contract First Approach to provide secure communication between different In-house application using Service Oriented Architecture (SOA), C# .Net 4.5, Oracle Client 11g. Trained C# to new recruits in Cognizant Academy.

## **COURSE PROJECTS**

**Dataset augmentation using InfoGAN and CGAN**

**Oct 2020 - present**

***Deep Learning for Computer Graphics*, University of Florida, FL, USA**

Currently implementing MNIST and CIFAR10 dataset augmentation using InfoGAN and ConditionalGAN to improve the classification accuracy of an image classifier. **[Report]** **[Code]**

- **Technology/Tools:** Python, Pytorch, Skit-Learn

**Deep Colorization with CNN**

**Oct 2020 - Nov 2020**

***Deep Learning for Computer Graphics*, University of Florida, FL, USA**

Designed a deep CNN with created which is trained to color grayscale face images with one channel and size 128 x128 per image to produce a full-colored image with 3 channels. We transform the RGB image to LAB colorspace (Lightness, A, and B) which is easier to extract the lightness channel from the image which will be then fed into CNN to predict the color values of the image using regression. **[Report]** **[Code]**

- **Technology/Tools:** Python, Pytorch, Skit-Learn

**Hashtag Counter**

**March 2020 - April 2020**

***Advanced Data Structures*, University of Florida, FL, USA**

Implemented a system to find the most popular hashtags that appear on social media using Max Fibonacci Heap data structure and a max priority structure to find out the most popular hashtags. Tested the code with 1M hashtags. **[Report]** **[Code]**

- **Technology/Tools:** Java

**Classification of Handwritten Characters**

**Oct 2019 - Dec 2019**

***Fundamentals of Machine Learning*, University of Florida, FL, USA**

Inspired by the famous architecture "**Lenet-5**", developed a deep CNN model to classify Handwritten Characters using a custom Handwritten Character Dataset prepared by Prof Alina Zare by utilizing the Adam Optimizer, Batch Normalization and dropout and achieved a classification accuracy of **97.3%** on a customised data set prepared by Prof Zare **[Code]**

- **Technology/Tools:** Python, Pytorch, Skit-learn

## Implementation of P2P network

Nov 2019 - Dec 2019

*Computer Networks*, University of Florida, FL, USA

Created a peer-to-peer(P2P) network for file downloading. Developed components – peer and file owner. The file owner has a file, and breaks the file into chunks of 100KB. Each peer connects to the file owner to download some chunks with the help of two threads, one acting as a server that uploads the local chunks to another peer (referred to as upload neighbor), and the other acting as a client that downloads chunks from a third peer (referred to as download neighbor). Tested the code with max **5** peers and max file size of **13.3 MB**. [Code]

- **Technology/Tools:** Socket Programming, Java

## TECHNICAL SKILLS

**Languages :** Python, C++, C, Java, C#, Javascript/Typescript

**Database :** MySQL, Oracle 9i/10g, MS SQL Server, DB2

**Web Development :** Angular, Node.js, WCF

**Machine Learning :** TensorFlow, PyTorch, Scikit-learn

## GRADUATE COURSES

- Fundamentals of Machine Learning
- Distributed Operating Systems
- Computer Networks
- Mathematics for Intelligent Systems
- Advanced Data Structures
- Machine Learning
- Deep Learning Computer Graphics
- Fundamentals of Probability
- Analysis of Algorithm (Spring 2021)

## ACHIEVEMENTS .

- Recipient of **National Scholarship** Award from **Central Government Human Resource Development Department of Higher Education, India** for excellent result in Higher Secondary Examination in the state of West Bengal, India.
- Topped with **1%** of all candidates appeared in **West Bengal Joint Entrance Examination** in 2008.
- Received **Star Employee** award in Q4, 2013 and Q4, 2015 in Cognizant Technology Solutions.
- Received **Achievement Award** of 4500 USD during the admission of graduate studies in the University of Florida in Fall 2019.
- Received **Research Assistantship** under the supervision of Prof Kevin Butler in FICS Lab, starting from Jan 2021 in the domain of explainable AI.