Deepayan Bardhan

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EDUCATION

North Carolina State University, Raleigh, NC — May 2020
Master of Science, Electrical and Computer Engineering — GPA – 3.815/4
Coursework: Design and Analysis of Algorithms & Data Structures | Computer Vision | Digital Imaging Systems | Neural Networks | Pattern Recognition | Random Processes | Object Orientated Design & Dev | Computer Networks | Digital Signal Processing

Indian Institute of Engineering Science and Technology, Kolkata, India — April 2018
Bachelor of Technology, Electrical Engineering — GPA - 8.51/10
Coursework: Data Base Management System | Artificial Intelligence | Digital Electronics

WORK EXPERIENCE

Computer Science Assistant, NCSU — (June 2020 –)
Working on image detection using masked R-CNN and deploying it on an UAV drone to identify spi gum and pine trees which is used for forest research. Also, provide technical expertise and consultation to graduate and undergraduate students in fields like computer vision, machine learning, time series, and natural language processing.

Food Data Analyst, NCSU Dinning — (Sept 2018 – Mar 2020)
Worked on the ordering of raw materials and items based on the raw material usage using the past data.

TECHNICAL SKILLS

Languages: Python, C++, Java, MATLAB, Ruby, Scala, Ruby on Rails
Python Tools: NumPy, SciPy, Pandas, Scikit-Learn, Flask, Tkinter, NLTK, SLAM, ROS
Machine Learning Frameworks: OpenCV, PyTorch, Tensorflow, Keras
Statistical Tools: JMP(SAS), R
Data Visualization: Matplotlib, Seaborn, Tableau, PowerBI, ggplot
Database Querying Language: SQL, mongoDB
Operating System: Windows, Linux
Tools: Jupyter, Spyder, VS Code, Github, MS Excel

Member of IoT Lab of NCSU

ACADEMIC PROJECTS

Data Science Projects:

Titanic Survival Prediction

- Analyzed and Feature engineered the Titanic dataset
- Used Machine Learning classifiers like Random Forest, Decision Tree, SVM, Perceptron model, and KNN to predict the survival chances of passengers in the Titanic.
- Achieved best performance using Random Forest through hyper-parameter tuning
- Titanic Survival Prediction - Source Code

Time series Demand Forecasting

- Forecasted hourly electric energy consumption for NY-ISO over a 2-weeks period
- Used an ARIMA model along with multivariate linear regression model trained over 3 years of energy and weather data.
- A prediction accuracy of close to 90% was achieved compared to the actual results

Hand Written Digit Recognition Live

- Built a convolution neural network model to classify the millions of handwritten digits
- Used image processing techniques such as line detector and edge detection to extract the digits
- Used Keras models to classify the digits after closely analyzing various features.
- Achieved an accuracy of 99.4 % on the famous MNIST dataset.
- Hand Written Digit Classification - Source Code

Event Timeline Detection

- Manufactured a model that understood cause and effect relation between 2 sentences
- Quantified performance of SVM and Random Forest supervised learning algorithms in detecting casualties between event pairs for NLP word embedding techniques (word2vec)
- Event Timeline Detection - Source Code

Body Rocking Behavior Recognition

- Aimed at identifying disease based on sensors values detecting body rocking behavior.
- Inertial measurements from wearable sensors were recorded from a blind subject which were processed through CNN and CNN+LSTM based model and was used for determining the state of the subject under consideration
- Accuracy improved from 63 % to 80% using CNN + LSTM modelling.

Automatic Vetting System

- Built an automatic vetting system using Amazon Web Services (AWS).
- Collected information from Alexa using Amazon Polly and Amazon Transcribe and integrated with Microsoft Azure Chatbot service to automate the process which was used for security testing purposes (ad generation).

Built a library database system with MVC architecture using RoR

- Built a relational database system(RDBMS) for library from scratch using Ruby on Rails (RoR) with OOPs concept.
- Used Model-View-Controller architecture for the design of the library database
- Used AGILE process and SCRUM framework for development for the database.
- Library Management - Deployment

Computer Vision Projects:

Counting lane changes by cars

- Used PyTorch built neural network model to find the total number of cars changing lanes from a provided GoPro and Drone feed
- Used Convolution Neural Network (CNN) model to detect cars and separate shadows from them
- Compared the performance with an industrial software (Camlytics) and achieved better performance by 8%

Pattern Recognition Using Mixture Models

- Separated Textures in an image using EM algorithm with mixture of Gaussian models.
- Generated data through Prague Texture Segmentation Data Generator
- Texture Segmentation - Source Code

2D model depth estimation

- Aimed at classifying foranifera images into certain types using 2D images
- Built an auto-encoder model to generate 2D depth images with depth information from detailed 2D images
- Generated the training set to train the auto-encoder model, involving 2D images and their corresponding depth images

ACHIEVEMENTS

Ranked 1st in ACM-ICPC (Association for Computing Machinery – International Collegiate Programming Contest) 2016-17 from College and 275th rank holder in India finals, organized at Kerala, India.

RESEARCH PUBLICATION

Bardhan D. “Fashion recommendation system: A systematic literature review on principles, methods and performance evaluation” IEEE journal – under evaluation