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EDUCATION

IIT Kharagpur *July 2016 - Present*
B.tech - Electrical Engineering *7.84/10*

Vrindavan International School *July 2013 - June 2014*
Higher Secondary *80.8/100*

Vrindavan International School *July 2013 - June 2014*
Secondary / Matriculation examination *10/10*

PROJECTS AND INTERNSHIPS

Categorical dimensionality reduction using NLPCA - Prof. J. Maiti - IIT Kharagpur *Mar'18 - May'18*
- Analysis and Visualization of data by frequency domain analysis techniques using standard python libraries matplotlib, plotly.
- Dimensionality reduction techniques PCA and NLPCA for visualization of categorical association between attributes
- Used **homals** library in R and clustering algorithm kmeans for suitable clustering of data and their visualization in Python and R.

Object detection and tracking for autonomous driving - Prof. Partha Pratim Das - IIT Kharagpur *Aug'18 - Oct'18*
-The application detects and localizes pedestrians and vehicles, predicts their trajectory from RGB frames captured by the vehicle.
-The application used: 1.HOG with SVM 2. SIFT with SVM 3. Convolution Neural Networks with ResNet and Yolo techniques.

Concept Map - Prof. J. Maiti - IIT Kharagpur *Jan'19 - Mar'19*
- Formed and Visualize Concept maps (Knowledge Graph) between topics and their relevant words from text dataset using NLP.
- Extracted relevant words from text using kmeans, LDA, TF-IDF, lemmatization techniques and visualize using **networkx** library.

Visual Salency – Prof. Pabitra Mitra – IIT Kharagpur *Jul'19 - Present*
- Implemented a SalGAN network in **Tensorflow** and SAlNet network in Keras using **custom loss function** with Salicon dataset.
- Generative model of SalGAN had loss function which was the sum of MSE between the pixels of images and BCE loss.

MedNLI – Prof. Pawan Goyal – IIT Kharagpur *Dec'18 - Feb'19*
- Implemented Bidirectional LSTM encoder of input sentences and max-pooling operation over timesteps.
- A mathematical technique was used to fetch information to produce a relationship between inputs and then classify.

Arduino based robot - Prof. Avishek Chatterjee - IIT Kharagpur *May'18 - Jun'18*
- Built an Obstacle avoiding Robocar using Atmenga320p, Proximity sensor, IR, HC-05 Bluetooth module, servo and DC motors.
- Robocar has following features Mobile Bluetooth Controlled, Wall Follower, Obstacle Avoider and Line Follower.

Samsung R & D Institute, India - Research Internship *May'19 - Jul'19*
- Trained CNN model using the backend of ResNet on own dataset to detect and localize device in the image and got high IOU.
- Increased IOU using IP techniques like canny edge detection, Hough transform and perspective transformation to anti-skew.
- Designed 3 stage pipeline for similarity detection using p-hash of 3 layers of Retina Net, SIFT, SURF, ORB techniques of IP.
- Design a user-friendly app on **Cordova** to capture picture and metadata, upload it to the database server for processing.

TRAINING

Security System - Term Project *Feb'19 - Mar'19*
- Built a security system for a highly secured place with the help of microcontroller ATmega2560.
- The system includes tracking location in a given range, alarm alert message and sound, operated by mobile app, and cannot be easily hacked because of hashing techniques applied in the password and stored in SD card.

AWARDS AND ACHIEVEMENTS

- Among the top 0.2 percentile having an All India Rank of 3058 in Indian Institute of Technology JEE(Advanced)-2016.
- Won 2nd prize in Digianatronix event in Impulse fest organised by Electrical Engineering Society, IIT Kharagpur.

SKILLS AND EXPERTISE

Programming Languages: C, C++, Python, R, Arduino, MATLAB, HTML, CSS, Javascript, AngularJS.
Professional Skills: Data Analytics, Machine Learning, Natural Language Processing, Deep Learning.
Libraries and Tools: Tensorflow, Keras, Theano, Pytorch, AWS, GCP, MATLAB, Tableau, Flask.

COURSEWORK INFORMATION

Academic Courses: Programming and Data Structures , Image Processing , Computer Architecture and Operating System , Control System Engineering, Information Retrieval , Transform Calculus , Linear Algebra , Signals and Networks , Embedded Systems , Probability and stochastics , Digital Electronics Circuits, Electric Drives, Power Electronics.
MOOC's: 'Deep Learning 5 course specialization' by coursera,'Machine Learning' by Andrew NG, 'Introduction to Probability-The Science of Uncertainty' by MIT. 'Machine Learning' by Andrew NG.

EXTRA CURRICULAR ACTIVITIES

- Part of Gold winning OpenSoft team of Radhakrishnan Hall of Residence during General Championship 2018-19.
- Part of Data Analytics team of Radhakrishnan Hall of Residence during General Championship 2017-18.
- Part of Hardware Modelling team of Radhakrishnan Hall of Residence during General Championship 2017-18.
- Part of a bronze winning Football team of Radhakrishnan Hall of Residence during General Championship 2016-17.
- Part of the school Football Cluster team in New Delhi organised by CBSE.
- Participation in Disaster Management program conducted by Sri Sathya Sai Seva Organisation, West Bengal which covers the basics of rescue techniques.
- Part of Illumination and Rangoli team of Radhakrishnan Hall of Residence which won gold among 21 Halls 2016-17.

EXTRA CURRICULAR PROJECTS

Arduino Based Quadcopter *Aug'19 - Oct'19*
- Built a Quadcopter using Arduino Mega as a flight controller, 4*1000KV brushless DC motors, 2300mAH battery with output voltage 11.1V, 2.4Ghz 6CH Transmitter and Receiver (approx. 2Km range in line of sight), I3G4250D 3-axis Gyroscope.
- Used gyroscope to get the proper orientation and proportional–integral–derivative(PID) controller to stabilise the quadcopter.

Cognitive Task Webpage *Nov'19 - Dec'19*
- Built a webpage for testing two cognitive tasks- Attention and Memory and launched the webpage using google cloud platform(GCP) with IP address **http://35.238.141.106/**.
- Programming Language used for this task are HTML, CSS, Javascript, AngularJS.
- Tasks Contain three types of activities- Visual remembering, Numerical remembering, and Textual remembering activities.

Face Recognition and People Count using Deep learning and Image Processing *Mar'19 - Apr'19*
- Built an API on Face Detection and Recognition in video and count people in an image, used for class and worker attendance.
- Used OpenCV libraries and image processing techniques for Face detection and recognition. Used **CSRNet** for counting people in an image, it uses **VGG-16** in its starting layers. Using Flask launch the API on google cloud platform(GCP).
- This application can be further used for crowd monitoring.

Forecast Electrical Consumption *Feb'20 - Mar'20*
- Forecast three electrical consumption meter reading with the help of different Data Analytics and Machine Learning techniques.
- Analyse and Visualize the dataset with different type of graphs, like bar graphs, heat maps, density plots, box plots, pie charts.
- Forecast data with ensemble different models(**CNN-LSTM, FbProphet, Arima, LightGBM**) after feature engineering on data.

Home Automation *Aug'19 - Sep'19*
- Built a Hardware that can control any type of electrical appliances that are connected with the switch using google assistant.
- Hardware used are Arduino Mega, ESP8266 wifi module, relay switch with 5V trigger voltage.

Wifi Enabled Colored LED Bulb *Sep'19 - Oct'19*
- Built a cheap wifi controlled colored LED bulb that can control with the help of any android mobile or Google assistant.
- Hardware used are atmega328p, 12* RGB led, wifi module, HC-05 Bluetooth module, resistances, 3* 2N2222 NPN Transistors.
- Designed a PCB circuit board and soldered all the components in it, bootload the atmega328p microcontroller.

Automatic Railway Gate Control *Feb'19 - Mar'19*
- Built an Automatic Railway Gate Control System Using Arduino nano, IR LED, Photodiode, Servo Motor.
- System works automatically as it closed gates when a train comes detect using IR sensor, and open after the train passed.

Solar Mobile Power Bank *Aug'19 - Sep'19*
- Built a solar mobile power bank with help of rechargeable battery cells, a solar plate, a buck converter that drop the voltage at 5V.
- We can charge the power bank with the help of both electricity and sunlight, this power bank has **12000mAH** capacity.

Crack and Potholes Classification *Sep'18 - Oct'18*
- Built a classification model using CNN network that can classify crack and potholes with an accuracy of **94.85%**.
- Used IP techniques like Hough transform and perspective transformation to find length and area covered by crack and potholes.