

EDUCATION

IIT Kharagpur <i>B.tech - Electrical Engineering</i>	<i>July 2016 - Present</i> <i>7.90/10</i>
Vrindavan International School <i>Higher Secondary</i>	<i>July 2013 - June 2014</i> <i>80.8/100</i>
Vrindavan International School <i>Secondary / Matriculation examination</i>	<i>July 2013 - June 2014</i> <i>10/10</i>

PROJECTS AND INTERSHIPS

Categorical dimensionality reduction using NLPCA - Prof. J. Maiti - IIT Kharagpur - 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.	<i>Mar'18 - May'18</i>
Object detection and tracking for autonomous driving - Prof. Partha Pratim Das - IIT Kharagpur -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.	<i>Aug'18 - Oct'18</i>
Concept Map - Prof. J. Maiti - IIT Kharagpur - 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.	<i>Jan'19 - Mar'19</i>
Visual Salency – Prof. Pabitra Mitra – IIT Kharagpur - Implemented a SalGAN network in Tensorflow and SAINet 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.	<i>Jul'19 - Present</i>
MedNLI – Prof. Pawan Goyal – IIT Kharagpur - 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.	<i>Dec'18 - Feb'19</i>
Arduino based robot - Prof. Avishek Chatterjee - IIT Kharagpur - Built an Obstacle avoiding Robocar using Atmega320p, 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.	<i>May'18 - Jun'18</i>
Samsung R & D Institute, India - Research Internship - 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.	<i>May'19 - Jul'19</i>

TRAINING

Security System - Term Project - 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.	<i>Feb'19 - Mar'19</i>
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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.