Rakesh Bal

✉ rakesh.bal@iitkgp.ac.in · ☎ (+91) 747-806-9777 · ⦿ rakeshbal99/ · ⚲ rakeshbal99.github.io/

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Education

Indian Institute of Technology (IIT) Kharagpur, West Bengal, India   2016 – 2020 (Expected)
Computer Science And Engineering   *CGPA - 9.11/10*
Bachelor Of Technology (Hons.)

BJB Junior College, Odisha, India   2014 – 2016
Council Of Higher Secondary Education, Odisha   *Overall Percentage-89%*
Intermediate In Science

St. Joseph's High School, Odisha, India   2011 – 2014
Indian Certificate Of Secondary Education   *Overall Percentage-96%*
Matriculation

Interests

Machine Learning   Computer Vision   Social Computing Systems   Artificial Intelligence   Algorithm Bias

Research Experience

Discovering and Mitigating Algorithmic Bias using Deep Neural Networks   *April'18-Ongoing*
Guide: Prof. Niloy Ganguly

- Working on discovering bias in COMPAS dataset using deep neural networks.
- Formulating ideas for its mitigation using Layerwise Relevance Propagation technique.
- Working on extending the discovery of bias to various others datasets like Census Income dataset.
- Used various types of neural netwrok architectures and other types of ML techniques like gradient boosting.

Election Optimization in Recommendation Fairness   *Oct'18-Ongoing*
Guide: Prof. Niloy Ganguly

- Working on determining fairness in recommender systems using election voting methods.
- Used traditional recommender system algorithms like Matrix factorization on SmartMedia Adressa News Dataset
- Applied the theory of electoral systems like Single Transferable/ Non-Transferable Vote, k-Borda count, Bloc Voting etc to measure fairness.

AI Team Member Autonomous Underwater Vehicle, IIT Kharagpur   *Feb'17-Ongoing*
Guide: Prof. CS Kumar

- Implemented real time under water buoy detection using Single Shot MultiBox Detector on the top of MobileNet.
- Working on making the inference of models lightweight and suitable for using in bot using Movidius NCS.
- Created a simulator for Underwater Vehicles using Gazebo.
- Used Actionlib and Smach Packages of ROS to create Mission Planner Stack on Kraken 3.0.

AUV IIT KGP | Kraken 3.0

Projects

Art Generation With Neural Style Transfer

Course Project

- Implemented the Neural Style Transfer Algorithm created by Gatys et al.
- Generated novel artistic images on the trained model using various content and style images.

Synisto-Movie Recommender App

Self Project

- Used Collaborative Filtering based algorithm to train model on MovieLens 1M dataset — GitHub
- Added Recommendation for new users based on ratings of few movies.

Fairseq-Convolutional Sequence To Sequence Learning

Guide: Prof. Pawan Goyal

- Analysed the paper on Convolutional Sequence to Sequence Learning by FAIR — [GitHub](#)
- Analysed the results on the pre-trained models for Fair-Seq in PyTorch by comparing their BLEU scores.

Reinforcement Learning Agent in Traffic Simulation Softwares   *May'18-Ongoing*

Guide: Prof. Soumyajit De

- Working on deploying RL based agents in Traffic Simulation softwares like Plexe.
- Used tools like Omnett++, Sumo for creating an integated environment for the simulation.

Interactive Timeline of NASA Space Missions   *July'18-Nov'18*

Guide: Prof. Plaban Kumar Bhowmick

- Working on implementing Faceted Search And Browsing features in the timeline.
- Used gFacet as new way of browsing RDF data by combining graph visualization and faceted browsing.

SKILLS

- **Languages:** Python, C, C++, Matlab/Octave, Java, Verilog
- **Computer Vision and Robotics:** OpenCV, ROS, Gazebo
- **Machine Learning:** TensorFlow, PyTorch, Keras, Numpy, Pandas, Scikit-Learn

COURSEWORK INFORMATION

- **Departmental Courses:** Algorithms-I & II, Discrete Mathematics, Signals And Networks, Linear Algebra, Symbolic Logic, Formal Language And Automata Theory, Probablity And Statistics, Switching Circuits And Logic Design, Computer Organization And Architecture, Compilers, Knowledge Modelling And Semantic Technologies, Operating Systems, Computer Networks, Educational Data Analytics, Machine Learning
- **Other Relevant Courses:** Deep Learning Specialization(Coursera), CS231n: CNNs for Visual Recognition (Stanford), CS294-112: Deep RL (UC Berkeley)

ACADEMIC ACHIEVEMENTS

- Secured All India Rank of 265 (amongst 200,000 candidates) in IIT-JEE Advanced 2016.
- Outperformed in Probablity And Statistics and Electrical Technology courses securing an EX grade given only to exceptionally performing students (top 1 percent).
- Qualified Kishore Vaigyanik Protsahan Yojana (Written and Interview) in SX stream (Organized by Indian Institute Of Science, Bangalore) with an All India Rank of 191.
- Qualified for Indian National Physics, Chemistry and Astronomy Olympiad conducted by HBCSE.
- Qualified National Talent Search Examination conducted by NCERT in Xth standard.

RESPONSIBILITIES

National Digital Library   *Dec'17-Mar'18*

JEE Solution Archives Reviewer

- Prepared solutions for Previous years JEE Question Papers for NDL JEE Archive
- Reviewed solutions of various JEE papers as a part of the JEE Solutions Archive.

Spring Fest, IIT Kharagpur   *Jan'17-Feb'17*

Crew Member

- Managed the performance of international artists during the fest.
- Successfully organized Shuffle Event and prepared music tracks for the event.

EXTRA CURRICULARS

- Represented LBS Hall, IIT Kharagpur in InterHall Maths Olympiad General Championship.
- Participated as a cadet at National Cadet Corps, IIT Kharagpur including taking part in Republic Day Parade.
- Secured 4th position in the Science Quiz held by Institute Of Physics, Bhubaneswar.
- Qualified for semifinals of debating tournament conducted by Debating Society, IIT Kharagpur.
- Secured 5th position in Rakesh Memorial Chess Championship at Puri.