Rakesh Bal

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Education

University of California Los Angeles — **Los Angeles, CA**
Master of Science in Computer Science | **GPA - 3.81/4.0** — Sep'21 - Jun'23

Indian Institute of Technology (IIT) Kharagpur — **Kharagpur, India**
Bachelor of Technology in Computer Science and Engineering | **GPA - 9.04/10.0** — Jul'16 - May'20

Work Experience and Internships

Amazon Web Services (AWS) — **San Francisco, US**
Applied Scientist Intern - Project Code: GitHub — Jun'22 - Sep'22
- Analysed the performance of Protein LLMs (from Transformers - BERT, T5, GPT) on Drug Target Interaction (DTI) problem
- Obtained 20% & 12% improvement with ProtBERT over two datasets compared to the baseline with significant cost reductions
- Employed large AWS GPU Clusters and services like S3, EC2, SageMaker, Lambda for training pipelines and dashboards
- Devised ways to add Physics-based equations and cross-attention to the models and published them in Amazon ML conference

Goldman Sachs — **Bangalore, India**
Analyst, Engineering Division — Aug'20 - Sep'21
- Integrated two internal bug & issue tracking softwares as a full-stack development project and worked on their cloud migration
- Implemented backend (with RESTful APIs) using Java/SpringBoot and frontend using TypeScript/Angular & Redux
- Coordinated with end-users for the entire SDLC; deployed project to production and handled adoption by over ***10000*** users

University of California Los Angeles — **Los Angeles, US**
Research Assistant — Jan'23 - Sep'23
- Augmented Protein & Molecule contact maps using Diffusion Docking and AlphaFold to DTI models and attained 10% boost
- Experimented with different novel cross-attention and contrastive loss architectures for modeling Drug-Protein Interaction

Accenture Technology Labs — **Bangalore, India**
Research Intern — May'19 - Aug'19
- Developed stock price prediction models using news articles and knowledge graphs to incorporate real-world domain knowledge
- Applied GCNs with events for real-world stock scenarios leading to performance improvement of 5% over the baseline models

Autonomous Underwater Vehicle (AUV) — **Kharagpur, India**
Artificial Intelligence Engineer — Feb'17 - Apr'19
- Implemented vision-based real-time underwater buoy detection using Single Shot MultiBox Detector on top of MobileNet
- Optimized inference of object detection models on GPU by 20%, and used ORB-SLAM for navigation of the underwater robot
- Used Actionlib and Smach ROS packages to implement the Mission Planner Stack and participated in SAVe at NIOT, Chennai

University of California Los Angeles — **Los Angeles, US**
Graduate Teaching Associate — Sep'21 - Jun'23
- Managed and led discussions/office hours for 500 undergrads in CS32 & Chem 20A, totaling over 500 hours in 5 quarters

Publications

Analysing the Extent of Misinformation in Cancer Related Tweets **[Link]**
- **Rakesh Bal***, Sayan Sinha*, Swastika Dutta, Rishabh Joshi, Sayan Ghosh, Ritam Dutt
- *14th International AAAI Conference on Web and Social Media (**ICWSM** 2020)* [*30 citations*]

Two-Sided Fairness in Non-Personalised Recommendations **[Link]**
- Aadi Swadiptio Mondal*, **Rakesh Bal***, Sayan Sinha*, Gourab K. Patro
- *35th AAAI Conference on AI (**AAAI** 2021) Student Abstract and Poster Program* [*9 citations*]

PGraphDTA: Improving Drug Target Interaction Prediction using Protein Language Models & Contact Maps **[Link]**
- **Rakesh Bal**, Yijia Xiao, Wei Wang [In Peer Review]

* - equal contribution

Relevant Projects

CLIP for Visual Question Answering (VQA) **[Link]**
- Harnessed OpenAI CLIP in VQA models like MCAN and Pythia in both zero-shot and finetune settings with 2% upgrade
- Added Language Driven Semantic Segmentation (LSeg) to pipeline for answering number-based questions in VQA2.0 dataset

Text Graph Convolutional Networks (GCNs) **[Link]**
- Investigated TextGCN by reproducing the model's results and adding new components on 5 different text classification datasets
- Designed new graph construction algorithms and improved the time cost of graph construction in TextGCN model by 5 times

Stereo Vision based NeRF
- Built NeRF framework for rectified stereo vision on NeRF synthetic dataset, with superior performance over monocular vision

Skills

Languages: Python, Java, C, C++, C#, JavaScript, TypeScript, R, Go, Matlab, Lisp
Frameworks: PyTorch, Keras, Tensorflow, Angular, React, Spark, Node.js, SpringBoot, Kafka, AWS, MySQL, MongoDB, Docker