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 - Aug'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

University of California Los Angeles **Los Angeles, US**
Graduate Teaching Associate Sep'21 - Jun'23
– Managed and led discussion sections/office hours for **500** undergrad students in CS32 and Chem 20A courses for 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* * - equal contribution

Relevant Projects

Autonomous Underwater Vehicle (AUV), IIT Kharagpur **[Link]**
– Implemented real-time underwater buoy detection using MobileNet and made inference of the model lightweight by 20%
– Used ROS packages like Actionlib and Smach to implement the Mission Planner Stack, participated in SAVe at NIOT, Chennai

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

Skills

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

Achievements

– Participated in Winter Camp and awarded Certificate in drill and weapon training at National Cadet Corps (NCC) Aug'18
– Secured All India Rank 265 (200K candidates) in IIT-JEE Advanced and 187 (13M candidates) in IIT-JEE Mains Jun'16
– Secured 5th position in District Level Chess Championship held at SCS College, Puri amongst 1000 players Jan'10