Aishik Mandal

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Education

- **Indian Institute of Technology, Kharagpur** **CGPA: 9.55/10**
  Bachelor of Technology in Electronics and Electrical Communication Engineering, *2018-Present*
  Master of Technology in Artificial Intelligence, Machine Learning and Applications
  Minor in Computer Science and Engineering
  Micro Specialisation in Embedded Control, Software, Modelling and Design
- **Hem Sheela Model School, Durgapur** **Percentage: 93.6**
  Class XII(AISSCE), *2018*
- **Delhi Public School, Bardhaman** **CGPA: 10/10**
  Class X(AISSE), *2016*

Internships

- **Multimodal Turn Taking in Conversational Agents** **INRIA Paris, France**
  Under Prof. Justine Cassell, Articulabo, Cognitive Machine Learning Group *May 2022-Present*
  - Proposed models to **improve turn taking** in conversational agents using **acoustic and linguistic data**.
  - **Ran baselines** to show the improvement achieved by our proposed models.
  - **Pre-processed raw video data** to **extract visual features** like gaze and nod using OpenFace toolkit and **acoustic features** using OpenSmile toolkit to **create dataset** suitable for training models with **all the modalities**, visual, acoustic and linguistic.
  - Currently working on **developing novel models using all modalities** to improve turn taking prediction of conversational agents.
- **Revenue Function of Hierarchical Clustering in Comparison Framework** **TU Munich, Germany**
  Under Prof. Debarghya Ghoshdastidar, Theoretical Foundations of AI *June 2021-August 2021*
  - Proposed a **novel revenue function** to evaluate the **meaningfulness of the dendrograms** produced by **hierarchical clustering algorithms** in a **comparison framework**.
  - Showed that the **proposed comparison-based revenues** are equivalent to **Dasgupta's cost or revenue** applied to particular pairwise similarities that can be computed from comparisons.
  - **Proposed two variants of average linkage hierarchical clustering** based on passive triplet or quadruplet comparisons.
  - **Empirically compared** the performance of these new approaches with state of the art baselines using **synthetic and real datasets**.

Projects

- **Discourse Mutual Information for Dialogue Understanding and Response Generation** **IIT Kharagpur**
  Bachelor's Thesis, under Prof. Pawan Goyal, Department of Computer Science and Engineering *Dec 2020-April 2021*
  - Performed extensive **experimentation** on a **dual encoder architecture** to encode context and response in a dialog, with the purpose of increasing the proposed **Discourse Mutual Information** objective function.
  - Performed various **downstream dialog-understanding tasks** as a means of evaluating the representations learned.
  - **Ran baselines** for comparing the performance of the proposed model against state of the art models on downstream tasks.
  - **Trained a decoder** to obtain response from response encoding.
  - Proposed **methods to obtain response encoding** from only context encoding.
  - Performed **exploratory analysis** to understand the **features captured by the encoder** as the response was only partially predicted from only context.
- **Knowledge-Aware Neural Networks for Medical Forum Question Classification** **IIT Kharagpur**
  Under Prof. Niloy Ganguly, Complex Networks Research Group(CNeRG) *May 2020-May 2021*
  - Performed **extensive experimentation and baselining** for the proposed **MedBERT model**, a novel application of dual encoder model for medical forum question classification task.
  - Performed **error analysis** by extracting the confusion matrix of the proposed MedBERT model when applied on ICHI dataset
  - Performed **ablation analysis** on the proposed MedBERT Model showing the importance of local and global encoders
  - Used subsets of ICHI training set data to show **MedBERT outperforms other baselines in a low resource setting**

Publications

- **Representation Learning for Conversational Data using Discourse Mutual Information Maximization**
  Bishal Santra, Sumegh Roychowdhury, **Aishik Mandal**, Vasu Gurram, Atharva Naik, Manish Gupta, Pawan Goyal, *2022 Annual Conference of the North American Chapter of the Association for Computational Linguistics*(Link to the paper) (Link to project webpage)
- **A Revenue Function for Comparison-Based Hierarchical Clustering**
  Aishik Mandal, Michaël Perrot, Debarghya Ghoshdastidar, *37th AAAI Conference on Artificial Intelligence, currently annonymised due to triple-blind process*
- **Knowledge-Aware Neural Networks for Medical Forum Question Classification**
  Soumyadeep Roy, Sudip Chakraborty, **Aishik Mandal**, Gunjan Balde, Prakhar Sharma, Anandhavelu Natrajan, Megha Khosla, Shamik Sural, Niloy Ganguly, *30th ACM International Conference on Information and Knowledge Management* (Link to the paper) (Code-base Link)

Skills and Expertise

- **Programming Languages:** Python | C++ | C
- **Softwares and Libraries:** PyTorch | TensorFlow | Keras | ScikitLearn | Pandas | NumPy | MATLAB | OpenSmile | OpenFace | Elan

Coursework

- **Institute Courses**: Algorithm-I* | Natural Language Processing | Data Analytics | Probability and Stochastic Processes | Digital Signal Processing* | Linear Algebra for AI | AI Foundations and Applications | Machine Learning Foundations and Applications* | Deep Learning Foundations and Applications | Big Data Processing
- **Ongoing Courses**: Graphical and Generative models for Machine Learning
- **Online Courses**(Coursera): DL Specialisation |TensorFlow in Practice Specialisation |Data Visualisation with Python

Awards And Achievements

- **Department and Institute Rank:** Currently holding Department Rank 1 among 37 students in Artificial Intelligence, Machine Learning and Applications
- **DAAD WISE Awardee:** Received WISE scholarship for summer internship(2021)
- **Charpak Lab Scholarship Awardee:** Received Charpak Lab scholarship for summer internship(2022)
- **GKF International Internship Scholarship:** Received GKF International Internship Scholarship from IITKGP Foundation for summer internship(2022)

Extra Curricular Activities

- **National Service Scheme**, *IIT Kharagpur(2018-2020)*: Volunteer of NSS and Co-Leader of the teaching team
- **SWG Mentor**, *IIT Kharagpur(2020-2021)*: Mentor for 5 junior undergraduate students

(* indicates both lab and theory courses)