Agneet Chatterjee

Email | Google Scholar | DBLP | LinkedIn | LeetCode

Education

Arizona State University — **Tempe, AZ**
PhD in Computer Science — *August 2022 –*

Jadavpur University — **Kolkata, India**
B.E. in Computer Science and Engineering — *July 2015 – May 2019*

Professional Experience

Salesforce India — **Hyderabad, India**
Member of Technical Staff — *August 2021 - July 2022*
Associate Member of Technical Staff — *June 2019 - July 2021*

- Lead developer on a 15-person global team in the QTC domain, aiming to unlock a revenue of $1B in India by FY27.
- Spearheaded the development and deployment of an Apex, LWC, and JavaScript-based application to automate 70k monthly emails, creating a modular and configurable microservice-based subscription model that was adopted organization-wide, with potential earnings of $7M+.
- Developed a highly scalable, OAuth 2.0-secure, data extraction solution utilising Mulesoft and Heroku, facilitating 35M+ transactions and achieving a 200x performance improvement over the preceding reporting-based solution.

Samsung Research Institute — **Bangalore, India**
Summer Intern — *May 2018 - July 2018*

- Using Unity's Rendering API's, worked on the Graphics and VR team to create a C# and Java-based application that renders 3D models in real time, with special focus on Physically Based Rendering (PBR).

Selected Publications / Pre-Prints

Peer-Reviewed Conferences

3. Chakraborty, A., De, R., **Chatterjee, A.**, Schwenker, F., & Sarkar, R. (2019, September). Filter method ensemble with neural networks. *International Conference on Artificial Neural Networks (ICANN)*
2. **Chatterjee, A.**, Malakar, S., Sarkar, R., & Nasipuri, M. (2018, January). Handwritten digit recognition using DAISY descriptor: a study. *Fifth International Conference on Emerging Applications of Information Technology (EAIT)*
1. Dey, P.*, **Chatterjee, A.*** & Roy, S. (2018, January). Knowledge based community detection in online social network. *10th International Conference on Communication Systems & Networks (COMSNETS)* [Best Paper - Runners up]

Peer-Reviewed Journal Articles

10. Chakraborty, B., **Chatterjee, A**, Malakar, S. et al. (2022) An iterative approach to unsupervised outlier detection using ensemble method and distance-based data filtering. *Complex & Intelligent Systems*
9. **Chatterjee, A.**, Ghosh, S., Chakraborty, A., Ghosal, S. K., & Sarkar, R. (2021). A two-phase gradient based feature embedding approach. *Journal of Information Security and Applications*, 61, 102898.
8. Ghosal, S. K.*, **Chatterjee, A.***, & Sarkar, R. (2021). Image steganography based on Kirsch edge detection. *Multimedia Systems*, 27(1), 73-87.
7. Ghosh, S.*, **Chatterjee, A.***, Sen, S., Kumar, N., & Sarkar, R. (2020). CTRL–CapTuRedLight: a novel feature descriptor for online Assamese numeral recognition. *Multimedia Tools and Applications*, 1-24.
6. De, R., Chakraborty, A., **Chatterjee, A.**, & Sarkar, R. (2020). A weighted ensemble-based active learning model to label microarray data. *Medical & Biological Engineering & Computing*, 58(10),2427-2441.
5. Saha, A.*, **Chatterjee, A.***, Ghosh, S., Kumar, N., & Sarkar, R. (2020). An ensemble approach to outlier detection using some conventional clustering algorithms. *Multimedia Tools and Applications*, 1-25.
4. Ghosh, S.*, **Chatterjee, A.***, Singh, P. K., Bhowmik, S., & Sarkar, R. (2020). Language-invariant novel feature descriptors for handwritten numeral recognition. *The Visual Computer*, 1-23.
3. Mumford, S., Freij, N., Christe, S., Ireland, J., Mayer, F., Hughitt, V., **Chatterjee A.**, ... & Murray, S. (2020). SunPy: a python package for solar physics. *Journal of Open Source Software*, 5(46).
2. **Chatterjee, A.**, Ghosal, S. K., & Sarkar, R. (2020). LSB based steganography with OCR: an intelligent amalgamation. *Multimedia Tools and Applications*, 1-19.
1. Dey, P.*, **Chatterjee, A***. & Roy, S (2019). Influence maximization in online social network using different centrality measures as seed node of information propagation. *Sādhanā*, 44, 205

Selected Research Experience

Indian Institute of Technology, Kharagpur **Kharagpur, India**

Research Intern, Department of Computer Science *May 2017 - July 2017*

- Formulation of Random Walk with Restart on Social and Spatio-Temporal graphs generated on the WSU CASAS Dataset, enabling efficient data gradation for ADL Detection. [report] (**Advisor**: Dr. Niloy Ganguly)
- The proposed method resulted in a 40% decrease in average runtime, a 75% reduction in data, and a 10% increase in overall accuracy.

Jadavpur University, Kolkata **Kolkata, India**

Undergraduate Researcher, Department of Computer Science *June 2016 - June 2019*

- **Optical Character Recognition (OCR) - DAISY, PLSS & HOPP Descriptors** (**Advisor**: Dr. Ram Sarkar)
  - Enhanced the DAISY Descriptor to achieve a maximum accuracy of 98.75% in handwritten digit recognition on 4 scripts by modifying the descriptor rings, outer radius and the descriptor sampling points, outperforming the existing state-of-the-art methods in the process.
  - Introduced the concept of perspective projection of light (PLSS) and angular partitioning of histograms (HOPP) to generate a slant and protrusion-free feature set, evaluated the classifier performance on 10 scripts, and statistically validated it using the non-parametric Friedman test.
- **OCR-Based Steganography** (**Advisor**: Dr. Ram Sarkar)
  - Proposed an efficient technique for transforming and embedding message contents as unique features, resulting in a highly secure model that circumvents the cover image's limited hiding capacity, with its robustness corroborated using Primary sets, Sample pairs, and RS analysis techniques.
  - Enhancements were made to the work, creating a gradient-based, extendible framework that selectively embeds features based on the principle of least distortion, resulting in adequate Payload, PSNR, SSIM, and UQI values.
- **Active Learning** (**Advisor**: Dr. Ram Sarkar)
  - To address the costly labelling of microarray data, combined the heuristics of an active learning algorithm with a weighted classifier ensemble on 10 standard datasets, performing Marginal Selection iteratively and updating the training set via a feedback loop.
- **Social Network Analysis - Community Detection and Influence Maximisation** (**Advisor**: Dr. Sarbani Roy)
  - On a crawled Twitter dataset, introduced a novel user attribute-based knowledge network, generating highly modular communities using hierarchical and random walk-based community detection algorithms, which were validated against standard benchmarks such as Maximum ODF.
  - Work was extended to develop a degenerative network computed from the k-core of the original graph, which demonstrated comparable spread performance with a significant reduction in computation complexity and graph size.
- **Identification of Immunological Biomarkers with Multiplex Networks** (**Advisor**: Dr. Ujjwal Maulik)
  - A random walk with restart mechanism, with a defined layer switching and restart probability was applied to a bi-layered multiplex network to identify influential autoantibodies, with the findings analysed using KEGG and Pathway Semantic Network.

Open Source Contributions

SunPy | *Python* **2017**

- Implementation of a Multi-Scale Gaussian Normalisation Algorithm, as well as refactoring of existing codebase, released as part of v0.8. [details]

Relevant Coursework

- Pattern Recognition
- Soft Computing
- Operating System
- Discrete Math
- Artificial Intelligence*
- Robot Learning*
- Topics in NLP*

Graduate-Level courses

Technical Skills

Languages: Python, R, JAVA, C++, MATLAB, SQL, Apex, HTML/CSS, JavaScript, Shell (Bash).
Technologies/Frameworks: NumPy, Scikit-Learn, PyTorch, TensorFlow, OpenCV, CUDA, Tableau, Mulesoft, Heroku.

Honors & Awards

- **Invited Talk** - Future Generation Computing and Applications. [recording] **2020**
- **1st** position - Salesforce Summer Hackathon. **2020**
- **3rd** position - Salesforce Fall Hackathon. **2019**
- **Best Paper Runner up & Full Student Grant** - Social Networking Track COMSNETS. **2018**
- **3rd** position - Hult Prize Regionals. [pitch] **2017**
- **Convenor**, CodeClub Jadavpur University. **2016-17**
- **Best Speaker & Team**, The Energy Debate by CESC. **2016**
- The Telegraph - Kalyan Bharti Award for **All-Round Excellence.** **2015**
- **INSPIRE** Scholarship - DST, Govt. of India. **2015**
- West Bengal Joint Entrance Examination - (**149**/0.2M). **2015**