Sanchayan Sarkar

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Summary

4+ years experienced in Machine Learning and data analysis with expertise in multimodal deep learning in analyzing emotion and turn-taking behavior in multimodal dialogue. Passionate and adept in developing and applying statistical and ML algorithms in solving real world problems. I am self-motivated, quick to learn and enjoy working in a collaborative environment.

Technical Skills

Programming Languages: Python, MATLAB, Java, C/C++, Javascript, SQL
Tools: PyTorch, Keras, TensorFlow, scikit-learn, opencv, pandas, Caffe, git, Arduino IDE, Android SDK, Unity 3D

Education

Master of Science (MS), University of Pittsburgh, PA, USA   Aug 2017-Ongoing
- Computer Science with specialization and research experience in Machine Learning. | *CGPA: 3.55 / 4.0*
- *Courses:* Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Artificial Intelligence.

Master of Science, (MSc) University of Calcutta, India   Jul 2013- Jun2015
- Computer and Information Science. | *First Class, 75 % (in top 5)*
- *Thesis*: Image Enhancement using Cuckoo-Search Optimization.

Bachelor of Science, **(BSc)**, **St. Xavier's College, Kolkata**, India   Jul 2010- Jun 2013
- Computer Science (Honors). | *First Class, 76% (in top 10)*

Work Experience

University of Pittsburgh, Pittsburgh, PA, USA

Graduate Student Researcher   Aug 2018- Ongoing
Research assistant in developing multimodal machine learning models and analyzing behavior in dyadic conversations.
(*Adviser: Dr.Malihe Alikhani and Dr. Jeff Cohn*)

Project: Multimodal Turn Taking in Dyadic Conversations   July 2020- Ongoing
- Developed multimodal machine learning models for learning turn-taking strategies (end-of-turns, silence duration) from audio-video-text sequences in dyadic interactions.
- Achieved statistically significant multimodal cues and used multimodal transformers to obtain higher performance.
- Technologies: Python, Pytorch, ELAN

Project: Automatic Emotion Recognition in Dyadic Conversations   May 2020- Ongoing
- Developed context aware multimodal sequential and non-sequential neural models (LSTM, Conv-LSTM, Transformers) for predicting composite emotion constructs from audio-video-text sequences in dyads.
- Technologies: Python, Pytorch, ELAN

Project: Automatic Depression Detection in Mother-Child Dyads   May 2019- Apr 2020
- Developed jointly learned Siamese neural networks for predicting PHQ-9 scores of depressed mothers in from mother-child face to face conversations.
- Technologies: Python, Pytorch, ELAN

Graduate Teaching Assistant   May 2018- Ongoing
- Developed and delivered presentations for audiences of over 25 people.
- Taught courses: Algorithm Implementation (CS1501)
- Graded courses: Artificial Intelligence (CS 2710), Machine Learning (CS 1675) , Human Computer Interaction (CS 1637)

Indian Statistical Institute, Kolkata, West Bengal, India.

Project Researcher   Nov 2015- Dec 2016
Research Intern working on developing mathematical and statistical models for human face recognition.
(*Adviser: Dr. Arindam Kar*)

Project: Illumination Variation Problem on Human Face Recognition
- Developed novel local illumination-invariant feature for face recognition beating competitive methods with accuracy of 6.7% on CMU-PIE, 5% on Yale B and 2% AR, CUHK dataset • Technologies: MATLAB. [Paper]

Project: Dimension Reduction and Noise Reduction for Face Recognition
- Used linear regression to stabilize lower entropy space for dimension reduction in face recognition. • Applied on FRAV-2D, FERET dataset. • Technologies: MATLAB [Details]

Publications

- *"Local Centre of Mass Face For Face Recognition under varying Illumination",* Arindam Kar[1], **Sanchayan Sarkar[1]**, Debotosh Bhattacharjee[2], Springer: Multimedia Tools and Application, 2017.
- *"Challenges and Effects of Plastic Surgery on Face Recognition Performance: A review",* **Sanchayan Sarkar,** Samir Kumar Bandyopadhyay, European Journal of Pharmaceutical and Medical Research, 2017.
- *"Leaning Turn-Taking Strategies in Multimodal Dialogue",* **Sanchayan Sarkar,** Ali Darzi, Jeff Cohn, Malihe Alikhani**.** (under preparation).

Selected Academic Projects

Detecting Deep Fakes (11785 Deep Learning).   Nov 2019- Dec 2019
- Developed Siamese Statistical Recurrent Neural Networks to detect deep-fake video sequence (using Python, Pytorch)
- Achieved 10% higher performance over Statistical Recurrent Networks in FaceForensics++ dataset. [Details]

Detecting Pneumonia in Chest X-Ray Images: ML approaches (2750 ML)   Mar 2019 – Apr 2019
- Implemented Resnet-50, InceptionNet, CNN on Chest X-ray images (using Keras, Tensorflow) with a 3% increase in recall with Resnet-50 over InceptionNet. [Details]

Tiny Google – A parallel word search engine (2510 OS)   Nov 2018- Dec 2018
- Developed a distributed search engine, using multithreading, that searches and retrieves documents based on search words from multiple worker nodes. Project done using Python and Threading. [Details]

Direct Manipulation in Virtual Reality (2610 HCI).   Nov 2017- Dec 2017
- Used tracked movements from smartwatch to move objects in Virtual Reality (using Android SDK, Unity 3D).
- Set up an user study gauging the difficulty of moving an box to a sphere of varying length in the virtual environment. [Details]