

# 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 97.45 on CMU-PIE, 95 on Yale B and 100 CUHK dataset • Technologies: MATLAB.

**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

## Publications

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- *“Local Centre of Mass Face For Face Recognition under varying Illumination”*, Arindam Kar<sup>1</sup>, **Sanchayan Sarkar<sup>1</sup>**, Debotosh Bhattacharjee<sup>2</sup>, 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

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| <b>Detecting Deep Fakes (11785 Deep Learning).</b>  | Nov 2019- Dec 2019 |
| <ul style="list-style-type: none"><li>• Developed Siamese Statistical Recurrent Neural Networks to detect deep-fake video sequences.</li><li>• Achieved 10% higher performance over Statistical Recurrent Networks in FaceForensics++ dataset.</li><li>• Technologies: Python, Pytorch.</li></ul> |                    |
| <b>Tiny Google –A parallel word search engine (2510 OS).</b>  | Nov 2018- Dec 2018 |
| <ul style="list-style-type: none"><li>• Developed a distributed search engine, using multithreading, that searches and retrieves words from multiple worker nodes.</li><li>• Technologies- Python</li></ul>   |                    |
| <b>Direct Manipulation in Virtual Reality (2610 HCI).</b>   | Nov 2017- Dec 2017 |
| <ul style="list-style-type: none"><li>• Used tracked movements from smartwatch to move objects in Virtual Reality.</li><li>• Technologies: Android SDK, Unity 3D.</li></ul>   |                    |