

# Sanchayan Sarkar

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## Experience

**Graduate Student Researcher, University of Pittsburgh, Pittsburgh, PA, USA.** Aug 2018-Present

Research assistant in developing multimodal machine learning models for turn-taking and emotion analysis in dyadic conversations.

**Project: Multimodal Turn Taking in Dyadic Conversations (Current Research)** July 2020- Present

- Developed multimodal machine learning models (in Python, PyTorch) for learning turn-taking strategies (end-of-turns, silence duration) from audio-video-text sequences in dyadic interactions.
- Achieved statistically significant multimodal cues and proposed multimodal transformers to obtain higher performance.

**Project: Automatic Emotion Recognition in Dyadic Conversations (Current Research)** May 2020- Present

- 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 (using Python, PyTorch).

**Project: Automatic Depression Detection in Mother-Child Dyads** Aug 2018- Apr 2020

- Created jointly learned Siamese neural networks for predicting PHQ-9 scores of depressed mothers in from mother-child face to face conversations (using Python, PyTorch). • Achieved 3% F1-score improvement over non-siamese models.

**Project Researcher, Indian Statistical Institute, Kolkata, West Bengal, India.** Nov 2015- Dec 2016

Research Intern working on developing mathematical and statistical models for human face recognition.

**Project: Illumination Variation Problem on Human Face Recognition**

- Created a novel local illumination-invariant descriptor for face recognition beating accuracy of competitive methods by 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.
- Achieved 3% improvement on FRAV-2D, FERET dataset over state-of-the art methods • Technologies: MATLAB [\[Details\]](#)

## Skills & Interests

**Programming Languages:** Python, MATLAB, Java, C/C++, SQL.

**Tools:** PyTorch, Keras, TensorFlow, scikit-learn, openCV, pandas, Caffe, git, AWS, Android SDK, Unity 3D

**Research Skills:** Deep Learning/Machine Learning, Natural Language Processing, Computer Vision, Data Analysis.

## Education

**Master of Science (MS), University of Pittsburgh, PA, USA** Aug 2017- Present

- 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)*

## Selected Academic Projects

**Detecting Deep Fakes (11785 Deep Learning).** Nov 2019- Dec 2019

- Created a Siamese Statistical Recurrent Neural Networks to detect deep-fake video sequence (using Python, PyTorch)
- Achieved 10% increase in AUC-ROC 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, Resnet-50 on Chest X-ray images (using Keras, Tensorflow).
- Improved recall performance by 3% using 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

- Extracted tracked movements from smartwatch to move objects in Virtual Reality (using Android SDK, Unity 3D).
- Created a user study gauging the difficulty of moving an box to a sphere of varying length in the virtual environment. [\[Details\]](#)

## Publications

- “*Leaning Turn-Taking Strategies in Multimodal Dialogue*”, 2021. (under preparation).
- “*Local Centre of Mass Face For Face Recognition under varying Illumination*”, 2017. [\[Link\]](#)
- “*Challenges and Effects of Plastic Surgery on Face Recognition Performance: A review*”, 2016. [\[Link\]](#)