Sanchayan Sarkar

sanchayansarkar@yahoo.com • (412)5265258• Website • github.com/sanchveda • LinkedIn
5604 Fifth Avenue, Apt B-301, Pittsburgh, PA 15232

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. Worked with state-of-the-art Computer Vision and NLP language models. Passionate and adept in developing and applying statistical and ML algorithms in solving industry standard world problems.

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.

***Graduate Teaching Assistant,* University of Pittsburgh,** Pittsburgh, PA, USA. May 2018- Present

- Led recitations with classes over 25 students.
- Taught courses: Algorithm Implementation (CS1501)
- Evaluated projects on courses including Artificial Intelligence (CS 2710), Machine Learning (CS 1675) , Human Computer Interaction (CS 1637).

***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

Image Captioning using context attention (3730 NLP) Oct 2020- Nov 2020

- Generated captions from images using LSTM decoder with attention to image embeddings from Resnet-101.

Mortality Prediction using Heterogenous data sources (3750 ML) Mar 2020- Apr 2020

- Investigated contribution of multiple data sources (medications, vital signs) and built a Transformer architecture to predict mortality from continuous time-series data (using PyTorch).
- Evaluated Microbiology events as indicative of morality and achieved a 3% improvement with Transformers over LSTM.

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]*