Bipasha Sen

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Research Interests

Multimodal Perception, Self-Supervised Learning, Computer Vision

Education

K.C.College of Engineering, University of Mumbai Jul 2012 - Jun 2016
B.E. in Computer Engineering (8.13/10, First Class with Distinction)

- Thesis: Reinforced and Collaborative Music Recommendation
- Relevant classes taken:
  CPC 703 Artifical Intelligence
  CPE 7023 Image Processing

Kendriya Vidyalaya O.N.G.C. Panvel Apr 2011 - Mar 2012
12^{th} C.B.S.E (82%)

Research Experience

Microsoft Research & Development 2016 - Present
Data Scientist II (Microsoft's Search and Assisted Intelligence) - Outlook Platform

- **Self-Supervised Meeting Summarization (BReSQ)**
  - Building a **self-supervised** framework called BReSQ to generate summaries of long meetings with multiple participants and speakers. **B**revity to reduce the transcript to a short latent space. **Re**levance to evaluate if the summary contains the key points of the meeting. **S**pan to keep the summary from getting too short. **Q**uality to enable readability.
  - Using a combination of **Autoencoders, Generative Adversarial Networks**, and pretrained Question-Answering model.
- **Inline Suggested Attachments**
  - Responsible for building a **high-precision classification model** for the suggestion of potential document as attachments to a half-composed email. Correct suggestion reduces the number of clicks to attach from 4 to 1.
  - My tasks involve analyzing user behavior and discovering non-linear patterns on the dataset to determine the file-type, user-file-affinity of the intended attachment based on limited context (half-composed emails).
- **Meeting Insights Relevance**
  - Responsible for building a **high-recall classification model** for the recommendation of relevant email to meetings.
  - Using AiGraph, a knowledge graph generated using Outlook data, to generate the candidates for recommendation;
  - Using **Graph Neural Networks** to generate embedding (cached); Using simple linear models (to meet the extremely low-latency requirements of 200ms) on the embedding plus 150 handcrafted features for ranking and classification.
  - Training model on a weakly-supervised and massively-imbalanced big data ($\sim$45M unlabelled data, $\sim$ 72k positive data).
  - Meeting Insights power recommendations for more than 100 million users per month.
- **Detection of Business Trips**
  - Planning a trip leads to multiple reservations: Flights, Hotels, Cabs, etc. Keeping track of the several bookings is a taxing job. Trips solve the problem by showing all booking relevant to a trip on a single page.
  - Single-handedly developed the convoluted **algorithm** to club multiple disjoint Flight, Hotel, Bus, and Cab reservation emails on Outlook to form a single logical entity representing an end-to-end trip.
- **Scalable non-template based approach for information extraction on Machine Generated Emails**
  - Developed a **scalable** approach for extracting key information such as Invoice amount, Account number, Due Date from long machine-generated emails. No dependency on sender templates (airbnb.com, icici.com, etc.). Using Microsoft's Program Synthesis using Examples (PROSE) for scalable extraction.
  - Developed an automated pipeline to monitor the soundness of the extracted information.

International Institute of Information Technology - Hyderabad Oct 2019 - Jul 2020
Visiting Researcher - Speech and Vision lab, LTRC

- **Reed: An Approach Towards Quickly Bootstrapping Multilingual Acoustic Models**
  Built a multilingual acoustic model for low resource Indian Languages: Gujarati, Tamil, and Telugu. Used Kaldi for data pre-processing and pytorch-Kaldi for training convolutional neural networks on raw speech signals.

Microsoft Research & Development Dec 2015 - Feb 2016
Data Scientist - Intern (Search Technology Center India)

- **Conversational Shopping Assistant Bot**
  - Built a conversational bot tasked for proactively engaging the users and assisting them in placing an order.
  - Developed the bot from scratch trained by **reinforcement learning**. Defined the optimal policy & reward and integrated Microsoft's Multi-World Testing (MWT), a reinforcement learning-based framework.
  - *Project demoed to David Ku (former CVP and CTO of Microsoft AI+R).*

Publications

Reed: An Approach Towards Quickly Bootstrapping Multilingual Acoustic Models, paper
Bipasha Sen, Aditya Agarwal, Mirishkar Sai Ganesh, Anil Kumar Vuppala
Spoken Language Technology (SLT 2021) [to-be published]

An Approach Towards Action Recognition using Part Based Hierarchical Fusion, paper
Bipasha Sen, Aditya Agarwal
International Symposium on Visual Computing (ISVC 2020)

Sub-Reviewer for ECIR, COMAD, DAFSAA, MLADS - SYNAPSE

Microsoft's Machine Learning and Data Science (MLADS) Publications

Sentence Modelling for Contextual Meeting Segmentation, short-paper
Jay Paranjape, **Bipasha Sen**

AiGraph for Meeting Insights Relevance, short-paper
Bipasha Sen, Prakash Pandey, Rajeev Gupta, Vipin Vangala

Major projects

Reinforced and Collaborative Music Recommendation 2016
Undergraduate Thesis

- Developed an agent that recommended music from the song-library on the mobile phone. The agent continuously learned and evolved based on collaborative (users with similar behavioral patterns) feedback.
- Created a music player with the agent in the backend, supervised a group of 10 people who used the music player for over one month, and observed their behavior and feedback.
- Received the highest O (Outstanding) grade.

Anterior Segment Imaging (MIT Media Lab's REDX Camp) 2015

- REDX is an interdisciplinary platform to enable collaboration between world-renowned medical professionals and engineers to build solutions for society's most pressing healthcare challenges.
- Worked in collaboration with India's leading Eye-Institute, LVPI.
- Developed a low-cost, solid-state device with no moving parts, as a replacement for heavy and bulky Ophthalmic Slit Lamp, to capture and reconstruct a 3D visual model of a patient's cornea (the anterior segment of the eye) reflecting the abnormalities in the cornea.

TheBhaad: Cloud-Based Group-Oriented file-sharing network (video) 2014

- Single-handedly developed a fully-fledged cloud-based file-sharing network with windows like user-interface. Features: Search, Contacts, Groups (Classrooms), Personalized Document Alignment, Discussion Forum.

Awards and Achievements

Invited for talk at MLADS on Quick Bootstrapping of Multilingual Models	July 2020
3rd in Microsoft One Week Hackathon - Mobile Endpoint (3k+ participants)	August 2016
126th in TCS CodeVita '15 Round 2 (19800+ participants)	February 2016
Best Student of the Year (One out of 600+ graduating students)	February 2016
Best Entrepreneur (as the founder of TheBhaad that hosted 5000+ users)	March 2015

Skills

Languages	Python, Spark.net, SQL, C#, C/C++, HTML, CSS, jQuery
Framework	Pytorch, Tensorflow, scikit-learn, pytorch-Kaldi, Kaldi
Techonologies	Apache Spark and HDIInsight, Full-Stack Web Development
Tools	TLC (The Learning Code), Adobe Premiere Pro

Extra-Curricular

I am a musician: vocalist, guitarist, and composer. I've toured around India along with my previous band, Andrometa. I've also traveled to 6 countries, 11 states solo over a period of 5 months and interviewed 70+ independent music bands (180+ artists) about their struggles as independent artists.