Pranav Khadpe

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RESEARCH INTERESTS

Social Computing, Human-Centered Systems, Educational Technology, Computational Social Science

EDUCATION

Indian Institute of Technology Kharagpur, *West Bengal, India* May '20
B.Tech and M.Tech in Electrical Engineering, *Minor* in Computer Science & Engineering
CGPA: **9.03/10**, Additional CGPA: **9.27/10**
Department Rank: **3**/30
Advisor: Prof. Ashish R. Hota September '19 - Present
Thesis: *Mixed Autonomy in Network Routing Games with Co-existing Atomic and Non-atomic Players*

PUBLICATIONS

[1] Anshul Bawa, **Pranav Khadpe**, Pratik Joshi, Kalika Bali & Monojit Choudhury
Do Multilingual Users Prefer Chat-bots that Code-Mix? Let's Nudge and Find Out!- **(under review) CSCW 2020**

[2] **Pranav Khadpe**, Ranjay Krishna, Li Fei-Fei, Jeffrey T. Hancock & Michael S. Bernstein
Low Expectations Lead to Better Experiences: The Effect of Conceptual Metaphors on Human-AI Collaboration-**(under review) CHI 2020**

[3] Junwon Park, Ranjay Krishna, **Pranav Khadpe**, Li Fei-Fei & Michael S. Bernstein
AI-based Request Augmentation to Increase Crowdsourcing Participation-**HCOMP 2019** [pdf]

RESEARCH EXPERIENCE

Stanford Human-Computer Interaction Group May '19 - Present
Research Intern with Prof. Michael Bernstein and Ranjay Krishna *Stanford, CA*

· Contributed to a project that sought to increase response rates of an organic crowdsourcing system deployed on Instagram by incorporating insights from social psychology. Primarily involved in designing and running experiments and writing the paper that was subsequently accepted at HCOMP 2019.
· Led a project to understand how conceptual metaphors attached with systems shape user attitudes towards them in an attempt to study how users formulate folk theories of systems they interact with. Involved in experiment design, study setup and deployment. Designed a WoZ study for which I recruited and trained freelancers from UpWork to serve as wizards. Built the interfaces for the study and deployed the study on Amazon Mechanical Turk. Submitted a paper based on the work to CHI 2020.
· Currently collaborating remotely*

Microsoft Research India - Multilingual Systems Group May '18 - September '19
Research Intern with Dr. Monojit Choudhury *Bangalore, India*

· Studied style variation in conversations in context of the Communication Accommodation Theory with the primary aim of designing conversational systems that can reciprocate multilingual users' language mixing. In continuation of previous work establishing Code Switching (language-mixing) as a linguistic style marker, designed computational Code-Switching policies for chat-bots to accommodate for it.
· Built a human-in-the-loop study platform for us to test our Code-Switching policies and study user preferences among our chatbot variants. Deployed the study via flyers on social media and analyzed the responses, including chatlogs of the 91 participants. The paper that resulted from this work is currently under review at CSCW 2020.

Center for Educational Technology- IIT Kharagpur July '18 - March'19
Undergraduate Researcher with Prof. Plaban Bhowmick and Prof. Pawan Goyal *Kharagpur, India*

· Worked on generating automated comparisons between pairs of entities using their Wikipedia articles.
· Explored the use of clustering algorithms, on bag-of-words sentence embeddings, including Gaussian LDA and Gaussian PLSA but these methods fail to work on large unstructured documents
· Using Simple English Wikipedia, I constructed a document network with nodes representing sentences and Word Mover's Distance based similarity as edge weights, I developed heuristics to select the optimal subgraph as the first step in the pipeline.
· To improve the system and filter erroneous comparisons, I adapted the VDPWI model for the binary classification task of whether a pair of sentences is comparable or not and introduced this as the second step of the pipeline. In order to prove the efficacy of this approach, I ran a crowdsourcing task to curate a list of thousand pairs of comparison points in the "animals" domain to fine-tune the VDPWI model that I trained on the MSR paraphrase data.

TCS Innovation Labs December '17 - January '18
Research Intern under A. Anil Kumar *Bangalore, India*

· Worked on resolving ambiguities in multi-polarised images using graph signal processing. In order to refine coarse depth maps, we worked on resolving ambiguities in azimuthal and zenith angle estimated obtained from BRDF equations using polarisation cues. Constructed graph representations of data, to represent the data as a band-limited graph signal, on which we ran signal reconstruction algorithms.

ACADEMIC ACHIEVEMENTS

- Awarded the **S.N. Bose Scholarship** to pursue a summer internship at Stanford University in 2019. One of the 50 students, across India, awarded the scholarship
- Secured All India Rank **1322** in JEE Mains '15 *(out of 1.4M candidates)*
- Ranked **5th** in GCET '15
- Ranked **5th** in Goa Board Higher Secondary Examinations '15 with 94%
- Ranked **1st** in Goa in ICSE Board Examinations '13 with 98%

COURSE PROJECTS

Automatic Concept Map Generator February '18 - April '18
Term Project under Prof. Plaban Bhowmick *Center for Education Technology , IIT Kharagpur*

· Used DBpedia Spotlight to identify important concepts after which I extracted relation tuples using OpenIE. I retained meaningful relations by building filters based on the type of relations and finally used GraphViz for visualizations.

Twitter Bot January '18 - February '18
Term Project under Prof. Plaban Bhowmick *Center for Education Technology, IIT Kharagpur*

· Built a simple twitter bot working with n-gram models and different smoothing techniques using Solr to index the n-grams. Improved the system by making the generation POS template aware. Finally built a collocation based generator that accepted two query terms.

Linguistic Approaches to Predict Usefulness of Yelp Reviews August '17 - November '17
Term Project under Prof. Niloy Ganguly *Computer Science & Engineering, IIT Kharagpur*

· Analysed Yelp Reviews dataset to identify linguistic patterns common to useful reviews. Formulated the problem as an ordinal classification problem using 'useful votes' as a proxy for actual usefulness. Worked with LIWC features as well as some custom features to achieve on accuracy of 72% on the task.

Design of Analog Frontend for Biomedical Data Acquisition February '17 - April '17
Term Project under Prof. Mrigank Sharad Electronics & Electrical Communication, IIT Kharagpur

· Designed and simulated circuit models for front end ECG signal acquisition as part of Analog Electronic Circuits course. Implemented a Current Controlled Oscillator based ADC. Implemented and analysed Single Ended and Differential Amplifier based Voltage to Current Converter.

RELEVANT COURSES

- **Computer Science** - Speech & Natural Language Processing, Language Processing for E-Learning, Machine Learning, Deep Learning, Artificial Intelligence, Computer Architecture and Operating Systems, Algorithms-1.
- **Electrical Engineering** - Statistical Signal Processing, Introduction to Digital Speech Processing, Digital Electronic Circuits, Embedded Systems, Programmable and Embedded Systems, Signals and Networks, Control Systems, Digital Signal Processing, Analog Signal Processing.
- **Mathematics** - Probability and Stochastic Processes, Linear Algebra, Transform Calculus, Complex Analysis, Multi-variate Calculus, Symbolic Logic.

TECHNICAL SKILLS

- **Strong** - Python , C/C++
- **Familiar** - MATLAB, HTML, CSS, JavaScript, Arduino
- **Libraries and Frameworks** - TensorFlow, Git, Selenium, Flask, BeautifulSoup, Pandas, Numpy, Scikit-learn.

PROFESSIONAL ACTIVITIES

- **Teaching Assistant, EE29001 Signals and Networks Lab** - IIT Kharagpur.
- **Executive Editor, The Scholars' Avenue** - the media body of IIT Kharagpur.
- **Student Mentor** - Mentoring 5 freshmen, of the Electrical Engineering Department, helping them get accustomed to institute life and academics
- **Shadow Tutor, Department of Electrical Engineering** -*Signals and Networks* in Fall '17. Conducted doubt solving sessions and tutorial sessions for students from the class of 2021.