Akshat Choube

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RESEARCH INTERESTS

I am interested in building computational frameworks that aid in a better understanding of human intentions and emotions. Thus, research areas that excite me are Social NLP, Affective Computing, and Multimodal Machine Learning.

EDUCATION

University of Southern California, Los Angeles	**GPA: 3.94/4.0**	**August 2019 – May 2021**
Master of Science in Computer Science (Honors)		
Indian Institute of Technology (IIT), Palakkad	**GPA: 8.89/10**	**August 2015 – April 2019**
Bachelor of Technology in Computer Science and Engineering		

WORK EXPERIENCE

SDE-1 | Amazon Search   **July 2021 – present**
Working on Query Understanding
- Working on different methods to increase query parsing coverage for a Gazette-based Linker.

Graduate Research Assistant | Institute for Creative Technologies (ICT), USC   **Jan 2021 – May 2021**
Worked on predicting mood using apple watch data
- Worked on mood prediction using heartbeat and exercise data from apple watch.
- Did statistical analysis and used deep learning models to understand the correlation between mood and apple watch data.

Teaching Assistant | Viterbi School of Engineering, USC   **Jan 2021 – May 2021**
TA for Applied NLP (CSCI-544)
- Conducted regular office hours to help students with NLP theory, project, and report writing.
- Corrected students' test papers and held sessions to brainstorm ideas for their projects.

SDE Intern | Amazon Search   **June 2020 – Aug 2020**
Spark Based Data Processing Framework
- Designed and implemented a framework to convert multiple offline user behavior and clickstream datasets into read-only database (RODB) which can be deployed on an online search service.
- The framework provides custom data preprocessing options like filtering, transformation, aggregation, and merging.
- The framework uses efficient serialization/deserialization using protocol buffer.
- The RODB file generated from the framework reduces overall search latency.

Graduate Research Assistant | Social Media Analytics Lab, Keck School, USC   **Sept 2019 – Jan 2021**
Using Natural Language Processing for Public Health
- Analyzed Twitter for conversations, marketing, and misinformation around tobacco products (like cigarettes, cigars, etc.) and cannabis products (like weed, hash etc.).
- Analyzed the roles of social bots in spreading misinformation and promoting hazardous products.
- Conducted analyses on predominant health effects of cannabis use on Twitter.

Summer Intern | Divum Labs   **May 2018 – July 2018**
Using Blockchain for ecommerce
- Modified Merkle Patricia trie in Ethereum framework to allow for ecommerce data storage in blockchain.
- Represented ecommerce data from blockchain as Knowledge Graph and applied machine learning algorithms on it.
- Compared Graph databases like Neo4j and Dgraph for performances on read, write, and query search operations.

Junior Research Fellow | Tata Institute of Fundamental Research   **May 2017 – Dec 2017**
Information exchange system involving bit packets
- Defined Quality of Service considering transmission time and fraction of a bit packet.
- Proved optimal order for transmission of packets and devised a greedy algorithm that performs at most twice worse than intractable optimal solution.

● Published and presented this work at National Conference on Communications (NCC 2018) ([link](#))

PUBLICATIONS

[1] **Akshat Choube**, Mohammad Soleymani, "Punchline Detection using Context-Aware Hierarchical Multimodal Fusion", International Conference on Multimodal Interaction (ICMI), 2020.

[2] Rahul Vaze, **Akshat Choube**, Shreyas Chaudhari, Nitin Aggarwal, "Energy-Delay-Distortion Problem", National Conference on Communications (NCC), 2018.

[3] Jon-Patrick Allem, Allison Dormanesh, Anuja Majmundar, Jennifer Unger, Mathhew Kirkpatrick, **Akshat Choube**, Aneesh Aithal, Emilio Ferrara, Tess Cruz, "Topics of nicotine-related discussions on Twitter: quitting, withdrawal, and hypnotherapy", Journal of Medical Internet Research (JMIR)

[4] Jon-Patrick Allem, Anuja Majmundar, **Akshat Choube,** Aneesh Aithal, "Surveillance of discussions about health effects of cannabis use on Twitter", Drug and Alcohol Dependence (under review)

PROJECTS

Persona and Emotion Aware Dialogue System
● Created a new dataset by augmenting the PERSONA-CHAT dataset with discrete emotions for utterances using deepmoji network.
● Finetuned GPT-2 on the new dataset to generate a response given the persona of the agent, dialogue history, and desired emotion of the response.
● Analyzed the interplay between emotion and persona of the agent by varying intensity and label of emotions.

Multimodal Punchline Detection
● Designed context-aware hierarchical network for the task of multimodal punchline detection in TED Videos.
● Demonstrated the ability of hierarchical fusion to learn multimodal interactions for humor.
● Achieved state-of-the-art accuracy on UR-FUNNY Dataset and published the work at ICMI 2020 ([link](#)).

Analyzing Happy Moments
● Designed and implemented a Sentiment Analysis study to understand true sources of happiness among people of different culture, sex, age, etc. based on HappyDB dataset containing 14K happy moments.
● Built a word cloud generator to better visualize data based on query given by user.
● Classified happy moments into 7 categories like Affection, Achievement, etc. using LSTM and achieved 81% accuracy.
● Developed a valence scoring algorithm for sentences considering contextual valence shifter words like not, barely etc.

Multiview Face Synthesis using Generative Adversarial Network (GAN)
● Studied, implemented, and compared existing Multiview face generation models like CR-GAN, DR-GAN, TP-GAN, and GANnotation.
● Implemented a distributed version of CR-GAN using PyTorch to train in multiple CPU/GPU environment.

Intelligent Document Summarizer
● Created a Python application that gives a summary of a large text document that best describes the document.
● Devised an algorithm that works by clustering sentences and choosing the ones with maximum tf-idf cosine similarity score within the cluster.

Expert Paper Recommendation System
● Designed a recommendation system that assigns papers to experts for reviewing in a conference.
● Developed an algorithm that learns an expert's domain of work from their papers and recommends them papers in same domain.

TECHNICAL SKILLS

● **Programming Languages:** Python, C, C++, Scala, Haskell, C#, Go, HTML, CSS
● **Database:** MySQL, MongoDB, Dgraph, Neo4j
● **Frameworks/Tools:** PyTorch, NLTK, Spark, Keras, TensorFlow, Visual Studio, LaTeX, Git, Matlab, ArcGIS

EXTRA-CURRICULAR ACTIVITIES

● Managed corporate relations for Dept. of Computer Science, IIT Palakkad and secured 100% recruitments.
● Conducted practical sessions on Machine Learning and AI for 70+ teachers as part of the Additional Skill Acquisition Programme.
● Taught 50+ underprivileged students as part of National Service Scheme (NSS) and motivated them to pursue science.