Chaitanya Krishnaji Kulkarni

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http://chaitanya2334.github.io

Education

Ohio State University Aug. 2014 – Present
MS + PhD in Computer Science and Engineering CGPA: 3.81/4

- Research Focus(NLP): Developing translators for life science protocol instructions by learning domain specific semantic parsers from supervised methods by employing various neural network approaches.(`Python, pytorch, R`).

National Institute of Technology Karnataka, Surathkal Aug. 2010 – May 2014
BTech. in Computer Science and Engineering CGPA: 8.12/10

- Major Project: Developed a system in `C++`. (with `MATLAB`. for prototyping) that generates a single high-resolution image from multiple noisy low-resolution images.

Publications

- **Kulkarni, C.**, Xu, W., Ritter, A., & Machiraju, R., *"An Annotated Corpus for Machine Reading of Instructions in Wet Lab Protocols"*. North American Chapter of the Association for Computational Linguistics(NAACL 2018).
- Srivastava, A., **Kulkarni, C.**, Huang, K., Parwani, A., Mallick, P., & Machiraju, R. *"Imitating Pathologist Based Assessment With Interpretable and Context Based Neural Network Modeling of Histology Images"*. Biomedical informatics insights, (BII 2018).
- Shrivastava, A., **Kulkarni, C.**, Mallick, P., Huang, K., & Machiraju, R., *"Building Trans-Omics evidence: using imaging and omics to characterize cancer profiles"*. Pacific Symposium on Biocomputing. (PSB 2018).
- Prabhakar, T., Bhaskar, N., Pande, T., & **Kulkarni, C.** . *"Joule Jotter: An interactive energy meter for metering, monitoring and control"*. In International Workshop on Demand Response, co-located with the ACM e-Energy. (2014)

Research Experience

Semantic Representation of Wet Lab Protocols Ohio State University
with Eric Fosler-Lussier, Alan Ritter, Raghu Machiraju Nov 2016 – Present

- Currently working on building a framework for cross sentence temporal and causal relations found in wet lab protocols to better capture the flow of materials from start to finish.
- Contributed a corpus consisting of natural language instructions for wet labs and demonstrated its utility for developing machine learning approaches to shallow semantic parsing of instruction texts. **(NAACL 2018)**

Analysis of Neuronal Processes in Mice Brain Ohio State University
with Takaki Komiyama (UCSD), Raghu Machiraju Oct 2019 – Present

- Currently working on learning correlative networks of neuronal assemblies through various attention guided graph convolutional networks towards modeling state transitions in response to stimuli.
- The primary goal of the overarching project (under NSF Grant) is to model state transition networks to better understand the functional relationships between various neurons in mouse brain during certain activity/stimuli.

Improving Search Retrieval Facebook
PhD Research Intern May 2019 – July 2019

- Improved search retrieval by enhancing query and document level word embedding representation through state-of-the-art self-attention mechanisms and proposing novel extensions. (`caffe2, Python`).

Histology Image Classification Ohio State University
with Raghu Machiraju, Kun Huang May 2016 – May 2019

- Proposed image-based classifiers for histology images using deep learning approaches as well as extracting high level features that best categorize various cancer cohorts. (**BII 2018**)
- Incorporated imaging and omics to better characterize cancer profiles **(PSB 2018)**

Ultra sound Ohio State University
with Raghu Machiraju, Halyard Health Nov. 2015 – Jan 2016

- Proposed a method by taking a multi-altas approach to the detection and auto-segmentation of Brachial Plexus nerves, in order to assist medical professionals in guiding needles to block those nerves.

Burn Medical Assistant (BURNMAN) Ohio State University
with Raghu Machiraju, Chandan Sen May 2017 – May 2019

- Detection and segmentation of burn regions using deep learning techniques and evaluating percentage of total body surface area for each degree of burn.

Zero Energy Building Project Karnataka, India
Indian Institute of Science in corroboration with Bosch May 2013 – June 2014

- Developed the network stack used for machine to machine communication by making use of the latest SEP 2.0 profile, to facilitate the power load balancing in a house setting. (`C, TI-MSP430`)
- Demonstrated the scalablity of SEP 2.0 protocol itegration for demand response and load control through seamless communication between utilities and home user smart meters. (**ACM e-Energy 2014**)

Development Experience

Label Coach: Image Labelling Platform Ohio State University
with Raghu Machiraju, Anil Prawani June 2018 – Present

- Developed and currently maintaining an open source image labelling platform as a web app to enable training of deep learning models. (`react-redux, Python`)

OSUMO: Multi-Omics Data Analysis Ohio State University
with Raghu Machiraju, Kun Huang, Kitware May 2016 – April 2018

- Integrated several workflows onto the web platform for processing and analyzing images for problems in cancer, neuro and wound biology and immunology. (`react-redux, node.js, Python`)

3D Skull Template Ohio State University
with David Dean, Raghu Machiraju April 2016 – Aug. 2016

- Managed a 3-person team of under-graduates to develop a 3d visualization tool in Open Inventor built to perform the entire workflow for the segmentation of the skull template. (`C++, Open Inventor`)

Computer Vision Aided Liquid Handling Robot Ohio State University
with Raghu Machiraju Nov. 2015 – Jan. 2016

- Drove the development of an intricate system that integrates multiple cameras, pipetting system, position actuators, user-interface and computer vision modules, to improve its ease of use by biologist. (`Python, tornado, crossbar.io`)

Traffic Anomaly Detection System Ohio State University
with James W. Davis Aug. 2014 – Dec. 2014

- Developed a real-time traffic entity and anomaly detection system using Mean Shift tracking and Kalman filtering. (`C++, OpenCV`).

Teaching Experience

Teaching Assistant Columbus, OH
Ohio State University Aug 2019 – Dec 2019

- **CSE 5523: Machine learning**: *Assisted in preparation of the assignments and solutions.* Additionally was also responsible for grading assignments and projects (40 students).

Teaching Assistant Columbus, OH
Ohio State University Jan 2016 – May 2016

- **CSE 5544: Introduction to Data Visualization**: *Assisted in preparation of the course syllabus, and assignments.* Additionally was also responsible for grading assignments (40 students).
- **CSE 2431: Systems II Introduction to Operating Systems**: Responsible for grading assignments, class participation, and exams as well as provided students with one-on-one tutoring and regular out of class assistance (44 students).

Achievements & Awards

- **ACM ICPC (2012):** Stood 38th in the Onsite Regionals of ACM ICPC 2012 Asia-Amritapuri, out of 350+ teams.

Skills

- **Languages:** C/C++, C#, Python, Java, SQL, LaTeX, Bash, HTML, CSS, Javascript , Matlab,
- **Operating Systems:** Proficient in Windows and Linux environments; Comfortable working with 8-bit AVR micro-controllers
- **Software:** `lex`, Django, React-Redux, R, `pandas`, `pytorch`, `tornado`, `cherrypy`