Benjamin Kane

bkane2@ur.rochester.edu linkedin.com/in/bkane2 github.com/bkane2 https://cs.rochester.edu/u/bkane2/

Experience

Department of Computer Science, University of Rochester **Rochester, NY**

Graduate Researcher *June 2019 – Present*

- Developed and built a multiprocess dialogue management architecture for the creation of virtual conversational agents (Python), utilizing NLP techniques for user interpretation, reasoning, planning, and generation. Resulted in publications in NLP venues such as EMNLP. Deployed architecture to the cloud for crowdsourcing online conversational data (Heroku, Node.js, PostgreSQL).
- Worked with cross-functional team to create a multimodal virtual human for simulated patient-physician practice conversations. Mentored undergraduate student in developing the dialogue flow and natural language understanding pipeline. Deployed agent in pilot study with UR Medical Center (URMC) aimed at helping medical students practice end-of-life communication scenarios.
- Implemented and trained machine learning models for classifying and analyzing natural language inferences from sentences in an annotated corpora, particularly those pertaining to an agent's belief, desire, and intention states. Crowdsourced a lexicon-scale natural language inference (NLI) dataset and performed analysis using a mixed-effects transformer model as well as a Bayesian mixed-effects mixture model (Pyro, Pytorch, Pandas, Numpy, sklearn).

Openstream.AI **Somerset, NJ (Remote)**

Summer Research Intern *May 2022 – September 2022*

- Developed and implemented an approach for automatically generating hierarchical planning models from a domain ontology and business process model (BPMN) using graph decomposition algorithms, allowing domain experts to specify dialogue plans for task-oriented chatbots in a "low-code or no-code" environment (Python, OWL, PDDL).
- Proposed a method for enriching a Belief-Desire-Intention (BDI) dialogue system with domain-specific hierarchical planning capabilities.

Army Research Lab **Adelphi, MD (Remote)**

Summer Research Intern *May 2021 – August 2021*

- Enabled a situated robot to learn novel concepts in unexplored environments through interactive back-and-forth dialogue with a human operator, by extending DIARC cognitive robotic architecture with a decision network model for adaptive question generation (Java, Python).
- Worked with Unity3D to develop action scripts and connect cognitive robotic architecture to PR2 robot situated in simulated spacecraft domain (C#).
- Resulted in a publication and physical demonstration, as well as a presentation before a panel of ARL researchers from multiple directorates.

Education

University of Rochester **Rochester, NY**

PhD Candidate in Computer Science (Artificial Intelligence), 4.00/4.00 GPA *June 2019 – Present*

- **Advisor:** Lenhart Schubert
- **Co-Advisor:** Ehsan Hoque, Aaron Steven White
- **Relevant Coursework:** Collaborative Programming and Software Design, Deep Learning, Statistical Speech & Language Processing, Sampling Algorithms, Machine Vision, Formal Semantics, Computational Neuroscience.
- **Awards:** NSF GRFP Honorable Mention, Donald M. and Janet C. Barnard Fellowship

University of Rochester **Rochester, NY**

BSc (Highest Distinction) in Computer Science, BA (Distinction) in Economics, 3.92/4.00 GPA *Aug 2015 – May 2019*

- **Relevant Coursework:** Machine Learning, Data Mining, Natural Language Processing, Web Technologies, Databases, Statistics, Linear Algebra, Data Structures & Algorithms, Econometrics, Intermediate Microeconomics, Environmental Economics, Honors Physics (Mechanics & Modern Physics).
- **Education Abroad:** University of Bristol

Skills and Technologies

Languages: Python, Java, Common Lisp, JavaScript, C#, Haskell
ML/Data Analysis: PyTorch, Pyro, Jupyter, Numpy, Pandas, Scikit-learn, transformers, Matplotlib, ggplot2
NLP: Conversational Agents/Dialogue Architectures, Semantic Parsing, Natural Language Inference (NLI), LLMs (fine-tuning, prompting, RAG, etc.), Ontologies
Web/Deployment: Docker, Heroku, Node.js, PostgreSQL, HTML, CSS
Other: Git, Amazon Mechanical Turk, LaTeX, Protégé, Unity, Photoshop/Illustrator