Vikram Ramavarapu

Github: Github Link
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Research Interest: I am interested in learning about and designing algorithms to solve problems in biology. I am especially interested in learning about protein folding, drug discovery, and phylogeny estimation. I am also interested in the application of machine learning to various aspects of clinical practice.

Education

University of Illinois at Urbana-Champaign Aug. 2022 – May 2024
MS. Computer Science: Bioinformatics *Champaign, IL*

- **Course Work**: Bioinformatics, Algorithmic Genomic Biology

University of Illinois at Urbana-Champaign Aug. 2019 – May 2022
BS. Mathematics and Computer Science *Champaign, IL*

- **GPA**: 3.79
- **Course Work**: Adv. Algorithms, Deep Learning, Web Programming, Database Systems, Numerical Analysis, Partial Differential Equations, Graph Theory, Real Analysis

Conference Presentations

Demystifying Digital Home Assistant Devices for Older Adults with and without Disabilities
*Kadylak, T., Blocker, K.A, Gowrishankar, S., Malecki, M., Galoso, L., Khamzina, M., **Ramavarapu, V.**, Sreenivas, R.S., Rogers, W.A. (2021, September)*
Presented at the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2021 Virtual Conference.

A Smart Power Outlet for Electric Devices that can Benefit from Real-Time Pricing
***V.P. Ramavarapu**, R. Sreenivas, R. Sowers*
Conference article in The Proceedings of the 2017 International Conference on Control, Electronics, Renewable Energy and Communications (ICCEREC)

Technical Reports

Voice-Activated Digital Home Assistant Application/Skill Development: Instructional Support and Recommendation Application Development for Older Adults with Mobility Disabilities (TechSAge-TR-2108).
***V. Ramavarapu**, T. Kadylak, W. Rogers (2021).*
Rehabilitation Engineering Research Center on Technologies to Support Aging-in-Place for People with Long-Term Disabilities. (Link)

Research Experience

Cyclicity Analysis on COVID19 in North America Jul. 2021 – May. 2022
Independent Study, University of Illinois at Urbana Champaign *Urbana, IL*

- **PI: Prof. Yuliy Baryshnikov**
- Cyclicity analysis is the technique of aggregating regional linear time series to map spread of a signal over a medium. (Traditionally in neuroscience to map the spread of trauma during a brain injury).
- Using American and Canadian provincial COVID case time series, spread is mapped across North America. **Python: Pandas/Matplotlib/Jupyter Notebook**
- Conducted a comparative literature review to justify our findings.

Human Factors and Aging Laboratory Jul. 2020 – May 2022
Undergraduate Research Assistant, University of Illinois at Urbana Champaign *Urbana, IL*

- **PI: Prof. Wendy Rogers**
- Created Amazon Alexa skills with voice and visual interface using AWS Lambda. Took into account **Nielsens Usability Heuristics** to ensure the app is usable by older adults and those with mobility disabilities. **NodeJS/AWS Lambda**
- **Undergraduate Research Symposium 2021:** Created a presentation for my independent project under the laboratory. Wrote the abstract for the research project and showcased the development process of the Alexa Application.

A Smart Power Outlet for Electric Devices that can Benefit from Real-Time Pricing Jun. 2017 – Aug. 2017
Independent Study, University of Illinois at Urbana Champaign *Urbana, IL*

- **PIs: Prof. Richard Sowers, Prof. RS Sreenivas**
- Designed algorithms to fetch real-time utility pricing and parse it into a readable format by a programmable **Intel Edison**.
- Wrote **JavaScript** Code in Figures 8 and 9 of the above conference paper

Grants and Funding

TechSAge App Factor: Developing a Novel Voice-Activated Alexa Skill (Awarded: 2021, June)
Funder: TechSAge RERC
Project Title: Amazon Alexa Interactive Help and Recommendation Application for Older Adults with Mobility Disabilities
Team: Travis Kadylak (PI) and **Vikram Ramavarapu** (Engineering Research Assistant)
Award amount: $5,000

Professional Experience

Uhnder Inc. Apr. 2022 – Present
Research and Development Intern *Champaign, IL*

- Object detection for self driving cars: Trained **2D U-Net** on 2D rectangular projections of spherical radar data (r, theta, phi) to perform **Semantic Segmentation**. Improved mean IoU by 30% since initial segmentation model's implementation. **Gitlab, Python: Pytorch/MMSegmentation, AWS S3**
- Built methods to validate effectiveness of various self driving car simulator versions: Created methods that used **Wasserstein Distance (EMD)** to compare simulated and real radar images, as well as older and newer simulator generated images. **C++: Catch2/CARLA (Unreal Engine)**

HBO Max (Warner Bros. Discovery) Jan. 2022 – Apr. 2022
SWE Intern – Data *Culver City, CA*

- Designed, implemented and productionalized method to identify potential international pricing abusers of the streaming service. **SQL/Python**
- Built a scheme to auto-generate the list using an orchestrator **Airflow, Snowflake**

Exelon Aug. 2021 – Dec. 2021
SWE Co-Op *Chicago, IL*

- Built an application to run statistical analysis of simulations based on the reactor design. **Python: Tkinter/Matplotlib/Pandas**
- Reduced analysis time from a week's worth of manual effort to about an hour for over 99% improvement in work efficiency.

Inprentus Jun. 2018 – May 2019
Research and Development Intern *Champaign, IL*

- Built an application to automatically generate precise statistical product reports from Atomic Force Microscopy (AFM) images of diffraction gratings. Recipients of these reports included NASA and SLAC (Stanford). **Python: Matplotlib/PyGTK**
- Created macros to identify components of Scanning Electron Microscope (SEM) images of indentation tools. **ImageJ, Java**
- Material indentation simulations in a joint project with UC Berkeley. **Mathematica**

Projects

User-Friendly Class Registration System (Demo Video) Nov. 2021 – Dec. 2021

- Won top 7 in a University Full-Stack contest of roughly 50 teams.
- User-friendly upgrade to UIUC's class registration system with a **REST API** in the back-end, and a thoroughly UI-prototyped front-end. **Gitlab, JavaScript: React/Express/MongoDB, Miro**

VerseNet (Github) Nov. 2020

- Designed and trained **Recurrent Neural Network** to generate verses with stylistic similarity to the provided piece of literature. **Python: PyTorch**
- Neural network has been tested on pieces from Shakespeare to contemporary works.

Certificates

Artificial Intelligence in Medicine Received Dec. 2021
Carle-Illinois College of Medicine *Urbana, IL*

- Completion of modules on theory (mathematics and statistics) behind the design of CNNs, GANs, RNNs.
- CNNs for tumor detection, and RNNs to analyze sequences in sleep cycles. **PyTorch**, **Tensorflow**

Programming Languages

Python:	>100k lines of code
JavaScript:	>50k lines of code
C/C++:	>50k lines of code
Java:	>10k lines of code
Shell:	>500 lines of code

Technical Skills

Front End:	React, HTML, CSS, BootStrap
Back End:	Django, Node.js, Express.js
Databases:	SQL, MongoDB, Neo4j
Machine Learning:	PyTorch, Tensorflow, OpenCV
AWS:	S3, EC2, Lambda