

# PATRICK WIERZBICKI

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## EDUCATION

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### Ramapo College of New Jersey

Mahwah, NJ

*B.S. in Computer Science, Dual Minor in Mathematics and Statistics*

*Sep. 2020 – December 2023*

Relevant Coursework: Artificial Intelligence, Machine Learning, Statistics, Linear Algebra, Multivariable Calculus

GPA: 3.78

## PREPRINTS

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### Interpolation versus Self-Recovery: Does the kNN-LM Retriever Introduce Exposure Bias?

Patrick Wierzbicki, Zining Zhu

*Submitted to ACL Rolling Review October*

## RESEARCH EXPERIENCE

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### Research Intern

March 2024 – Present

*Explainable and Controllable AI Lab, Stevens Institute of Technology*

*Hoboken, NJ*

*Advisor: Zining Zhu*

- Implemented quantification methods proposed in previous literature such as Exposure Bias Marginal (EB-M) to investigate if the reason for kNN-LM's poor open-ended text generation abilities is exposure bias
- Orchestrated a thorough evaluation spanning numerous LMs and automatic evaluation metrics to observe the kNN-LM retriever's effect on a neural LM's theorized ability to self-recover
- Optimized existing model and evaluation code to be up to 45 times faster, allowing for large experiments to be conducted on a single GPU
- Refined various lab papers and grant proposals prior to submission, including an Amazon grant proposal requesting \$70,000

## PROJECTS

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### Conversational AI Agent Application *Python, transformers, Pytorch, FastAPI, Javascript, Bootstrap, HTML/CSS*

- Developed a front end for multi-party conversations with a conversational AI agent on a popular social media app
- Engineered robust back-end infrastructure for serving the underlying LMs of the AI agent on remote hardware
- Designed a settings builder website to streamline configuration of LM prompts and generation hyperparameters
- Ported decoding methods such as Tail Free Sampling to allow for further customization of agent generated messages

### Credit Card Churn Data Analyzer and Classifier *Python, scikit-learn, Matplotlib, pandas*

- Assessed several Machine Learning algorithms' ability to classify potential credit card customers at risk of churning
- Employed data sampling techniques to mitigate low recall in an unbalanced data set
- Preprocessed dataset features to remove missing values, high multicollinearity, and redundant information
- Achieved 95% recall and 94% accuracy utilizing a Random Forest classifier in tandem with Random Undersampling

### Fictional Computer Emulator *C++*

- Created an emulator for a fictional computer utilizing Object-Oriented Principles
- Utilized data structures such as vectors and maps to emulate computer opcodes, registers, and machine instructions
- Constructed a custom assembly language for the fictional computer, allowing users to write and execute programs
- Programmed robust error-checking methods to provide detailed feedback to user-generated programs

## TECHNICAL SKILLS

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**Languages:** Python, C++, JavaScript, HTML/CSS, Bash,  $\text{\LaTeX}$

**Frameworks:** Bootstrap, FastAPI

**Libraries:** transformers, PyTorch, scikit-learn, Matplotlib, NumPy, pandas

## HONORS AND AWARDS

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### NSF S-STEM Scholarship

*September 2020 – December 2023*

- Full-tuition scholarship supporting up to 4 years of undergraduate Computer Science study at Ramapo College of New Jersey through NSF grant #1643945
- Selected as one of 16 recipients in department history for excellent academic merit

### Magna Cum Laude

*January 2024*

- Awarded for graduating from Ramapo College of New Jersey with a GPA of 3.78