

Abishai Ebenezer

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WORK EXPERIENCE

Baker Lab, Institute of Protein Design, University of Washington

Seattle, WA

Staff Research Scientist

Aug 2023 – Nov 2024

- Built an impressive new sequential Monte Carlo pipeline that creates protein backbones in RF Diffusion, improving backbone design by about 10% to 15%.
- Fine-tuned an antibody diffusion model that designs T-Cell Receptors (TCRs) that improved TCR design by 30% (based on AlphaFold metrics). Pre-print soon with experimental validation results.
- Currently building a product-of-experts pipeline that combines ProteinMPNN and other language models for better sequence design from a backbone.

Microsoft Research, India

Bangalore, India

Research Fellow

Jul 2022 – Jul 2023

- Built a small-sized language model that performs "magic" repair of formulas in Microsoft Excel (Accepted at AAAI 2024). Performed better than models 1000 times its size.
- Worked on the code repair (fixing buggy code) pipeline in Visual Studio Copilot.

Microsoft Research, India

Bangalore, India

Research Intern

Jan 2022 – June 2022

- Built an internal working PoC using Graph Neural Networks that substantially improves code reviewer recommendations in GitHub.

EDUCATION

PES UNIVERSITY

Bangalore, India

Bachelor of Technology (B.Tech)

2018-2022

Computer Science

Cumulative GPA: 8.2/10.0; First Class with Distinction

Relevant Coursework: NLP, Theory of Computation, DBMS, Data Analysis, Deep Learning, Software Eng, Algorithms.

PUBLICATIONS

[FLAME: A small language model for spreadsheet formulae](#) (accepted at AAAI 2024)

2023-2024

- Pre-trained and fine-tuned a small language model (16M parameters) that can repair and autocomplete formulas in Excel using novel pre-training objectives. Beats zero-shot, few-shot, and fine-tuned codex (up to 175B parameters).

[An Atypical Metaheuristic Approach to Recognize an Optimal Architecture of a Neural Network](#) (accepted at The 14th International Conference on Agents and Artificial Intelligence.)

2022

- Designed and built a model that used a bio-inspired algorithm to find an optimal number of hidden layers and the optimal number of neurons in each hidden layer for a neural network. First such approach to do this kind of bi-level optimization. Main contributor and first author.

[A Question-Centric Evaluation of Descriptive Answers using Attention-Based Architecture](#) (The 12th International Conference on Cloud Computing, Data Science and Engineering)

2022

- First such approach to evaluate answers by using the question using a custom-made cross-attention architecture. Co-first author. I came up with the design of the entire architecture and helped implement parts of it. Beat SOTA by about 4-5% in short answer scoring.

ADDITIONAL

PESU I/O

Bangalore, India

Subject Matter Expert

Oct 2019 – Dec 2019

- I taught a class of 40 students about Reverse Engineering in Cyber Security i.e., how to convert binary to machine-level instructions.