Malathy Nagalakshmi

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https://malathy-nagalakshmi.github.io/

Research Interests

Interdisciplinary domains within Natural Language Processing, specifically Computational Social Science and AI safety.

Education

University of Pennsylvania, M.S., Computer and Information Science 2021-2023
GPA: 3.77/4.0

PES University, B.S., Computer Science 2015-2019
GPA: 9.2/10

Research Experience

University of Pennsylvania, Research assistant Philadelphia, 2022 - Present

- **Linguistic markers for warmth and competence [1]**
  Advisor: Prof. Lyle Ungar
  Our understanding of how language affects first impressions is limited. To gain insights into the formation of these impressions, we studied the universally recognized dimensions of social cognition: warmth and competence. We performed linguistic analysis on the Candor Corpus (Large Multimodal corpus of Human Speech) to identify key features such as style, emotion, and empathy that affect the perception of warmth and competence. This work will be submitted to ACL.

- **Augmentative and Alternative Communication (AAC) for Autistic Adults [4]**
  Advisors: Prof. Chris Callison-Burch and Prof. Lara Martin
  Research in the realm of Augmentative and Alternative Communication (AAC) often overlooks the needs and experiences of autistic adults. We interviewed 12 autistic adults and performed thematic analysis on the interview transcripts to understand the pain points of the AAC applications used and determine what technological advances they might find helpful. We address the following research questions : a) What are the benefits and challenges that autistic AAC users run into when using existing AAC applications? b) How do participants feel about NLP techniques being integrated into their AAC apps? c) What types of features do autistic adults require or prefer to see from AAC applications? This work will be submitted to CHI'25.

Indian Institute Of Science, Research Assistant Bengaluru, 2020 - 2021
Advisors: Prof. Raghavan Komondoor and Dr Raveendra Kumar Medicherla

- **HDR-Fuzz [5]**
  Buffer overruns are a prevalent vulnerability in software libraries and applications. We improved the performance of AFL (American Fuzzy Lop), an open-source vulnerability detection tool, by using a novel fitness metric to detect buffer overflows. We detected 20 vulnerabilities within 200 seconds with the MIT and Google Fuzzer Test Suite benchmarks compared to baseline AFL which detects 7.

PES University, Research Assistant Bengaluru, Spring 2019
Advisor: Prof. NS Kumar

- **Framework for automatic detection of Syntax errors [2] [3]**
  Programmers spend a lot of their time on syntax error corrections. There is no universal tool that emits helpful descriptive error messages for all languages. We built a flexible language-agnostic framework that identifies errors in a program and improves incomprehensible error messages emitted by a compiler/interpreter using Python Lex and Yacc (PLY).

In Preparation

[1] **Linguistic markers of warmth competence in conversation**
Malathy Nagalakshmi, Louis Hickman and Lyle Ungar

Publications

[2] **Flexible Language-Agnostic Framework To Emit Informative Compile-Time Error Messages**
Malathy Nagalakshmi, Tanya Sharma, and NS Kumar.
Springer International Conference on Inventive Computation and Information Technologies, 2021.

Posters

[3] **Erratum Elaboratum: A Language Independent Framework to Detect and Correct Syntax Errors**
Malathy Nagalakshmi and Tanya Sharma.
Grace Hopper Celebration India (GHCI), 2020.

Preprints

[4] **Bridging the Social & Technical Divide in Augmentative and Alternative Communication (AAC) Applications for Autistic Adults**
Lara J. Martin* and **Malathy Nagalakshmi*** (* equal contribution)

[5] **HDR-Fuzz: Detecting Buffer Overruns using AddressSanitizer Instrumentation and Fuzzing**
Raveendra Kumar Medicherla, **Malathy Nagalakshmi**, Tanya Sharma, and Raghavan Komondoor.

Work Experience

Amazon	**AWS CloudTrail Processing** *Software Development Engineer*	2023 - Present
Amazon	**AWS CloudTrail Verifications** *Intern*	Summer 2022
Goldman Sachs	**Client Commission Management** *Software Engineer*	2019 - 2021
Goldman Sachs	**Client Commission Management** *Intern*	Spring 2019

Teaching Experience

- CIS 521: Artificial Intelligence — Teaching Assistant (Spring 2023, Fall 2022)
- CIT 582: Blockchains and Cryptography — Teaching Assistant (Spring 2022)
- CIS 511: Theory Of Computation — Teaching Assistant (Fall 2021)

Professional Activities

- Atendee - Grace Hopper Celebration, 2022
- Presenter - Grace Hopper Celebration India, 2020

Skills

Languages : Python, Java, C, Javascript, C++, SQL | **Frameworks and Tools** : Tensorflow, Pytorch, Keras, scikit-learn, OpenCV, NLTK, AWS, Docker, LLVM, Clang

Awards

- Scholarship for being among the top 20% of the batch during undergraduate study.