

Tugay Bilgis

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EDUCATION

University of Arizona

B.S. in Computer Science, B.S. in Mathematics (Summa Cum Laude)

Tucson, AZ

Aug. 2020 – May 2024

- GPA: **3.90**

Relevant Coursework: Statistical NLP (CSC 439), Algorithms in NLP (Grad) (CSC 585), Principles of Machine Learning (CSC 480), Principles of Data Science (CSC 380), Neural Networks (Grad) (INFO 557), Machine Learning Theory (Grad) (CSC 588), Theory of Probability (MATH 464), Theory of Statistics (MATH 466), Applied Stochastic Processes (MATH 468), Linear Algebra for Data Science (MATH 412)

PUBLICATIONS

- **Bilgis, Tugay.** 2024. "Revisiting Medical Concept Normalization: A Comparative Analysis of Transformer-Based Models and Search Engine Approaches." Undergraduate Honors Thesis, The University of Arizona, Tucson, AZ.
- **Tugay Bilgis**, Nimet Beyza Bozdag, and Steven Bethard. 2023. Gallagher at SemEval-2023 Task 5: Tackling Clickbait with Seq2Seq Models. In Proceedings of the 17th International Workshop on Semantic Evaluation (SemEval-2023), pages 1650–1655, Toronto, Canada. Association for Computational Linguistics.
- Nimet Beyza Bozdag, **Tugay Bilgis**, and Steven Bethard. 2023. Arizonans at SemEval-2023 Task 9: Multilingual Tweet Intimacy Analysis with XLM-T. In Proceedings of the 17th International Workshop on Semantic Evaluation (SemEval-2023), pages 1656–1659, Toronto, Canada. Association for Computational Linguistics.

EXPERIENCE

Amazon Web Services - S3

Software Development Engineer

Jul. 2024 – Present

Seattle, WA

- Build services using Rust and Java to enhance the public S3 API and reduce costs.
- Participate in the full software development life cycle, from authoring a design document to adopting Agile methodologies through daily standups and sprint reviews

Computational Language Understanding Lab

Research Assistant

Aug. 2022 – May 2024

Tucson, AZ

- Conducted research under Dr. Steven Bethard on medical concept normalization, extending geocoding techniques to medical ontologies using UMLS and the 2019-n2c2-MCN dataset
- Authored an honors thesis comparing transformer-based models (SAPBert) and search engine approaches (Whoosh) for medical concept normalization
- Investigated Clickbait Spoiling and Multilingual Tweet Intimacy Analysis for SemEval-2023, developing models that ranked highly in the task leaderboard.
- Fine-tuned transformer-based models (e.g., BERT, SAPBert, T5) and developed custom search engines to address specialized NLP tasks
- Contributed to weekly research meetings, presenting progress on model performance, data analysis, and experimental design, while receiving and incorporating feedback from senior researchers

Materials Informatics Lab

Research Assistant

Dec. 2023 – May 2024

Tucson, AZ

- Researched grant proposal enhancements under the mentorship of Dr. Marat Latypov, utilizing natural language processing (NLP) to identify common themes and features of funded versus unfunded proposals
- Fine-tuned large language models (LLMs) using Low-Rank Adaptation (LoRA) to create a proposal-writing assistant that enhances the competitiveness of human-written proposals
- Implemented Retrieval Augmented Generation (RAG) methods to enhance language model performance in proposal writing

Security, Privacy and Reliability Lab

Research Assistant

Aug. 2022 – Feb. 2024

Tucson, AZ

- Conducted a replication study on Author Attribution from Executable Binaries under the guidance of Dr. Saumya Debray and Dr. Sazzadur Rahaman
- Led dataset creation and managed the execution of hundreds of experiments with diverse subsets, following guidelines from the prior study

- Performed critical assessments of the ML model to ensure its replicability and robustness
- Attended weekly meetings with Dr. Debray and Dr. Rahaman along with other researchers to analyze and discuss the performance of the models and the progress

Amazon Web Services

May. 2023 – Aug. 2023

Software Development Engineer Intern

Seattle, WA

- Developed an Object Fixity Check service using Java, automating a complex validating process for customers and ensuring data integrity in S3 storage
- Implemented AWS services such as Lambda, Step Functions, and S3 to allow customers to run the service natively in the cloud

Google Computer Science Research Mentorship Program

Jan. 2023 – May 2023

Research Scholar

Remote

- Received mentorship from Dr. Anastosios Kementsietsidis about NLP and collaboratively worked on a set of goals over a course of 12 weeks
- Connected with other researcher students through weekly pod and group meetings

UnitedHealth Group — Optum

June 2022 – Aug. 2022

Software Engineer Intern

Phoenix, AZ

- Developed a full-stack web application using Angular and Spring Boot to allow business partners to perform the state-required insurance testings that lead to a **90%** increase in processing time
- Designed a REST API using Spring Boot and PL/SQL to track and store the request progress
- Implemented automation scripts to run a batch of commands in the remote UNIX machine using JSch and SSH
- Collaborated with teammates through daily meetings and practiced Agile software development

TEACHING

Undergraduate Teaching Assistant

University of Arizona

CSC 380 - Principles of Data Science

Spring 2023, 2024

- Teach and guide students to improve their ability in Probability, Statistics and Machine Learning through weekly assignments and office hours

CSC 144 - Discrete Math

Fall 2023

- Taught and guided students to improve their ability in Discrete Math, Logic, and Proofs through weekly assignments and office hours

CSC 144 - Discrete Math (Course Coordinator in Training)

Spring 2022

- Taught and guided students to improve their ability in Discrete Math, Logic, and Proofs through weekly assignments and office hours
- Assisted in preparing the weekly homework and supplemental instruction questions
- Managed the duties of the other TAs in assignment grading
- Organized the weekly supplemental instruction sessions

CSC 120 - Intro to Computer Programming II

Fall 2021

- Taught and guided students to improve their ability in introductory level programming and data structures through weekly assignments and office hours

HONORS & AWARDS

Galileo Circle Scholar

2023

University of Arizona

- Galileo Circle Scholarship for demonstrating exceptional academic achievement and research excellence in Computer Science

LEADERSHIP

Google Developer Student Club - Tech Lead

May 2021 – May 2022

University of Arizona

Tucson, AZ

- Organized monthly workshops on various Computer Science topics to increase the learning opportunities for underclassmen and underrepresented students
- Managed the Discord server of the club that contained 160+ members
- Built necessary software for club functionality such as Discord bot and the website

VOLUNTEER ACTIVITIES

Code in Place, Section Leader

April 2021 – May 2021

Stanford University

Online

- Instructed a section of students on Python and the basics of programming for the online course CS 106A by Stanford
- Evaluated student progress through weekly meetings and assignment grading

SKILLS

Programming Languages: Python, Rust, Java, Matlab, C, C#, SQL, JavaScript, HTML/CSS

Libraries: Tensorflow, PyTorch, Huggingface, Transformers, scikit-learn, Pandas, Numpy

Technologies: AWS, Tokio, REST, Node.js, Django, MongoDB, ASP.NET, Azure, MSSQL, Flask, Spring Boot, Angular