

Muhammad Umair

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EXPERIENCE

Tufts Technology Services

Oct. 2020 – Present

Student Employee

Medford, MA

- Developing a Security and Event Management system as an alternative to commercial software.
- Designed a flask-based backend with security and encryption as a primary concern.
- Developed a RESTful API to connect frontend with backend endpoints, such as Elasticsearch and Kibana.

Tufts Human Interaction Lab

Jan. 2019 – Present

Lab and Intern manager

Medford, MA

- Pioneered an automated transcription system for Conversation Analysis and presented research results at AMLAP 2020 and as a first-authored research paper.
- Developed a pipeline consisting of multiple projects to assist in identifying interesting conversational features.
- Led the lab internship program by recruiting, training, and completing projects with multiple Research Assistants.

Vicarious Surgical

May 2020 – Dec. 2020

Artificial Intelligence Intern

Charlestown, MA

- Integrated tools to the AI pipeline of an FDA breakthrough-design designated surgical robot.
- Created a tool to remove image distortions in real-time and packaged it as a node-based architecture using ROS.
- Learned Computer Vision techniques, including RANSAC, blob detection, and extrinsic/intrinsic estimation.

Tufts University

Sept. 2018 – Jan. 2019

Teaching Assistant –Intro. to Computational Design

Medford, MA

- Led lab sections to teach students MATLAB and heuristic optimization algorithms, such as simulated annealing.
- Collaborated with students to debug assignments and evaluated student performance by grading coursework.

Tufts Human Interaction Lab

May 2018 – Jan. 2019

Research Assistant

Medford, MA

- Introduced major changes to the Conversation Analysis transcription format to create a computer readable format.
- Developed a bidirectional tool to convert between CALite, CHAT transcription formats, and XML.
- Participated in monthly Cognitive Science interdisciplinary data sessions.

Pakistan Aeronautical Complex (PAC)

June 2016 – Aug. 2016

Intern

Kamra, Pakistan

- Crafted aircraft components using precision machining and reviewed avionics software during the overhaul process.

TECHNICAL SKILLS

Languages:

Python, C, C++, JavaScript, SQL, R, Racket, Smalltalk, TypeScript, MATLAB, VHDL

Frameworks and Tools:

ROS-2, Flask, Docker, Jenkins, Apache Hadoop, AWS, NodeJS, React, Elasticsearch, Kibana, Unity, Git, IntelliJ, Visual Studio

Libraries:

OpenCV, PyQt5, Tensorflow, Keras, PyTorch, Sickit, Numpy, Pandas, Matplotlib, Requests, Tkinter, Elasticsearch, NLTK, Scipy, Twisted, Autobahn

EDUCATION

Tufts University

Bachelor of Science in Computer Science
Minor in Cognitive and Brain Science

Sept. 2017 – Expected May 2021
Medford, MA

GPA: 3.6, Dean's list for all semesters

CS Electives: Intro. to Machine Learning and Data Mining, Intro. To Artificial Intelligence, Deep Neural Networks, Cloud Computing, Database Systems, Game Design, Software Engineering.

PUBLICATIONS AND PRESENTATIONS

26th Architecture and Mechanisms for Language Processing (AMLaP) Conference – 2020

Poster presentation

[Umair, M., Mertens, J., Albert, S. & De Ruiter, J.P. \(September, 2020\). GAILBOT: An automated system for Jeffersonian transcription.](#)

GailBot: An automated transcription system for Conversation Analysis (CA)

Dialogue and Discourse – In peer review

[Umair, M., Mertens, J., Albert, S. & De Ruiter, J.P \(In peer review\). GailBot: An automated transcription system for Conversation Analysis](#)

PROJECTS

G-Meta Plus

Nov. 2020 – Present

Tufts University – Deep Neural Networks course

- Modified G-Meta, a model-agnostic meta-learning method for fast adaptation of deep networks, to incorporate global graph structure through various sub-graph relationships, such as sub-graph distance.
- Incorporated a prototypical network component with a relation network for label prediction in GNN's.

NextGen. Alerts

Oct. 2020 – Present

Tufts Technology Services

- Security and Event Management system, as an alternative to commercial software, that Provides real-time visualization, reporting, and alerting of ElasticSearch data clusters.
- Supports multiple endpoints (ElasticSearch, Kibana etc.), alert mediums (email etc.), Single Sign On, and clients.

GailBot: UI/UX design

Sept. 2020 – Present

Tufts Human Interaction Lab

- Supervised an internship to design of a CLI/GUI for GailBot using wireframes and user testing rounds.
- Implemented the design using the PyQt5 framework and integrated it into GailBot.

GailBot: An automated system for Conversation Analysis

May 2018 – Present

Tufts Human Interaction Lab

- Designed and developed an automated speech to text system that uses novel statistical models to identify and transcribe para-linguistic features of conversation such as prosody, intonation, and laughter.
- Presented at AMLAP 2020 and submitted to Dialogue and Discourse as a first-authored paper.
- Licensed and actively distributed and used by the Human Interaction Lab at Tufts.

Camera Calibration and Distortion Visualization

May 2020 – Dec. 2020

Vicarious Surgical

- Developed a tool that uses RANSAC and blob detection detect calibration patterns and remove image distortions in real-time in a robot's visual input, and provides a full GUI implemented in PyQt5.
- Dockerized the tool and ROS environment to ensure cross-platform support.
- Integrated a component to provide various visualizations for errors between distorted and un-distorted images.