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 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.

Tufts University May 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.

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 Sept. 2017 – Expected May 2021
Bachelor of Science in Computer Science *Medford, MA*
Minor in Cognitive and Brain Science

GPA: 3.56, 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, JP. (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.