# ASAD MAHMOOD

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## EDUCATION

### University of Iowa (UIowa)                                     Aug 2018 - May 2021
Master of Science (MS) in Computer Science
<u>Relevant Courses</u>: Formal Methods in Software Engineering, Design and Analysis of Algorithms, Data Science, Deep Learning, Statistical Learning, Health Data Analytics

### National University of Computer and Emerging Sciences (NUCES-FAST)      Aug 2014 - May 2018
BS Computer Science
<u>Relevant Courses</u>: Object Oriented Programming, Algorithms, Data Structures, Software Engineering, Database Systems, Artificial Intelligence, Natural Language Processing, Operating Systems, Computer Networks

## TECHNICAL STRENGTHS

**Languages**: Python, C++, NodeJS/JavaScript, Java, Bash, PHP, Dart, Ruby, R (ordered by familiarity)
**Web Development**: MERN Stack, Flask/Django, Laravel, ROR
**Machine Learning**: PyTorch, Scikit-Learn, Keras
**Mobile Development**: Android, Unity3D, Flutter
**Frameworks**: Git, SQL, Agile, Test Driven Development (TDD), Docker, AWS

## WORK EXPERIENCE

### Software Development Engineer - Amazon                          July 2022 - Present
Physical Stores - Just Walk Out technology
*Worked on React based frontend and Java based backend to provide receipt lookup feature for mobile wallet launch in 3P physical stores. AWS services that I used include CloudFormation, CloudWatch, DynamoDB, OpenSearch, API Gateway, Lambda etc.*

### Full-Stack AI/ML Engineer - GSK                                July 2021 - July 2022
AI/ML Information Extraction Team
*Worked on enhancing the current knowledge graph pipeline. I used kafka based microservices and increased document processing capacity from 4000 docs/week to 1.5 mil docs/week. I was also responsible for managing Django based backend containing APIs and React based frontend.*

### Graduate Assistant                                            Aug 2018 - May 2021
*<u>Research Assistant</u>: Worked on privacy enhancing techniques using <u>Natural Language Processing (NLP)</u> and Machine/Deep Learning (ML)*
*<u>Teaching Assistant</u>: Duties include leading discussion sessions and final projects along with checking assignments. Courses: Object Oriented Software Development, Informatics Project and Computer Science Fundamentals*

### AI/ML Engineer Intern - GSK                                   May 2020 - Aug 2020
AI/ML Information Extraction Team
*Designed and implemented a pipeline for fine-tuning <u>BioBERT</u> on Named Entity Recognition (NER) task using agile framework . Trained and added BioBERT models in the existing information extraction pipeline which gives 39% relative F1 improvement over older models. Added <u>MetaMap</u> Entity Linking (EL) to existing API . Used <u>pytest</u> for adding unit and integration tests in information extraction API, following Test-driven Development (TDD).*

### Research Associate - LUMS                                     Aug 2017 - Mar 2018
Security and Privacy Group, TPI Lab
*Worked in the Data and Privacy team, involved in creating innovative technological solutions for solving everyday problems. Completed projects belong to the domains of Machine/Deep Learning and Data Science (Key Projects detailed below).*

### Web Developer Intern - LUMS                                   June 2017 - Jul 2017
Security and Privacy Group, TPI Lab
*Worked as a backend Web Developer on migration of <u>ROR</u> based dataset visualization tool called Statistan from SQL to NoSQL (<u>MongoDB</u>).*

## RESEARCH PUBLICATIONS

- **A Girl Has A Name: Detecting Authorship Obfuscation** (*link*) (*code*)
  Association for Computational Linguistics, ACL 2020
  Created a tool targeting novel problem of Automated Obfuscation Detection, using the power of pre-trained language models like <u>BERT</u> and <u>GPT-2</u> for feature extraction, in combination with standard machine learning models like <u>SVM</u>, <u>RFC</u>, <u>GNB</u> and <u>ANNs</u>, for prediction.

- ***A Girl Has No Name: Automated Authorship Obfuscation using Mutant-X (link) (code)***
  Proceedings on Privacy Enhancing Technologies, PoPETs 2019
  Created an automated Authorship Obfuscation tool called Mutant-X, using sentiment preserving word embeddings (Word2Vec) and Genetic Algorithm (GA) to enhance user privacy. Experiments show that Mutant-X can decrease the accuracy of state-of-the-art authorship attribution methods by as much as 64% while preserving the semantics much better than existing automated authorship obfuscation approaches.
- ***Twitter Bots and Gender Detection using Tf-idf (link)***
  PAN-CLEF Shared Tasks, PAN 2019
  Created a SVM based predictive model using Tf-idf features which, given a tweet, can classify it as written by human or bot, to combat fake tweets.

## ADDITIONAL DETAILS: KEY PROJECTS

**- Reverse Image Search**
Created a flask based web application to find images similar to query image, using deep convolutional neural network i.e VGG-19 for image's feature extraction in combination with im2txt model for image's text description.

**- Soccer Games Analysis**
Worked on in-game analysis of soccer matches through a proprietary dataset of events and tracking data of 6000 soccer matches across four different leagues. Derived several spatiotemporal features from the dataset and developed an adversarial model to provide teams with valuable insights about team's performance while taking the opposition team's strategy and style of play into account.

**- Enhancing OLX Ad-verification System**
Used affinity clustering with tf-idf features to identify ads with redundant descriptions (Same ad descriptions with some mispellings). Also built a ML pipeline to detect watermarks using YOLO for watermark localization and ANNs for detection.

**- Script Tracker (code)**
Created an android and Ios mobile application using cross-platform framework i.e., Flutter with Firebase based backend, for tracking the status of python scripts.

**- Hotel Management System (HMS) (code)**
Created a PHP Laravel based web application for hotel room booking, with database created in MySQL. Implemented interface for customers, managers and administrators with corresponding constraints and permissions.

**- Android Custom Keyboard (code)**
Java based android application for custom keyboard which extends from official InputMethodService and KeyboardView. Can be changed to create keyboard for any language.

**- Predictive Modelling on Stocks Data (code)**
Created a flask based tool comparing the predictive modeling power of different Machine/Deep Learning models. For the dataset, I used opening, high, low, and closing values for different stocks like AAL, AAP, AAPL. Models are implemented using scikit-learn and Keras. The performance of each model is shown on plots using Chart.js library.

**- Quotastic (code)**
Java based android application for showing quotations shuffled randomly. Quotes are saved in and read from SQLite database.

**- Kids learning Application (code)**
Java based android application for teaching Kids of age 4-7, following HCI principles. Application performs three different tasks. First, provides learning content, second, takes quiz related to that content and third, shows a report card.

**- Portfolio Website (code)**
Flask based web portfolio containing sections like about, projects, experience, skills etc. Each section has its own json file, which means anyone can change these files to make it their own

**- Developers Social Media (code)**
Web based social media application for developers where users can login/register, create posts and comment/like on posts. Users can also create profile showing their education, experience and 5 recent most github repos. Application is created using MERN stack.

## ADDITIONAL DETAILS: EXTRA-CURRICULAR

- Participated in **Softec Web development** and Graphic Designing competition
- Participated in **UIUC hackathon**
- Served as external reviewer for PoPETs conference
- Lead graphic designing team of Fast Care society
- Served as a graphic designer in ACM-FAST
- Member of Soccer team in High School and Cricket team in a tournament at FAST