

# SYED FAHIM AHMED

Graduate Research Assistance – University of Utah  
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## EDUCATION

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### University of Utah

*PhD in Computer Science*

Utah, USA

Fall 2022 - present

GPA: 3.917/4.00 (till Spring 2024 semester)

### Ahsanullah University of Science & Technology

*B.Sc in Computer Science and Engineering*

Dhaka, Bangladesh

June 2015 - July 2019

GPA: 3.65/4.00 (11th among 152 students)

## WORK EXPERIENCE

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### Rakuten Mobile Inc.

*Software Engineer, Department of Symphony Digital Experience*

Tokyo, Japan

May 2022 - June 2022

- Developed interactive web system to improve customer experience

### ILCT Research Institute Inc.

*Software Engineer, Department of IT*

Fukuoka, Japan

July 2020 - April 2022

- Developed full-stack web applications across various platforms using latest industry-adopted technologies and frameworks
- Integrated Computer Vision, Machine Learning and IoT to the developed projects to reduce COVID-19 risks.
- Implemented SIP based technologies in server side, analyzed network protocols, and troubleshooted VoIP Phone System
- Conducted web design workshops designed for high school students

### Nelsite Inc. Ltd.

*Software Engineer, Department of IT*

Fukuoka, Japan

February 2020 - June 2020

- Built a full-stack web application to improve customer service performance by 10%
- Utilized voice bio-metric system for automating hospital environment
- Designed optimized database structure for faster data loading and fetching

## RESEARCH INTEREST

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Machine Learning, Deep Learning, Visualization, Computational Topology, NLP.

## PUBLICATIONS

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- **Syed Fahim Ahmed**, Fairuz Shezuti Rahman, Tasmia Tabassum, Md. Tariqul Islam Bhuiyan, "3D U-Net: Fully Convolutional Neural Network for Automatic Brain Tumor Segmentation", 2019 22nd International Conference on Computer and Information Technology (ICCIT 2019), Dhaka, Bangladesh, DOI: 10.1109/ICCIT48885.2019.9038237
- **Syed Fahim Ahmed**, Jixian Li, Mingzhe Li, Bei Wang. Visualizing Activation Spaces of Morse Complex Generation (In Progress)

## TECHNICAL SKILLS

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<b>Programming</b>	Python, C, C++, Java, R
<b>Web Development</b>	HTML5, CSS3, JavaScript, Ajax, jQuery, React, Node.js, PHP, Laravel
<b>DBMS</b>	Oracle, MySQL, Microsoft SQL Server, PostgreSQL
<b>Computer Vision</b>	OpenCV, MATLAB
<b>Machine Learning</b>	PyTorch
<b>Hardware</b>	Arduino, Raspberry Pi
<b>SIP Server</b>	Asterisk, Kamailio, Flexisip
<b>OS</b>	Linux, Windows
<b>Version Control</b>	Git
<b>DevOps</b>	Docker

## PROFESSIONAL PROJECTS

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### VoIP Phone System

*May 2021 - April 2022*

- The IP phone system allows users make phone calls through your internet connection instead of a regular landline.
- The system provides advanced functions i.e priority call, attended transfer, absence transfer, secretary call, hotline, etc. to the users.
- Tools: Asterisk, Kamailio, Drachtio, Flexisip, PJSUA, Node.js.

### Ohori Koen Kindergarten Management System

*January 2021 - April 2021*

- This web application was developed to manage daily activities of the children in the kindergarten
- It assists both teachers and parents to check previous, current health of the children with user-friendly interfaces.
- Tools: Laravel, React, PostgreSQL.

### Kyushu Corp. Attendance System

*July 2020 – December 2020*

- The structure is consisted of IoT-enabled real-time face recognition (FaceNet) system, IC card reading system, and a web server.
- The previous system was modified to reduce COVID-19 risks in the company.
- Tools: CodeIgniter, Bootstrap, Javascript, PostgreSQL, Python, OpenCV, TensorFlow, Vega3000, Vega5000, Raspberry Pi.

### FAQ System

*May 2020 – June 2020*

- The web application can be integrated to industrial websites to enhance customer service administration.
- It assists customer service's person in charge with statistical data and provides customers with dynamic search option to find their desired QA.
- Tools: Laravel, Bootstrap, Javascript, Ajax, jQuery, Chart.js, MySQL.

### Nursing Assistant System (Speaker Identification, Database)

*February 2020 – March 2020*

- This system automate the working environment for the nurses in the hospital.
- I mainly contributed to the project by building speaker identification model using SincNet and designing a relational database.
- Tools: PyTorch, MySQL.

## SELECTED ACADEMIC PROJECTS

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### Benchmark of Deep Learning Algorithms for Left Atrium Wall Segmentation

*Fall 2022*

- Explored multiple deep learning architectures for the segmentation of the left atrium to aid in the treatment of atrial fibrillation.
- Utilized a range of state-of-the-art models including UNet, UNet++, MANet, and DeepLabV3 to improve the accuracy of medical imaging segmentation.
- Employed various data pre-processing techniques and advanced metrics like Dice Score and IoU Score for performance evaluation.
- Project Code: [https://github.com/syedfahimahmed/Left\\_Atrium\\_Segmentation](https://github.com/syedfahimahmed/Left_Atrium_Segmentation)

### **Exploring Seismic Over Time: An Interactive Visualization**

*Spring 2023*

- Designed and developed an interactive web-based visualization tool to analyze seismic data trends using JavaScript, Leaflet, and D3.js, enhancing understanding of earthquake patterns globally.
- Conducted in-depth analysis of seismic activity data, integrating real-time data with historical earthquake information to identify regions at high risk and evaluate disaster impact.
- Demonstrated project's utility through case studies of major seismic events, providing insights for disaster management and infrastructure planning.
- Demo Website: <https://slee9244.github.io/interactiveearthquakes.github.io/>

### **HepaticVision: Deep Learning for Liver and Tumor Segmentation in CT Scans**

*Fall 2023*

- Developed HepaticVision using U-Net and Attention U-Net architectures to segment liver and tumors from CT scans, achieving an F1 score of 0.9855 for liver segmentation.
- Enhanced tumor segmentation accuracy by employing attention mechanisms, focusing on salient features within scans, which is critical for medical image analysis.
- Applied advanced data preprocessing and loss functions to address class imbalances and improve model training outcomes, demonstrated through rigorous validation.
- GitHub Link: [https://github.com/syedfahimahmed/liver\\_tumor\\_seg](https://github.com/syedfahimahmed/liver_tumor_seg)

### **Visualization of Activation Space in ReLU Neural Networks through TDA**

*Spring 2024*

- Implemented Topological Data Analysis (TDA) using the Mapper algorithm to visualize high-dimensional activation spaces of neural networks, enhancing AI interpretability.
- Developed a model with a single hidden layer of three neurons to demonstrate how activation spaces form polyhedral complexes, aiding in the understanding of neural processing.
- Applied the methodology to various datasets, showcasing distinct clustering and partitioning within activation spaces, which offers insights for more reliable AI systems.
- Project Code: <https://github.com/syedfahimahmed/vis-activation-space-relu-nn>

### **A Comparative Study of Explainable Hate Speech Detection**

*Spring 2024*

- Evaluated multiple deep learning models using the HateXplain dataset to enhance the transparency and fairness of hate speech detection, focusing on models' ability to provide interpretable explanations alongside classifications.
- Conducted a comparative analysis that identified variability in models' alignment with human reasoning and the impact of training on annotated rationales, highlighting the explanations' plausibility and faithfulness.
- Demonstrated through subgroup analysis using AUROC scores how biases affect model performance across different demographic groups, underscoring the need for improved model fairness.

### **Pregnancy HealthCare 24/7**

*Fall 2018*

- Developed an Android app during a hackathon (won 2nd prize) to enhance the child-bearing experience by providing essential health and emergency features, winning 2nd prize at a hackathon.
- Features include a Blood Bank directory, an Emergency button to instantly contact relatives, a locator for nearby hospitals within 2 km, and a BMI calculator.
- Includes educational tools such as a week-by-week baby growth chart and a nutritional guide tailored for different stages of pregnancy.
- Tools: Android Studio, SQLite.

## **AWARDS AND ACHIEVEMENTS**

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- Community and Social Program of the Year (2023-2024) for Boshonto Utshab, ASUU, University of Utah.
- 1st Runner Up in hackathon category at BUP ICT Fest 2018, Bangladesh University of Professionals, Dhaka, Bangladesh.
- 2nd Runner Up in Project Display at National Science Festival 2012, Notre Dame College, Dhaka, Bangladesh.

## **TECHNICAL TRAINING**

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**iOS Mobile Application Development Program (200 hours)**

*Trainee, ICT Division Bangladesh*

**Dhaka, Bangladesh**

*June 2018 - November 2018*

## CO-CURRICULAR ACTIVITIES

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- Sports Secretary, Bangladesh Student Association of the University of Utah (2023-2024).
- Joint Secretary, AUST Cultural Club (2018-2019).
- Organizer, CodeWare18 (week-long annual program organized by CSE Department, AUST in 2018).

## LANGUAGE SKILLS

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<b>Bengli</b>	Native
<b>English</b>	Fluent
<b>Japanese</b>	Proficient (Passed JLPT N3)
<b>Hindi</b>	Conversational

## REFERENCES

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- **Dr. Bei Wang Phillips**  
Associate Professor, Kahlert School of Computing  
Adjunct Associate Professor, Department of Mathematics  
Faculty member, Scientific Computing and Imaging (SCI) Institute  
University of Utah  
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