

# Raiful Hasan

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## SUMMARY

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- NSF GRSP Fellow, PhD student in Computer Science.
- Research interest: Mobile and wearable computing, human computer interaction, Internet of Things, machine learning, distracted pedestrian safety, and bystanders privacy.
- Five years industry experience in mobile application development, software design, debugging, and issue fixing
- Expertise in algorithms, data structures, and programming.

## EDUCATION

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### Doctor of Philosophy in Computer Science

January 2019 - Present

The University of Alabama at Birmingham

Advisor: Prof. Ragib Hasan

### Bachelor of Science in Computer Science & Engineering

June, 2012

University of Dhaka, Bangladesh

Thesis Supervisor: Prof. Hafiz Md. Hasan Babu

## RESEARCH AND INDUSTRY EXPERIENCE

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### Graduate Research Assistant

January 2019 - Present

UAB SECRETLab, University of Alabama at Birmingham.

Responsibilities: Research

- Working on developing a safety system with preserving privacy for pedestrians.
- Developed ad-hoc emergency alert system for smart cities using Internet of Things (IoT).
- Developed a framework for providing timely alerts to distracted pedestrians. The research work also focuses on user activity recognition through the sensor data using machine learning algorithms.

### Software Engineer

September 2012 - December 2018

Divine IT Limited

Responsibilities: Research, Development, and Team Management.

- Worked in Core4VoIP mobile dialer development team, which is used by ~200 service providers (~18 countries, mainly in Middle East and South Asia). More than 2 million downloads in Google Play.
- Worked on Voice over Internet Protocol (VoIP), Virtual Private Network (VPN), Geo-Blocking, Session Initiation Protocol (SIP), SoftSwitch, Load Balancing, VoIP Auth server, etc.
- Developed 7 mobile applications focused on geofencing, big data analytic, pattern recognition, machine learning, and networking.

### Software Engineer

June 2012 - August 2012

JICA Bangladesh

Responsibilities: Software Development

- Worked in automated fare system using smart card for Bangladesh Road Transport Corporation and Bangladesh Railway.
- Implement Pay as You Go fare collection system, which increases profit by more than 7% overall.
- Implemented crowd monitoring analytics by card usage to alleviate delays in rush hour.

## TEACHING EXPERIENCE

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Department of Computer Science, University of Alabama at Birmingham

- Spring 2022     **Guest Lecturer**, Discrete Structures (CS 250)  
- Topic: The Foundations: Logic and Proofs
- Fall 2019        **Teaching Assistant**, Discrete Structures (CS 250)  
Spring 2020     - Course Description: An undergraduate-level course that covers propositional and predicates  
Spring 2021     logic, sets, relations, functions, counting, elementary graph theory, proof techniques.  
- Number of Students: 78 - 90  
- Responsibilities: Held weekly office hours and assisted students with assignments. Graded assignments and classwork.
- Fall 2020        **Teaching Assistant**, Algorithms and Data Structures (CS 303)  
- Course Description: An undergraduate-level course that teaches techniques for the design and analysis of algorithms and various data structures.  
- Number of Students: 43  
- Responsibilities: Assisted in lab sessions by providing hands-on coding experience using Java and Python.
- Summer 2020    **Teaching Assistant**, Cloud Computing (CS 733)  
Summer 2021    - Course Description: A graduate course that teaches cloud computing architectures and programming paradigms, theoretical and practical aspects of cloud programming.  
- Number of Students: 82 and 77  
- Responsibilities: Taught lab sessions, held regular office hours, graded homework, project, and exams.

## SELECTED PROJECTS

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- **X-Fidence**: An IoT-assisted real-time crowd monitoring system in the smart city. The system offers a platform of a citywide network of several places to create a robust monitoring application.
- **InSight: Ad-hoc Emergency Warning System**: BLE beacons and smartphones-based system to locate and circulate any warning marked by an emergency responder without internet or cellular network.
- **StreetBit**: A framework for providing timely alerts to distracted pedestrians using Bluetooth beacons and smartphones. The research work also focuses on user activity recognition through sensor data using machine learning algorithms.
- **Preemptive Construction Site Safety (PCS2)**: Real-time location tracking, trajectory prediction, and prevention of potential collisions between workers and site hazards.
- **Security Analysis and Threat Modeling**: Investigated the security and vulnerabilities of video conferencing technology, identified cost-effective mitigation techniques.
- **Question Similarity Detection Using LSTM**: Implemented an LSTM based architecture for Natural Language Processing that can detect duplicate questions if they have the same intent; achieved an accuracy of 82.65%.
- **Sentiment Analysis using Twitter Data**: Analyzed the positive and negative sentiment of the people of Los Angeles are regarding COVID-19 from ~250k tweets using bidirectional LSTM, CNN-LSTM, and ResNet.
- **Core4VoIP Mobile Dialer**: A SIP dialer for the Android operating system. It is designed to work in low bandwidth areas; the voice goes as IP packets through the Internet.  
Technology: SIP, VoIP, VPN, Load Balancing, Authentication, Geo-Blocking.
- **Core4Xtreme**: An application for free calls, instant messaging, group conversation, audio and video conferencing with all types of file sharing (image, doc, pdf, ppt, txt, etc.).

Technology: SIP, VoIP, VPN, Openfire Server, P2P Call, P2P Messaging, etc.

- **Business Directory Bangladesh:** Designed and developed directory application for businesses in Bangladesh with 1 million addresses and phone numbers.

Technology: Large SQLite Database, Google APIs, Notification, Call manager, Phone state.

- **Mobile Application for Newspapers:** Designed and developed three Android mobile application for the daily newspaper. [Kaler Kantho] [Bangladesh Pratidin] [Daily Sun]

Technology: SQLite Database, Remote Connection, Notification, JSON, Caching.

## SELECTED PUBLICATIONS

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An up-to-date list is available on [Google Scholar](#).

1. **Raiful Hasan** and Ragib Hasan, "X-Fidence: Post-Pandemic Wellness By Density Monitoring with Privacy Preserving", in proceedings of the IEEE Consumer Communications & Networking Conference (CCNC), 2022.
2. **Raiful Hasan** and Ragib Hasan, "Towards a Threat Model and Privacy Analysis for V2P in 5G Network", in proceedings of the IEEE 5G World Forum, 2021.
3. David C. Schwebel, Ragib Hasan, Russell Griffin, **Raiful Hasan**, Aminul Hoque, Yasser Karim, Kevin Luo, Anna Johnston, "Reducing Distracted Pedestrian Behavior using Bluetooth Beacon Technology: A Crossover Trial", Journal of Accident Analysis and Prevention, 2021.
4. **Raiful Hasan** and Ragib Hasan, "FinderX: A Bluetooth Beacon Based System for Designing Sustainable Green Smart Cities", IEEE Consumer Electronics Magazine, 2021.
5. **Raiful Hasan**, Ragib Hasan, and Tanveer Islam, "InSight: A Bluetooth Beacon-based Ad-hoc Emergency Alert System for Smart Cities", in Proceedings of the IEEE Consumer Communications & Networking Conference (IEEE CCNC), Flamingo, Las Vegas, Nevada, USA, 2021.
6. **Raiful Hasan** and Ragib Hasan, "Towards a Threat Model and Security Analysis of Video Conferencing Systems", in Proceedings of the IEEE Consumer Communications & Networking Conference (IEEE CCNC), Flamingo, Las Vegas, Nevada, USA, 2021.
7. **Raiful Hasan**, Aminul Hoque, Yasser Karim, Russell Griffin, David Schwebel, and Ragib Hasan, "StreetBit: A Bluetooth Beacon-based Personal Safety Application for Distracted Pedestrians", in Proceedings of the IEEE Consumer Communications & Networking Conference (IEEE CCNC), Flamingo, Las Vegas, Nevada, USA, 2021.
8. **Raiful Hasan** and Ragib Hasan, "Bluetooth Low Energy (BLE) Beacon-Based Micro-Positioning for Pedestrians Using Smartphones in Urban Environments", In Precision Positioning with Commercial Smartphones in Urban Environments, 2021.
9. **Raiful Hasan** and Ragib Hasan, "BeaCloud: A Generic Architecture for Sustainable Smart City using Bluetooth Beacons", in Proceedings of the 18th IEEE International Conference on Smart City (SmartCity 2020), Yanuca Island, Fiji, 2020.
10. **Raiful Hasan**, Aminul Hoque, Yasser Karim, Russell Griffin, David Schwebel, and Ragib Hasan, "Smartphone-based Distracted Pedestrian Localization using Bluetooth Low Energy Beacons", in Proceedings of the IEEE SouthEastCon, Raleigh, NC, 2020.
11. **Raiful Hasan** and Ragib Hasan, "Towards Designing a Sustainable Green Smart City using Bluetooth Beacons", in Proceedings of the IEEE 6th World Forum on Internet of Things (WF-IoT), New Orleans, LA, 2020.
12. Khandakar M. Rashid, Songjukta Datta, Amir H. Behzadan, and **Raiful Hasan**, "Risk-Incorporated Trajectory Prediction to Prevent Contact Collisions on Construction Sites" Journal of Construction Engineering and Project Management (JCEPM), 2018.

## Publications Under Review

1. **Raiful Hasan**, Aminul Hoque, Yasser Karim, Russell Griffin, David Schwebel, and Ragib Hasan, "Someone to Watch Over You: Using Bluetooth Beacons for Alerting Distracted Pedestrians", in IEEE Internet of Things Journal.
2. **Raiful Hasan** and Ragib Hasan, "Pedestrian Safety Using the Internet of Things and Sensors: Issues, Challenges, and Open Problems", in Future Generation Computer Systems Journal.

## AWARDS AND ACHIEVEMENTS

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2022	Sigma Xi, The Scientific Research Honor Society Grants In Aid of Research (GIAR), Professional development Grant by UAB Graduate Student Government.
2021-22	Recipient of the NSF-EPSCoR GRSP fellowship.
2019	Awarded with the full-tuition scholarship at UAB
2014	Innovation Fund from Access to Information (a2i) and ICT Division of Bangladesh.

## TECHNICAL SKILLS

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- Languages	Java, C, Python, Swift, Shell Programming
- Database	MySQL, SQLite, PostgreSQL, Oracle
- Operating System	Mac OS X, Windows, Linux, <b>Android</b> , iOS
- Protocol and APIs	SIP, VoIP, Room, OKHTTP, Retrofit, Geofence, NLTK, JSON, XML, REST
- Version Control	SVN, Git, JIRA

## RESEARCH GRANTS

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1. Title: **Drone Assisted Ad Hoc Public Alert System in Emergency Management.**  
Grant Agency: Sigma Xi, The Scientific Research Honor Society Grants In Aid of Research (GIAR).  
Awarded: \$1000. 2022.
2. Title: **Bluetooth Low Energy Assisted Secure Warning System for Emergency Management.**  
Grant Agency: Alabama EPSCoR (Established Program to Stimulate Competitive Research) through Graduate Research Scholars Program (GRSP).  
Awarded: \$25,000. 2021.

## LEADERSHIP EXPERIENCE / PROFESSIONAL SERVICES

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2022	<b>Feature Editor</b> , XRDS (The ACM's magazine for students)
2020 - 2022	<b>Reviewer.</b> <ul style="list-style-type: none"><li>- IEEE BigData, 2021</li><li>- IEEE Internet of Things Journal, 2021</li><li>- WFIoT, 2021</li><li>- IEEE CCNC, 2021</li></ul>
2018 - Present	<b>Student Member.</b> <ul style="list-style-type: none"><li>- IEEE Student Member</li><li>- ACM Student Member</li></ul>
2021 - Present	Associate Member of Sigma Xi
2019 - Present	Senator of Graduate Student Government at UAB (GSG)
2020 - 21 & 2021 - 22	<b>Budget Committee Voting Member,</b> Graduate Student Government at UAB (GSG)