Md Rezaur Rahman

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Research Interest

Computer vision and graphics, virtual and augmented reality, 3D scene understanding, deep learning, medical imaging, human–computer interaction, software engineering

Education

❑ **Technical University of Munich**, Munich, Germany **Apr 2017 – Oct 2020**
Master of Science, Computer Science (Informatics) (CGPA: 1.8/1.0)
– Supervised by Prof. Dr. Gudrun Johanna Klinker (US Scale: 3.72/4.0)
– Thesis: Semantic segmentation & reconstruction of 3D point clouds using 3D deep learning **[pdf]**

❑ **Khulna University of Engineering and technology (KUET)**, Khulna, Bangladesh **Mar 2009 – Sept 2013**
Bachelor of Science, Computer Science and Engineering (CGPA: 3.44/4.0)
– Supervised by Prof. Dr. K. M. Rokibul Alam (Major CGPA: 3.62/4.0)
– Thesis: An untraceable voting scheme based on blind signatures (Class position: **13/45**)

Research Experience

❑ **Technical University of Munich**, Munich, Germany
– *Research Assistant*, Chair for Robotics, AI and Real-time Systems **July 2020 – Present**
– *Supervisor*: Prof. Dr. Matthias Althoff
Developed LTL graph parsers for SPOT that translate LTL specifications to automatons with multiple solution paths for benchmarking the human-robot collaboration. Currently expanding ADAPT to optimally generate animated human motions and simultaneously containerizing the entire platform for automatic deployment. [Code]

– *Research Assistant (Masters Thesis)*, Augmented Reality Research Group **Oct 2019 – Oct 2020**
– *Supervisor*: Prof. Dr. Gudrun Klinker, *Advisor*: Dipl.-Inf. Univ. Adnane Jadid
Research focused on leveraging 3D deep learning for semantic segmentation and 3d reconstruction of point clouds. Designed and implemented two deep networks; one based on two joint alignment nets and another one exploits hierarchical recursive partitioning of point sets to perform 3D semantic segmentation on the indoor and outdoor dataset. Implemented a generative adversarial network (GAN) based reconstruction model that incorporates a tree-structured graph convolution in its generator network to produce 3D point clouds **[1]**. [Code] [Presentation]

– *Student Researcher*, Chair for Computer Aided Medical Procedures **Oct 2018 – Mar 2019**
– *Supervisor*: Prof. Dr. Nassir Navab, *Advisor*: Dr. Shadi Albarquoni
Explored geometric deep learning on non-euclidean domain by exploiting rich multi-modal non-imaging data for Parkinson's disease prediction. Implemented a variant of Graph Convolution Network (GCN) called JK Network on the PPMI dataset to investigate how different layer aggregation techniques (Concat/ Max-pooling/LSTM-attention) learn the underlying graph structures on different feature settings. [Code] [Presentation]

– *Research Assistant*, Chair for Software and Systems Engineering **Oct 2017 – Jul 2018**
– *Supervisor*: Prof. Dr. Alexander Pretschner, *Advisor*: Dr. Mojdeh Golagha
Investigated on fault localization and failure diagnosis benchmark creation for C++ programs exploiting OpenCV. Researched on TIGRESS virtualizer/obfuscator for the C language to analyze fault localization on obfuscated codes. Research published on *IEEE/ACM 40th ICSE 2018* **[2]**. [Documentation] [Github Wiki]

❑ **Ludwig Maximillian University (LMU)**, Munich, Germany **Feb 2019 – Jan 2020**
– *Research Assistant*, Eye Research Institute (Augenklinik)
– *Supervisor*: Ilja Manakov
Developed an in-house data science pipeline called docker priority queue (DoPQ) for running heavyweight deep learning based docker containers on a multi-GPU system. It incorporates an internal priority queue with a penalty scoring system, hence ensures the balance between GPUs occupied among valid users. [Code] [Documentation]

❑ **Retorio GmbH**, Munich, Germany **Aug 2018 – Feb 2019**
– *Research Intern*, *Supervisor*: Dr. Patrick Oehler
Analyzed audio signals from videos to explore different spectrum based features including MFCC, LPCC etc., and created a custom audio dataset that includes German and North-American language and accent, and applied several classical machine learning algorithms to predict human emotion based on the feature characteristics. [Code] [Report]

❑ **Khulna University of Engineering and Technology (KUET)**, Khulna, Bangladesh **July 2012 – Aug 2013**
– *Research Assistant (Bachelor Thesis)*, *Supervisor*: Dr. K.M. Rokibul Alam
Designed and implemented an *E-Voting* scheme, where vote construction process utilizes extended Euclidean based blind signature (BS) algorithm and token generation stage employs RSA based BS algorithm **[3]**.

Publications

Conference Papers

[1] **Md Rezaur Rahman**, Muhammad Mushfiqur Rahman, Adnane Jadid, Gudrun Klinker. "Dense Point Completion Network with Hierarchical Feature Processing", *arXiv preprints available soon*, 2020 **[pdf]**

[2] **Md Rezaur Rahman**, Mojdeh Golagha, Alexander Pretschner. "Pairika: A failure diagnosis benchmark for C++ programs", *International Conference on Software Engineering (ICSE)*, Gothenburg, Sweden, 2018 **[pdf]**

Journal Articles

[3] Kazi Md. Rokibul Alam, Adnan Maruf, **Md Rezaur Rahman Rakib**, G. G. Md. Nawaz Ali, Peter Han Joo Chong, and Yasuhiko Morimoto. "An untraceable voting scheme based on pairs of signatures", *International Journal of Network Security (IJNS)*, Vol 20, No. 4, 2018, 774-787 **[pdf]**

Industry Experience

❑ **Samsung Research Bangladesh (SRBD)**, Dhaka, Bangladesh
– *Senior Software Engineer*, Mobile Solution Group **Mar 2016 – Apr 2017**
Designed and implemented Data Platform and Server Sync modules for S-Health app in iOS platform. Review codes and solved critical issues with S-Health team in Samsung HQ. As a team, developed the whole Food Intake module in Samsung Health App (iOS version).

– *Software Engineer*, Digital Imaging Group **Feb 2014 – Feb 2016**
Responsibilities included complete SDLC for Gear 360 Manager App for controlling smart camera in Android. Developed features and resolved critical issues in connectivity module of Mobile Link and RVF. Developed the WiFi connection module of Samsung Camera Manager App that supports easy and seamless connection with Samsung smart camera.

Technical Skills

- **Programming** Python, C++, C, Java, Kotlin, Javascript
- **Framework** OpenCV, PyTorch, TensorFlow, Open3D, PyQt5, sklearn, Android
- **Version Control** GitLab, GitHub, Perforce, SVN
- **Virtualization/cloud** Docker, Google Cloud Platform

Service and Leadership

- **Contest Manager:** Association of Competitive Programmers, KUET **Apr 2012 – Aug 2013**
  – Organized internal programming contests for undergraduate students
- **Workshop Organizer:** Graph Theory and String problem decomposition
  – Trained programmers to handle graph and string related problems in programming contests
- **Mentoring:** Sophomore/Junior year students, department of CSE, KUET
  – Personally mentored 2 teams for competitive programming contests

Honors and Awards

- 2016 **Iconic Team award** for *S-Health* project in iOS, SRBD
- 2015 **Advanced Coder** in software capability (SWC) test, Samsung Headquarter
- 2015 **Iconic Team award** for smart device app development project (SCM App) in android, SRBD
- 2014 Solved **500+** programming problems in UVa online judge [UVa Statistics]
- 2012 **Second runners-up** in Inter University Programming Contest, Grameenphone IT CSE festival, KUET
- 2012 Honorable Mention, International Collegiate Programming Contest, Dhaka site
- 2011 **Divisional Champion**, International Collegiate Programming Contest, Dhaka site
- 2011 **Divisional Champion**, Inter University Programming Contest, East West University, Dhaka
- 2011 **Champion**, Inter Department Programming Contest, KUET
- 2011 Honorable Mention, National Collegiate Programming Contest, University of Dhaka
- 2010 Honorable Mention, International Collegiate Programming Contest, Dhaka site