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Tanvir Ferdousi

Biocomplexity Institute and Initiative
University of Virginia, Charlottesville, VA, USA

EDUCATION

Ph.D. *in* ***Electrical and Computer Engineering*** *[May 2021]*

Kansas State University (K-State), Manhattan, KS, USA

- Dissertation: "Computational models and tools for analysis, prediction, and control of infectious diseases"
- Supervised by Dr. Caterina Maria Scoglio

B.Sc. *in* ***Electrical and Electronic Engineering*** *[Feb 2013]*

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

- Dissertation: "Design of a honeycomb all solid photonic bandgap fiber for a wide visible region"
- Supervised by Dr. Md. Shah Alam

RESEARCH INTERESTS

- Application of network science in modeling pathogen spread and social dynamics.
- Modeling physical and biological systems using data driven (AI) and mechanistic approaches.

PUBLICATIONS

Google Scholar Profile: https://scholar.google.com/citations?user=tEofsW0AAAAJ

- **Ferdousi, T.**, Cohnstaedt, L. W., & Scoglio, C. M. (2021). A windowed correlation-based feature selection method to improve time series prediction of dengue fever cases. *IEEE Access,* 9*, 2104.10289*, 141210 – 141222, [Paper, Code]
- **Ferdousi, T.** (2021). Computational models and tools for analysis, prediction, and control of infectious diseases. *Doctoral Dissertation*, *Kansas State University*. [Link]
- **Ferdousi, T.**, Gruenbacher, D., & Scoglio, C. M. (2020). A permissioned distributed ledger for the US beef cattle supply chain. *IEEE Access*, *8*, 154833-154847. [Paper]
- **Ferdousi, T.**, Moon, S. A., Self, A., & Scoglio, C. (2019). Generation of swine movement network and analysis of efficient mitigation strategies for African swine fever virus. *PLOS ONE*, *14*(12), e0225785. [Paper, Code]
- **Ferdousi, T.,** Cohnstaedt, L. W., McVey, D. S., & Scoglio, C. M. (2019). Understanding the survival of Zika virus in a vector interconnected sexual contact network. *Scientific Reports*, *9*(1), 1-15. [Paper, Code]
- Moon, S. A., **Ferdousi, T.**, Self, A., & Scoglio, C. M. (2019). Estimation of swine movement network at farm level in the US from the Census of Agriculture data. *Scientific Reports*, *9*(1), 1-14.
- Shahtori, N. M., **Ferdousi, T.**, Scoglio, C., & Sahneh, F. D. (2018). Quantifying the impact of early-stage contact tracing on controlling Ebola diffusion. *Mathematical Biosciences & Engineering*, *15*(5), 1165.

WORK EXPERIENCE

Postdoctoral Research Associate *at* ***University of Virginia Biocomplexity Institute*** *[Aug 2021 –Present]*

- Developing tools for graph generation, graph transformation, and data visualization as a part of the 'Cyber-Infrastructure for Network Engineering and Science' (CINES) project.
- Developing artificial intelligence (AI) based approaches to model water availability to assist irrigation managers and water districts in effective seasonal forecast, planning, and allocation of resources as a part of the 'AI Institute for Transforming Workforce & Decision Support' (AgAID) project.

Graduate Research Assistant *at* ***Kansas State University (K-State)*** *[Aug 2016 – May 2021]*

- Developed network-based epidemic spreading models for Zika and African swine fever viruses to study the impacts of pathogen behavior, host movements, and disease control measures in the United States.
- Developed a correlation-based feature selection method to improve the performance of recurrent neural networks (LSTM and GRU) in predicting time series case data of dengue fever.
- Designed and developed an Epidemic forecasting dashboard to visualize and analyze spatial and temporal data.
- Conceptualized a blockchain-based decentralized data management framework for the US beef cattle industry.
- Designed and developed models for graph generation from aggregate and incomplete data. The graphs were used to simulate virus spreading processes.

Senior Software Engineer** at **Samsung R&D Institute Bangladesh (SRBD) *[Apr 2013 - Jul 2016]*

- Managed the Connectivity, Security, and Protocol team of the OCF IoTivity QA project as a team lead in 2016.
- Developed tools for unit, integration, and compliance test of the OCF IoTivity framework.
- Extended a Java-based constrained application protocol (CoAP) library with IoTivity framework features.
- Implemented and maintained a TURN-based NAT traversal solution to establish TCP connections via relay servers.

Research Engineer** at **Institute of Information and Communication Technology (IICT) *[Feb 2013 - Mar 2013]*

- Conducted workshops on embedded systems as a teaching assistant. Prepared teaching materials on FPGA, Verilog, and Microcontrollers.

ACADEMIC EXPERIENCE

Relevant Courses	Machine Learning and Pattern Recognition, Network Theory, Mathematics of Data and Networks, Analysis of Algorithms, Agent-Based Game Theory, Multivariate Statistical Methods
Teaching Responsibilities	Introduction to Blockchain (Co-Taught), Applied Scientific Computing, Introduction to Computer Engineering, Linear Systems

TECHNICAL SKILLS

Areas of Expertise	Network Science, Machine Learning, Blockchains, Computational modeling
Languages	R, C/C++, Python, Java, MATLAB, SQL, JavaScript, Solidity
Platforms	Linux, Windows, Azure Cloud
Frameworks	TensorFlow/Keras, Pandas, Numpy, Node.js, PostGIS, Leaflet.js, Ethereum
Tools	Visual Studio, Jupyter Lab, Eclipse, GNU Make, Linux Shell, Jira, Git

RESEARCH COMMUNITY CONTRIBUTIONS

Volunteered as a peer reviewer for the following journals,

- IEEE Transactions on Network Science and Engineering
- Elsevier Preventive Veterinary Medicine
- IEEE Access
- IEEE Networking Letters

SELECTED PRESENTATIONS

- A permissioned distributed ledger for farm animal supply chains (Beef Cattle Institute, K-State) – June 2019
- Understanding the role of sexual transmission for Zika virus (AMCA Annual Meeting, Kansas City, MO) – Feb 2018
- Developing applications using Constrained Application Protocol (CoAP) (Samsung, Dhaka, Bangladesh) – Jul 2015
- From schematics to PCB layouts in Proteus Design Suite (Eastern University, Dhaka, Bangladesh) – Dec 2014

AWARDS & HONORS

- Grade 1 (90th pct.) in annual performance evaluation (2014), 1st place from Solution Lab (4th overall) in Software Capability Test (2013), and Advanced Level in Software Certification Test (2016) at Samsung Electronics (SRBD).
- University Deans List Award at BUET (2009-10). Scholarships from the Cisco Networking Academy Program, CSE, BUET (2010 –11) with a score of 95.75% (rank 1/84) in the CCNA Exploration 4.0 course.

ACTIVITIES & LEADERSHIP

- Alumnus of the Leadership Development Program at the Staley School of Leadership Studies, K-State.
- Founding member and the 1st president of Bangladeshi Students' Association (2019) at K-State.
- Former volunteer of the American Red Cross Club (ARCC) at K-State.

MEMBERSHIPS & AFFILIATIONS

- Full member of SIGMA XI Scientific Research Honor Society
- Member of Institute of Electrical and Electronics Engineers (IEEE)