Protik Bose Pranto

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Summary

Urban Climate Informatics researcher experienced in machine learning, remote sensing, and geospatial analysis to tackle urban and environmental challenges. Experienced in developing AI-driven models for urban mapping, assessing the impact of extreme heat, and analyzing vegetation dynamics. Skilled in deep learning techniques to enhance urban sustainability and climate resilience research.

Education

Arizona State University *August, 2022 - Present*
Ph.D. in *Computer Science*

Bangladesh University of Engineering and Technology *March, 2016 - February, 2021*
Bachelors in *Computer Science and Engineering*

Research Experience

SHaDE Lab: Sensable Heatscapes and Digital Environments Lab *2023 – Present*
Graduate Student Assistant

Graph Drawing and Information Visualization Laboratory, BUET *2019 – 2021*
Undergraduate Researcher with Prof. Md. Saidur Rahman

Publication

- **Protik Bose Pranto**. *Paper:* "Satire or Fake News? Machine Learning-Based Approaches to Resolve the Dilemma". In: **Accepted** at *International Conference on Electrical, Computer, Communications and Mechatronics Engineering*, **ICECCME** (**2024**).

- **Protik Bose Pranto**, Waqar Hassan Khan, Sahar Abdelnabi, Rebecca Weil, Mario Fritz and Rakibul Hasan. *Paper:* "From Bad to Worse: Using Private Data to Propagate Disinformation on Online Platforms with a Greater Efficiency". In: **Accepted** at *Design x Policy*, **CHI Workshop** (**2023**).

- **Protik Bose Pranto**, Bishal Basak Papan, and Md. Saidur Rahman. *Paper:* "k-Safe Labelings of Connected Graphs". In: **Accepted** at *IEEE International Conference on Telecommunications and Photonics*, **ICTP** (**2021**).

- Bishal Basak Papan, **Protik Bose Pranto**, and Md. Saidur Rahman. *Paper:* "On 2-Interval Pairwise Compatibility Properties of Two Classes of Grid Graphs". In: **Accepted** at *The Computer Journal*, **COMPJ** (**2021**).

Poster/Presentation

- **Protik Bose Pranto**, Waqar Hassan Khan, Ariane Middel. *Poster:* "A Systematic Literature Review on Urban Climate Informatics". In: **Accepted** at *Urban Climate Research Center Poster Event*, **UCRC** (**2025**).

- **Protik Bose Pranto**, Waqar Hassan Khan, Sahar Abdelnabi, Rebecca Weil, Mario Fritz and Rakibul Hasan. *Poster:* "Understanding the Effect of Private Data in Disinformation Propagation". In: **Accepted** at *Symposium on Usable Privacy and Security*, **SOUPS** (**2023**).

- Waqar Hassan Khan, **Protik Bose Pranto**, Tianyi Yang, Rakibul Hasan. *Poster:* "Exploring Privacy and Security Concerns of EdTech Users: A Qualitative Analysis of User Written Reviews". In: **Accepted** at *Symposium on Usable Privacy and Security*, **SOUPS** (**2023**).

Selected Research Experience

- **Literature Review on Urban Climate Informatics**: Conducted a comprehensive systematic literature review to explore the intersection of urban climate and computer science and examine how this cross-disciplinary approach addresses various urban climate challenges. Our initial findings show a growing interest in social media and crowdsourced approaches in urban climate research.

- **Pedestrian Network Map**: Generating "Pedestrian Network Map" by integrating multiple data sources and machine learning models. NAIP images are processed using DeepLabV3+ (ResNet-50) to extract roads and sidewalks, while Google Street View images are analyzed using a Pretrained Hierarchical Multi-scale Attention Model and NVIDIA Semantic Segmentation to refine sidewalk details. The OSM Network provides road coordinates and walkable routes, supplemented with park information from the City of Tempe. Extracted road and sidewalk masks are used to calculate sidewalk width, number and type of sidewalk.

- **Extreme Heat Impact on Environment**: Analyzing the effects of extreme heat on various environmental factors and vegetation in non-human intervened areas in Arizona using Google Earth Engine and available datasets. This study applies causal analysis and statistical methods to identify and quantify causal correlations between extreme heat and environmental changes, providing insights into its broader ecological impact.

- **Feature-Based App Analysis**: Automated exploration of all the features of an app to scrutinize the data collected, by conducting network traffic analysis. In instances where data is obfuscated or altered before transmission, deciphering the associated permission methods becomes challenging. To address this, we employ Frida Hooking to identify the specific permission methods called by the app and understand their utilization.

- **Real-Time Violence Detection from Videos**: Detected violations from surveillance video using I3D (video classification model) and OpenPose (real-time multi-person human pose detection library) and applying the Hierarchical Multiple Instance Learning model for the identification of violation patterns.

- **Satire or Fake news? Machine Learning Based Approaches to Resolve the Dilemma**: Examined nine widely used traditional machine learning models and three transformer-based traditional models (BERT, XLM-RoBERTa, DistilBERT) to see whether they can distinguish effectively between fake and satirical news. SVM performs better on a small dataset when text preprocessing and stemming are used. However, after text augmentation, the transformer-based model (XLM-RoBERTa) outperforms all other models, achieving 97% accuracy.

- **Bengali Covid Related Misinformation Detection**: Developed machine learning models to detect fake news in Bengali automatically. The best performing model is BERT, with an F1-score of 0.97. We apply BERT on all Facebook Bengali posts related to COVID-19. We find 10 topics in the COVID-19 Bengali fake news grouped into three categories: System (e.g., medical system), belief (e.g., religious rituals), and social (e.g., scientific awareness).

Research Area

- Machine Learning for Environmental Applications
- Remote Sensing and Geospatial Analysis
- Urban Climate Informatics
- Extreme Heat and Vegetation Studies

Achievements

- Secured runners-up at **SpaceHACK for Sustainability Hackathon** *2025*
- Won 3rd place in the graduate category at the **UCRC Poster Event** *2025*
- Awarded **USENIX Security Student Grant** *2023*
- Got accepted into the **post-CHI summer school** on Usable Privacy and Security *2023*
- Been awarded the **SCAI Doctoral Fellowship** *2022*
- Completed **Google Foobar Challenge** *2020*
- Ranked 3rd place in **South Asia Center for Media in Development** *2020*
- Winner of the **HackTheCode contest** in **Google Cloud DevFest** *2019*
- Our idea got selected among the **top 30 ideas** in **Eduprenuership Idea Quest** *2017*
- Ranked 3rd place in the hackathon of **IUT ICT Fest** *2017*

- Our team was among the **top 50 teams** in **ICPC Regional Contest** *2016, 2017*

Grants

- **CAP LTER Grad Grant:** The Central Arizona–Phoenix Long-Term Ecological Research program advances research and education on urban ecology and urban socio-ecological systems. It is one of two LTER sites funded by the National Science Foundation (NSF) that specifically study urban ecology. My proposal, entitled "Mapping the Distribution and Characteristics of Native and Non-Native Tree Species," was awarded the grant.

Academic Services

- **Peer Reviewer for Papers** *ICECCME 2025, ICECET 2025*
- **Conference Session Chair** *ICECCME 2024*
- **Invited Talk** *ASU CyberSecurity Symposium 2023*
- **Student Volunteer** *SOUPS 2023*

Leadership Experiences

- **Coordinator**, OLsA-Arizona Laboratorians Chapter *2024 - Present*
- **Student Representative**, Bangladesh Student Association, Arizona State University *2023 - Present*
- **Organising Member**, Laboratorian Association of BUET *2019 - 2020*

Industry Experience

Start Network *March, 2022 - July, 2022*
Consultant

On their Forecast-based, Warning, Analysis, and Response Network (FOREWARN) project, I conducted a Data Science program. I also worked with the team and provide technical assistance in the pursuit of a peer-reviewed publication.

Chaldal Engineering *March, 2021 - February, 2022*
Software Engineer

I have worked in Customer Experience team managing their website, mobile app, order APIs, search catalog and other user-facing services. I also worked in the *EggShell* team, which is a tech stack for front end apps. It combines a number of technologies like React, Fable, ReactXP, RenderDSL, and StyleDSL exhibiting a common framework for both web and android.

Teaching Assistant

- **CSE 100 (Principle of Programming with C++)**
  The course focuses on programming concepts, problem solving, and program design.

- **CSE 360 (Introduction to Software Engineering)**
  Introduces software engineering principles such as life cycle models, development methods, UML, project management, testing, and quality assurance standards.

- **CSE 467 (Data and Information Security)**
  This course is intended to provide students with an introductory understanding of the technical and behavioral mechanisms for information security and privacy.

- **CSE 470 (Computer Graphics)**
  This course introduces the basic concepts of interactive computer graphics, realistic rendering, and 3D viewing.

- **CSE 477 (Intro Computer-Aided Geometric Design)**
  The course introduces basic concepts of 3-D computer geometry, including curves, surfaces, and meshes.

- **CSE 485 (ASU Capstone Project)**
  It is a project-based course linking students with industry and faculty-sponsored projects, cultivating practical experience and preparing them for the professional world.

Skill

- **Language:** C, C++, Java, R, Dart, Python, HTML, Assembly(80x86), Matlab, SQL, Typescript, F#.
- **Mobile Application Development:** Android, Flutter, React Native.
- **Tools and Platforms:** Git, Unity, OpenCV, Cuda, JavaFX Scene Builder, Tensorflow, Keras, PyTorch, Scikit-learn, Qualtrics.
- **Other:** Qualtrics, Latex, Probability and Statistics, Data Structures.

Selected Academic Projects

Vasha-Sikkha
Dart

- A Flutter-based application designed to help users learn English interactively. Users can practice speaking, reading, listening, and writing through various tasks. Scores are tracked, and upon completing lessons, they are updated. Users can also view their rankings on the leaderboard.

CovidLife
Dart

- This Flutter-based health app displays COVID-19 information for Bangladesh, using two built-in APIs to provide district-wise and daily data.
- Doctor's appointments, phone calls or messages can be made easily.

Real-Time Vehicle Detection and Tracking Using a Fisheye Camera
Python

- A dataset of traffic videos from a fisheye camera is trained using the YOLOv5 algorithm.
- Fisheye images are mathematically modified to get a low distortion ratio so that vehicles at the junction can easily be identified.

Gesture Sensed Snake Game
C,C++,Makefile

- This hardware project utilizes an Atmega32 microcontroller and an accelerometer sensor.
- Four 8×8 RGB dot matrices are controlled by three types of decoders, with the rows managed by two 3×8 decoders (IC 74138).

Hotel Management System
Java,SQL

- This is a Java and Oracle Database-based project.
- JavaFX Scene Builder is used for the UI parts.
- In the database system, employees can be identified by their name, address, phone number, id, job title, salary, hire date
- The user can also add, delete, edit the reservation.

References

Dr. Ariane Middel
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