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Taoseef Ishtiak
B.S. in Computer Science and Engineering
North South University, Bangladesh

Expertise

Hard Skills

- Coding
- Data Science Skills and Tools
- Database Knowledge
- Problem Solving

Soft Skills

- Leadership
- Collaboration
- Research
- Critical Thinking

Programming and Query Languages

- Python
- Java
- C++ and Arduino
- JavaScript
- R
- PHP
- Flutter
- SQL
- MATLAB

Frameworks and Tools

- Laravel
- Django
- Maven
- Tableau

Other Computer Expertise

- MS Office
- Adobe Illustrator
- Adobe Photoshop

Languages

Fluent in Reading, Speaking and Writing in English and Bengali

Motivation

I have pursued my B.S. in Computer Science and Engineering from the passion for exploring this field. With the aim, I have the focus to engage in research activities, in the field of Data Science and Machine Learning. Amidst the vast field of computer science, the field of Algorithms, Computer Vision, Data Science, and Machine Learning have attracted me the most. I wish to take higher education in exploring these fields. I also have the ambition to do research on the corresponding field and contribute to the research field, community and industrial development of my country.

Educational Background

B.S.: 2020, from North South University, with CGPA 3.79
Higher Secondary School Certificate: 2015, from Notre Dame College with GPA 5.00
Secondary School Certificate: 2013, from Ideal School and College, with GPA 5.00

Field of Interest

Algorithms, Computer Vision, Data Science, Machine Learning and Data Mining.

Hobby

Traveling, Reading Books.

Co-curricular Activities

Debating, Anchoring, Graphics Designing, Science Project Development, Event Organizing, Volunteering.

Experience

1. Currently appointed as Lab Instructor at North South University.
2. Research Assistant at North South University in two funded projects.
3. Teaching Assistant at North South University for the courses: Java Programming Language, Data Structure and Design and Implementation of Algorithms.
4. Member R&D NSU ACM Students Chapter.
5. Machine Learning workshop instructor of IEEE NSU Student Branch.
6. Sub-Executive NSU ACM Students Chapter- Logistics and Administration.
7. Former intern as front end developer at Doctobaari (https://doctorbaari.com).
8. President Administration - Notre Dame Science Club (Session 2014-15).
9. Vice President Administration - Ideal Science And Technology Aiming Research Council (Session 2012-13).
10. Advisor and Debater - Ideal Debating Club (Session 2011-12).

Selected Projects and Research Publications

01. Conference Paper: *Indexed by Scopus:* T. Ishtiak,, S. Ahmed, M.H. Anila, S. Islam, R. Shelim, T. Farah, "Road state classification of Bangladesh with convolutional neural network approach", ***(2019) WMSCI 2019 - 23rd World Multi-Conference on Systemics, Cybernetics and Informatics, Proceedings, 4, pp. 129-134*** *(acceptance rate- 14.9%)*

02. Journal Article: *S. Ahmed, T. Ishtiak, A. U. R. C Suhan, M.H. Anila, T. Farah, "Road state classification of Bangladesh with convolutional neural network approach",* ***(2019) Journal of Systemics, Cybernetics and Informatics: JSCI, Volume 17 - Number 4*** *(extended version for journal publication)*

03. Conference Paper: T. Ishtiak, S. Ahmed, M. H. Anila and T. Farah, "A Convolutional Neural Network Approach for Road Anomalies Detection in Bangladesh with Image Thresholding", ***2019 Third World Conference on Smart Trends in Systems Security and Sustainability (WorldS4), London, United Kingdom, 2019, pp. 376-382. doi: 10.1109/WorldS4.2019.8903936***

04. Conference Paper: S. Rezwan et al., "A Minimalist Model of IoT based Sensor System for Sewage Treatment Plant Monitoring", ***2019 IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, Canada, 2019, pp. 0939-0945. doi: 10.1109/IEMCON.2019.8936182*** *(acceptance rate- 40%)*

05. Designing an algorithm to detect the number of cracks on a road surface and estimating the surface condition of road with projection in Google Map, from smartphone linear accelerometer and gyroscope.

06. Implementation of **UNet++: A Nested U-Net Architecture for Medical Image Segmentation, introduced by Z. Zhou, M. M. R. Siddiquee, N. Tajbakhsh, and J. Liang arXiv:1807.10165v1 [cs.CV] 18 Jul 2018,** on KITS 2019 Kidney and Kidney Tumor Segmentation Challenge**.**

07. Feature Engineering and applying tree-based data mining techniques "Human Activity Recognition from Continuous Ambient Sensor" dataset available at University of California Irvine Machine Learning Repository. Based on this project outcome a Conference paper has been submitted and currently under review.

08. Web and Backend system development for Sewage Treatment Plant Monitoring of North South University.

09. Full Stack separate Android and Web Application development for Coastal Disaster Vulnerability Data Collection of Bangladesh.

10. Crops yield prediction using Machine Learning algorithms based on obtained dataset from Bangladesh Bureau of Statistics and Information Division.

11. Conference Paper: T. Ishtiak, R. M. Orpon, N. Mashnoor, M. Ahmed and M. A. Nazim, "An advanced application to decrease household power consumption and save energy detecting the weather condition," ***2017 8th IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, 2017, pp. 622-627. doi: 10.1109/IEMCON.2017.8117168*** *(acceptance rate- 40%)*

12. Front End development of Android Mobile Application for **Doctorbaari,** https://doctorbaari.com.

13. An IoT based device to calculate energy consumption and sending data to server automatically.

14. Restful API based Weather Information Collection Web Application based on: Java Maven Framework.

15. Bus Ticket Booking System based on: Java Maven Framework.

16. Ekota- The social defender (A social platform to share the critical information of a society).

17. IoT based online Water level indication and automation system for disaster management and industrial usage.

Awards and Achievements

1. Champion of Senior Design Capstone Thesis Project Showcasing "North South University Innovation Challenge Season 8", with the project "A Complete Road Health Monitoring System for Bangladesh".
2. 100% tuition waiver recipient based on Academic Performance at North South University.
3. 2nd Runner of Up IEEE Day Hackathon, 2017.
4. 2nd Runner Up of NSU Intra University Line Follower Robot Competition Summer 2017.
5. Board Scholarship (General Category) in Higher Secondary School Certificate Examination, 2015.
6. Board Scholarship (Talent-pool Category) in Secondary School Certificate Examination, 2013.
7. Various achievements in scientific project development, extempore speech and Math and Biology Olympiad competitions during Secondary and Higher Secondary School.

Brief Explanation of Selected Research Projects:

01. **Road Image Classification of Bangladesh with Convolutional Neural Network Approaches:** It was a research project for classifying the RGB road images of Bangladesh into 5 classes: Perfect Roads, Good Roads, Bad Roads, Severe Bad Roads, Water on Surface Roads. My part of the work contained studying the state-of-the-art model architectures: Inception-v2, -v3 and -v4, Inception-ResNet-v2, and other computer vision-based image processing techniques to prepare the dataset and run the classification task. Later a customized CNN model combining the Inception-v3 and Inception-ResNet-v2 architectures was built as a research outcome. Two distinct conference papers were published based on the project outcome. I also developed a web application where the customized model weights ran on the backend to classify new road images uploaded on the system. I also developed a separate android application to collect data from volunteers to prepare the dataset of images.

02. **IoT Based Sewage Treatment Plant Online Monitoring:** I joined the project as a Research Assistant, being a part of a research team of six members. I worked in the backend server architecture and full-stack web platform development to fetch, project, analyse, and run data mining techniques on the sensors' values of the STP. The web system shows the STP status and the run time cleaning performance of the Inlet and Outlet tanks through the data interpretation of Temperature, pH, Turbidity, BOD-COD and Electricity sensors. A conference paper has been published based on the web architecture, security measure taken of the system and data interpretation methodology.

03. **Coastal Area Data Collection for Vulnerability Assessment and analyzing Machine Learning Approaches:** It was a Govt. funded research, jointly supervised by the Department of Environment, Government of People's Republic of Bangladesh and Department of Environmental Science and Management, North South University. I worked as a back-end developer for building an android application for data collection and a web platform to project the data and crucial information running SQL queries. In another part of the project, I was given the responsibility for dimensionality reduction of vulnerability assessment. Based on a partial dataset I applied Backward elimination, L1 Based Feature Selection and Low Variance Feature Removal techniques to analyse the feature selection process. This project has been nominated to be used on a massive scale to gather non-private data of coastal areas' people to improve their lives styles and disaster vulnerability assesment. I am currently working as a technical advisor in the project.

04. **Road Surface Estimation based on Smartphone Sensors:** This project was a part of my Senior Design Capstone and thesis project. Using the smartphone's Linear Accelerometer and Gyroscope sensors' data I developed an algorithm to detect the cracks of a road from the vibration a rider feels while sitting inside a vehicle during transportation. Based on the algorithm, I developed an approach for counting the number of cracks in each lane of a road based on the GPS locations where the user felt the vibration and projected those locations in Google Maps for sharing the road surface condition among users.

05. **Road Image Semantic Segmentation:** This was another part of my Senior Design Capstone Thesis project. I studied some state-of-the-art semantic segmentation approaches: Pyramid Scene Parsing Network, Google's DeepLab, SegNet, MultiNet, and Mask R-CNN models. Among them, I was able to train the road images of Bangladesh based on the MultiNet architecture. Currently, I am exploring with this project in more depth for better research outcomes.

06. **Depth Estimation of Potholes from 2D images:** Based on my research work performance, I am currently appointed as a Research Assistant to estimate the depths of Potholes from 2D images. I am working to build an algorithm in this regard, which might be able to mathematically solve this problem. At the same time, I am studying other possible computer vision-based techniques to validate my work.

07**. Implementation of U-Net and Unet++ on KITS 2019 Kidney and Kidney Tumor Segmentation Challenge:** For self-study, I have explored U-Net and UNet++ for biomedical image segmentation. I have trained the KITS 2019 Kidney and Kidney Tumor Segmentation Challenge dataset; both 2D and voxel images (through 3D U-Net) model architectures.

08. **Human Activity Recognition:** I have worked as a volunteering member in a research project of Human Activity Recognition upon the "Human Activity Recognition from Continuous Ambient Sensor" dataset of the University of California Irvine Machine Learning Repository. My responsibility of the project was to explore the tree-based different feature selection and feature ranking methodologies. I applied feature selection and feature ranking with Random Forest Classifier and Extra Tree Classifier A conference paper is under review based on this project's outcome.

09. **Household Power Consumption Reduction Algorithm:** I joined this research project during my 3rd year of B.S. I worked for the development of an algorithm and IoT based solution to make a weighted-greedy approach to optimize the power consumption based on the weather information. The algorithm designed in this project can be used to give optimal choice to usage of electronic appliances to maintain a fixed monthly budget yet ensuring user's satisfaction based on the weather condition. The weather information was achieved with Restful API service. The IoT based solution was used to capture the power consumption of appliances of a house and send the usage to a local server. A conference paper was published based on the research outcome concentrating the algorithm to decrease the household power consumption based on weather information.