Tamal Joyti Roy

AI Engineer · Digital Health Care Researcher

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Personal Profile

Tamal Joyti Roy is an experienced Data Scientist with a focus on data science and digital health care research. He graduated from North Western University with a Bachelor's degree in Computer Science and Engineering and is currently pursuing a Master's degree in Information and Communication Technology from Khulna University of Engineering & Technology. Tamal has expertise in AI algorithm development and implementation, data science infrastructure development, natural language processing, data analytics, and machine learning model deployment. He is working as a Data Scientist at United We Care, where he analysed business data, used several machine learning frameworks, and conducted sentiment analysis. Data Science, Bioinformatics, Machine Learning, Computer Vision, Artificial Intelligence, and Image Processing are among Tamal's research interests. He has had 12 publications published in peer-reviewed journals and has presented at international conferences and more than 6 are on the pipeline. Tamal is an expertise in Python, C, C++, MySQL, Git, and Linux, as well as TensorFlow, NumPy, Pandas, Matplotlib, Keras, Scikit-Learn, IBM SPSS, and Adobe Photoshop. He is also adept at leadership, teaching, and problem solving.

Education

University of Houston *TX,USA*

Doctor of Philosophy *Aug 2023 - Current*

- **Courses:**

North Western University, Bangladesh *Khulna , BD*

Bachelor of Science in Computer Science and Engineering, Class of 2020 *May 2016 - Apr 2020*

- **Relevant Courses:** Object Oriented Programming,Engineering Drawingand CAD Sessional, Digital Logic Design,Data Structure, Algorithms, Discrete Mathematics, Numerical Analysis, Applied Probability and Queuing Theory,Artificial Intelligence and Expert System,Computer Networks,Spring-2019 Systems Programming and Operating System,Computational Geometry, Data Communication,Neural Networks and Fuzzy Systems,Compiler Design,Parallel and Distributed Processing,Robotics and Computer Vision

Work Experience

United We Care *Delhi, India*

Data Scientist *Nov 2021 - Present*

- Developing hypotheses, making inferences, and analyzing customer and company revenue trends.
- Working with different machine learning frameworks.
- Analyzing business metrics and providing actionable insights.
- Performing qualitative and quantitative analyses
- Designing and implementing validation tests
- Search engine optimization
- **Technical Skills:** Python with PyTorch, NumPy, Matplotlib, Pandas, Scikit-learn.
- **Soft Skills:** Teamwork, Time Management, Communication, Presentation skills.

Research Initiative for Health Equity, Khulna, Bangladesh *Khulna,Bangladesh*

Honorary Researcher *Jul 2020- Present*

- Collaborating with healthcare researchers and practitioners on digital health projects
- Educating public health workers on digital health technologies
- Organizing informational sessions for interdisciplinary health research
- Supporting quantitative analyses for epidemiologic projects
- **Technical Skills:** Python,SPSS

Projects

Data Mining for Finding the Correlation Of COVID-19 And Human Fear

Khulna,BD

North Western University

Dec 2019-May 2020

- The study focuses on detecting fear of COVID-19 among people of different ages and backgrounds, including students, job holders, doctors, businessmen, and unemployed individuals.
- The researchers collected a wide variety of data to conduct the study, with a total of 553 instances. They used ten machine learning algorithms and their features technique to construct a machine learning classifier that can detect fear of COVID-19.
- The evaluation report of the study showed that the LogitBoost algorithm was the most effective in identifying fear of COVID-19, with an accuracy rate of 70.34%. The researchers hope that their study will help identify and address the fear of COVID-19 among people who have been suffering from it.
- **Technical Skills:** Weka, Google Drawing, Adobe Illustrator, LaTeX.
- **Soft Skills:** Time Management, Teamwork, Presentation skills, Report writing.

Prototype Drone Model for Carrying Water During Fire Hazards

Khulna,BD

North Western University

Dec 2018-Feb 19

- The prototype drone model was designed to carry water and was intended to be used during fire hazards. This indicated that the drone was being developed to serve a specific purpose, which was to help combat fires and mitigate their effects.
- **Technical Skills:** C,Arduino,Microsoft Excel
- **Soft Skills:** Time Management, Teamwork, Presentation skills, Report writing.

Chess Game with Java

Khulna,BD

North Western University

Jun 2018-Aug 18

- The game was created with a user-friendly UI in mind, as well as features such as move validation, game saving, and loading settings.
- **Technical Skills:** Java,Adobe Illustrator
- **Soft Skills:** Time Management, Teamwork, Presentation skills, Report writing.

Dynamic Medical Health Care Website

Khulna,BD

North Western University

Dec 17-Jan 18

- The website was created to give users with a dynamic and user-friendly interface for accessing healthcare services, including appointment scheduling, medication refills, and virtual consultations.
- **Technical Skills:** HTML,CSS,JS,Adobe Illustrator
- **Soft Skills:** Time Management, Teamwork, Presentation skills, Report writing.

Time Series Analysis

Remote

United We Care

Apr 22- Dec 22

- The examination of time series The SARIMAX project was created in order to estimate future trends in a certain dataset
- To generate a stationary series, the project required identifying and removing any trend, seasonal, or cyclical components in the dataset. The data was then fitted with a SARIMAX model, which was then used to make predictions.
- **Technical Skills:** python,SARIMAX,Scikit Learn,Anaconda
- **Soft Skills:** Time Management, Teamwork

Emotion Classification from User Data

Remote

United We Care

Jan 22- Feb 22

- The Emotion Classification from User Data study was carried out in order to determine emotions based on user data.
- The research team collected data from multiple sources and used machine learning techniques to appropriately characterize the emotions.
- **Technical Skills:** python,SARIMAX,Scikit Learn,Anaconda,Machine Learning
- **Soft Skills:** Time Management, Teamwork

Sentiment analysis with public Data set

Remote

United We Care

Jan 22- Feb 22

- A team of researchers worked on the sentiment analysis project employing a public data collection.
- We gathered data, analyzed it using machine learning methods, and reported their findings.
- **Technical Skills:** python,SARIMAX,Scikit Learn,Anaconda,Machine Learning
- **Soft Skills:** Time Management, Teamwork

Image to Text Classification: Implementation of An OCR Model with Tensor Flow and OpenCV

Remote

United We Care

Jun 22- Sep 22

- The project entailed developing an OCR model using Tensor Flow and OpenCV for image-to-text categorization.
- WThe team finished the project effectively and demonstrated the usefulness of their OCR model in accurately detecting and converting text images into digital text format.
- **Technical Skills:** python,SARIMAX,Scikit Learn,Anaconda,Machine Learning,OpenCV,Tensorflow
- **Soft Skills:** Time Management, Teamwork

Ongoing Projects

Applications of Blockchain Technologies in Health Care: Synthesizing global research *Khulna,BD*
Research Initiative for Health Equity *Jan 2022- Present*

Infodemiology Study *Khulna,BD*
Research Initiative for Health Equity *Jul 2022- Present*

Image to Text Classification: Implementation of An OCR Model with Tensor Flow and OpenCV *Remote*
United We Care *Jun 2022- Present*

Topic Modeling with Latent Dirichlet Allocation *Remote*
United We Care *Aug 2022- Present*

Medical support with AI *Remote*
United We Care *Nov 2022- Present*

Health and Mental Health Data Scraping and Analysis *Remote*
United We Care *Feb 2022- Present*

Developing a Named Entity Recognition System for Medical Text Extraction with Semi-Supervised Learning *Remote*
United We Care *Mar 2022- Present*

Building a healthcare-specific generative model using open source Bloom *Remote*
United We Care *Jan 2022- Present*

Developing a Multilingual Text-to-Voice and Voice-to-Text Conversion System using Variational Autoencoders, Convolutional Neural Networks, and Generative Adversarial Networks *Remote*
United We Care *Jan 2022- Present*

Virtual Coach: Enhancing Communication Skills with Voice-to-Facial Expression Generation *Remote*
United We Care *Apr 2022- Present*

Emotion Detection System for Clinicians: Real-time Insights into Patients' Emotional States During Sessions *Remote*
United We Care *Apr 2022- Present*

Patent Proposals

A Method for Randomized Dataset Creation and Evaluation of Language Models in Understanding Basic Human Emotions
United We Care *Apr 2023*

Skills

Programming Languages C(Basic), C++ (Basic), Python, LaTeX
Technologies MySQL, Git, Linux, WordPress,Linux
Software MS Office, IBM SPSS, Adobe Photoshop, Illustrator, Open Shot, Weka, RapidMiner Studio
Other competencies Leadership, teaching, details oriented, problem-solving capabilities
Research Interest Data Science, Bioinformatics, Machine-learning, Computer Vision, Artificial Intelligence, Image processing
Interests Mathematics, Evolution Theory of Human and Animals, Nonfiction Books, Digital Painting
Domain Skills Simulation and modeling, AI,Data mining, Neural networks and fuzzy systems, Information system analysis

Certifications

2022 **Problem-Solving (Intermediate) Certificate**, *HackerRank*
2022 **SQL (Basic) Certificate**, *HackerRank*
2022 **Python Basics (University of Michigan)**, *Coursera*
2022 **Use Canva to Design Digital Course Collateral**, *Coursera*
2022 **Popular Applications of Data Science**, *Great Learning*
2022 **English Proficiency Certificate**, *Duolingo*

Peer Review Articles and Conferences

Journal Articles

1. Hossain, M.M., Saha, N., Rodela, T.T., Tasnim, S., **Roy, T.J.,** Ahmed, H.U. and Basu, B.K., 2022. Global research on syndemics: a meta-knowledge analysis (2001-2020). F1000Research, 11(253), p.253.

Conferences

1. **Roy, T.J.,** Mahmood, M.A., Mohanta, A., Roy, D., Jyoti, J.T. and Ghosh, P.K., 2022, February. A Machine Learning Approach to Analyze the Performance of Bangladesh Cricket in T20. In 2022 International Conference on Innovations in Science, Engineering and Technology (ICISET) (pp. 129-134). IEEE.
2. **Roy, T.J.,** Mahmood, Md.A. and Mohanta, A. (2022). An Efficient Approach to Validate COVID-19 Related Vaccine Myths Utilizing LDA Algorithm. Proceedings of the 2nd International Conference on Computing Advancements. doi:10.1145/3542954.3542963.
3. **Roy, T.J.,** Mahmood, M.A. and Roy, D., 2021, December. A Machine Learning Model to Predict Earthquake Utilizing Neural Network. In 2021 International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering (IC4ME2) (pp. 1-4). IEEE.
4. **Roy, T.J.,** Mahmood, M.A. and Roy, D., 2021, December. An Efficient Approach to Identify the Key Factors of Failure of Bangladesh Cricket Team in Test Cricket Utilizing Hypothesis Testing and Clustering Method. In 2021 5th International Conference on Electrical Information and Communication Technology (EICT) (pp. 1-6).
5. Roy, D., Mahmood, M.A. and **Roy, T.J.,** An Efficient Approach to Assess the Soil Quality of Sundarbans Utilizing Hierarchical Clustering.International Conference on Big Data, IoT and Machine Learning (BIM 2021).
6. Mahmood, M.A., **Roy, T.J.,** Amin, M.A., Roy, D., Mohanta, A., Dipty, F.F. and Mitra, S.,.A Hybrid Approach to Find COVID-19 Related Lung Infection Utilizing 2 Bit Image Processing. International Conference on Innovative Computing and Communications (ICICC 2022).
7. Roy, D., Mahmood, M.A., **Roy, T.J.** and Mohanta, A., A Two-Step Clustering Approach to Measure Soil Quality of Sundarban Based on Organic Carbon and Bulk Density.2021 IEEE International Conference on Robotics, Automation, Artificial-Intelligence and Internet-of-Things.
8. **Roy, T.J.,** Mahmood, M.A., Mohanta, A. and Roy, D., An Analytical Approach to Predict the COVID-19 Death Rate in Bangladesh Utilizing Multiple Regression and SEIR Model.IEEE International Conference on Robotics, Automation, Artificial-Intelligence and Internet-of-Things 2021.
9. **Roy, T.J.,** Mahmood, Md.A. and Roy, D. (2021). An Analytical Model for Prediction of Upcoming ICC T20 World Cup 2021 Using Classification Algorithms. 2021 International Conference on Science & Contemporary Technologies (ICSCT). doi:10.1109/icsct53883.2021.9642558.
10. **Roy, T.J.** and Ashiq, M., Global Warming and Bangladesh: A Machine Learning Approach to Analyze the Warming Rate Utilizing Neural Network. International Conference on 4th Industrial Revolution and Beyond (IC4IR) 2021.
11. Roy, D.,**Roy, T.J.** and Mahmood, M., 2021, May. An Efficient Approach to Identify Economic Crisis During Covid-19 Outbreaks Utilizing Data Mining. In Proceedings of the International Conference on Smart Data Intelligence (ICSMDI 2021).

Manuscripts Under Review

1. Roy, T.J., Ashiq, M and Saha N., An Effective Method to Detect Tonsillitis Using Machine Learning.SN Computer Science.

Manuscripts Under Preparation

1. Online Vitamin-Related Information Behavior During Covid-19 In South Asia: An Infodemiology Study.
2. Investigating Association Between Obesity And Sugar Consumption: A Machine Learning Approach.
3. An Analytical Model for Prediction Of Heart Disease Using Machine Learning Classifiers.
4. A structured Machine Learning-Based Approach for Detecting Genetic Disorders in Children and Adolescents