

# Kanchan Chowdhury

Webpage: [kanchanchy.github.io](https://kanchanchy.github.io)

Linkedin: [linkedin.com/in/kanchan-chowdhury-5729699a](https://www.linkedin.com/in/kanchan-chowdhury-5729699a)

Email : [kchowdh1@asu.edu](mailto:kchowdh1@asu.edu)

Mobile : +1-480-410-8677

## RESEARCH INTERESTS

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Machine Learning, Big Data Analytics, Geospatial Data Analytics, and Database Systems

## TECHNICAL SKILLS

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- **Languages & Databases:** Python, Java, C, Scala, SQL, MySQL, PostgreSQL, and SparkSQL
- **Others:** Apache Spark, Apache Sedona, GeoPandas, PyTorch, Scikit-learn, Spatial and Statistical Data Analysis, Machine Learning and Deep Learning, Pandas, Numpy, Git, Rest API, Android SDK, IntelliJ IDEA, Eclipse, and Data Visualization with Matplotlib, Seaborn, and Plotly Express

## EDUCATION

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- **Arizona State University** Tempe, Arizona  
*PhD in Computer Science* *Aug. 2018 – Present*  
*Advisor: Prof. Mohamed Sarwat, CGPA: 4.00*
- **Chittagong University of Engineering and Technology** Chittagong, Bangladesh  
*Bachelor of Science in Computer Science and Engineering* *Mar. 2010 – Nov. 2014*  
*Advisor: Prof. Mohammed Moshikul Hoque, CGPA: 3.76*

## EXPERIENCE

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- **Wherobots Inc.** Scottsdale, Arizona, USA  
*Research and Development Intern* *Jan. 2023 - Present*
  - **Responsibilities:** Developing scalable spatial machine learning tools, scalable map-matching and routing algorithms.
- **Arizona State University** Tempe, Arizona  
*Research & Teaching Assistant* *Aug. 2018 - Present*
  - **Research:** 1) Solving research problems to enable the efficient application of big spatial data into model training. 2) Designing and implementing a spatiotemporal deep learning framework. 3) Evaluating state-of-the-art approaches for synthesis of SQL queries from natural language questions. 4) Contributing to a geospatial entity matching framework and a satellite image labeling framework.
  - **Instructor of the Course:** Spatial Data Science and Engineering (Fall 2022)
  - **Courses Taught as TA:** Distributed Database Systems, Data Processing at Scale, Object-Oriented Programming & Data Structure, Principles of Programming with C++, Principles of Programming with Java & Python
- **Gagagugu PTE LTD** Dhaka, Bangladesh  
*Software Engineer* *Jan. 2017 - Jun. 2018*
  - **Responsibilities:** Developing Android Apps with social networking features such as calling, messaging, and posting.
- **Le Chef Plc** Dhaka, Bangladesh  
*Android Application Developer* *Jan. 2015 - Dec. 2016*
  - **Responsibilities:** Developing Android Apps featuring online order and reservation services for restaurants in UK.

## PUBLICATIONS

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- **Kanchan Chowdhury**, Mohamed Sarwat; A Demonstration of GeoTorchAI: A Spatiotemporal Deep Learning Framework. *Accepted in SIGMOD 2023*
- **Kanchan Chowdhury**, Mohamed Sarwat; GeoTorch: A Spatiotemporal Deep Learning Framework. *30th International Conference on Advances in Geographic Information Systems (SIGSPATIAL '22)*, 2022

- **Kanchan Chowdhury**, Vamsi Meduri, Mohamed Sarwat; A Machine Learning-Aware Data Re-partitioning Framework for Spatial Datasets. *38th International Conference on Data Engineering (ICDE)*, 2022
- Vamsi Meduri, **Kanchan Chowdhury**, Mohamed Sarwat; Evaluation of Machine Learning Algorithms in Predicting the Next SQL Query From the Future. *ACM Transactions on Database Systems (TODS)*, 2021
- Jia Yu, **Kanchan Chowdhury**, Mohamed Sarwat; Tabula in Action: A Sampling Middleware for Interactive Geospatial Visualization dashboards. *46th International Conference on Very Large Databases (VLDB)*, 2020.
- Vamsi Meduri, **Kanchan Chowdhury**, Mohamed Sarwat; Recurrent Neural Networks for Dynamic User Intent Prediction in Human-Database Interaction. *22nd International Conference on EDBT*, 2019
- **Kanchan Chowdhury**, Lamia Alam, Shyla Sarmin, Safayet Arefin, Mohammed Moshiul Hoque; A Fuzzy Features Based Online Handwritten Bangla Word Recognition Framework. *18th ICCIT*, 2015

## PROJECTS

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- **GeoTorchAI**: A spatiotemporal deep learning framework, formerly known as **GeoTorch**. It enables spatiotemporal machine learning practitioners to easily and efficiently implement deep learning models targeting the applications of raster imagery datasets and spatiotemporal non-imagery datasets, besides supporting scalable data preprocessing.
- **Named Entity Recognition**: This work tunes various steps of state-of-the-art methods for named entity recognition in order to experiment the changes in performance. Evaluation is done with two popular datasets: CoNLL-2003 and OntoNotes-5.0.
- **Climate Change Forecasting**: A data science project to perform data cleaning, feature engineering, and data preprocessing operations on raw temperature data and predict temperature trend with LSTM model.
- **NLIDB-Bench**: A benchmark for evaluating state-of-the-art approaches of SQL query generation from natural language text queries. Besides proposing a set of evaluation metrics, we evaluate all approaches with three state-of-the-art datasets along with our own proposed dataset.
- **Fake News Detection**: A data science project to perform data cleaning, feature engineering, and data preprocessing operations on news datasets and classifying fake and real news with Bidirectional LSTM model.
- **Hotspot Analysis on Apache Sedona**: This work performs spatial queries and range joins between two spatial datasets and calculates Getis-Ord statistic of NYC Taxi Trip dataset to perform hot-cell analysis.

## PARTICIPATION AND AWARDS

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- Recipient of ACM SIGSPATIAL 2022 travel award to attend the conference.
- Recipient of CIDSE Doctoral Fellowship at Arizona State University for the academic year 2018-2019.
- Contributed to Apache Sedona, an open-source geospatial cluster computing framework, by adding supports for two new spatial data types. I am Serving as a PPMC member and release manager of Apache Sedona.
- 2nd Runner-up at National Hackathon organized by ICT Division of Bangladesh in 2014. The challenge of the hackathon was to design a project based solution to solve a national problem of the country.
- 2nd Runner-up at National Mobile Application Code Hub organized by BUET, Bangladesh in 2014.
- 6th at Inter University Programming Contest organized by CUET, Bangladesh in 2012.
- Recipient of Honors award from my undergraduate university for maintaining academic excellence.

## COURSEWORKS

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Distributed Database Systems, Statistical Machine Learning, Fundamentals of Statistical Learning, Data mining, Semantic Web Mining, Programming in C/C++, Object Oriented programming, Data Structure, Algorithms, Discrete Mathematics, Artificial Intelligence, Software Engineering, Operating Systems, Database Management Systems, Social Media Mining, Big Data Analysis with Scala and Spark, Deep Neural Networks with PyTorch, and Effective Programming in Scala.