

# Kanchan Chowdhury

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## RESEARCH INTERESTS

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Machine Learning, Geospatial Data Analytics, and Big Data Systems

## TECHNICAL SKILLS

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

## EDUCATION

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- **Arizona State University** Tempe, Arizona  
*PhD in Computer Science (CGPA: 4.00)* *Aug. 2018 – Jul. 2023 (Expected)*  
Advisor: Prof. Mohamed Sarwat
- **Chittagong University of Engineering and Technology** Chittagong, Bangladesh  
*Bachelor of Science in Computer Science and Engineering (CGPA: 3.76)* *Mar. 2010 – Nov. 2014*  
Advisor: Prof. Mohammed Moshiul Hoque

## EXPERIENCE

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- **Data Systems Lab, Arizona State University** Tempe, Arizona  
*Research Assistant* *Aug. 2018 - Present*
  - **Responsibilities:** Solving research problems in the intersection of spatio-temporal big data analytics and machine learning; developing a benchmark for evaluating approaches of SQL synthesis from natural language query.
- **Arizona State University** Tempe, Arizona  
*Teaching Assistant* *Aug. 2018 - Present*
  - **Courses Taught:** Distributed Database Systems (Fall 2021, Spring 2021, Fall 2020, Spring 2020), Data Processing at Scale (Fall 2019), Object Oriented Programming & Data Structure (Spring 2019), Principles of Programming with C++ (Spring 2019), Principles of Programming with Java & Python (Fall 2018)
- **Gagagugu PTE LTD** Dhaka, Bangladesh  
*Software Engineer* *Jan. 2017 - Jun. 2018*
  - **Responsibilities:** Developing Android Applications featuring functionalities related to social networking such as calling, messaging, and post sharing.
- **Le Chef Plc** Dhaka, Bangladesh  
*Android Application Developer* *Jan. 2015 - Dec. 2016*
  - **Responsibilities:** Developing Android Applications featuring services such as online order and reservation system for restaurants located in UK.

## PUBLICATIONS

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- 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*, 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 Moshikul Hoque; A Fuzzy Features Based Online Handwritten Bangla Word Recognition Framework. *18th ICCIT*, 2015

## PROJECTS

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- **Spatio-Temporal ML Framework:** A framework consisting of two modules: 1) data preprocessing module on top of Apache Sedona to support all preprocessing of spatial and spatio-temporal data from data loading to tensor generation and 2) machine learning module on top of PyTorch to support easy implementation of custom spatio-temporal models.
- **Spatial Data Repartitioning:** A framework built on Apache Sedona for efficient re-partitioning of spatial data with an end objective to reducing training time and memory usage of spatial machine learning models. It can reduce the training time significantly without major impact on model accuracy.
- **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.
- **Data Visualization:** A project to visualize statistical data in Python with the help of most frequently used plots required for data analysis. It uses three libraries: Matplotlib, Seaborn, and Plotly Express.
- **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.
- **Sentiment Analysis with BERT:** A project to classify twitter emotions with BERT pretrained model.
- **Hotspot Analysis on Apache Sedona:** This work writes functions in SparkSQL to perform spatial queries, performs range join between two spatial datasets, and calculates Getis-Ord statistic of NYC Taxi Trip dataset to perform hot-cell analysis.
- **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.
- **Hyper-parameter Optimization:** Comparing state-of-the-art approaches for searching the optimum hyper-parameters of a deep learning model, such as grid search and Bayesian optimization.
- **Image Denoising with Autoencoder:** This project adds noise to MNIST dataset images and builds an auto-encoder model consisting of encoder and decoder to reproduce actual images.

## PARTICIPATION AND AWARDS

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- Recipient of CIDSE Doctoral Fellowship at Arizona State University for the academic year 2018-2019.
- 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 undergraduate University for maintaining good CGPA.

## COURSEWORKS

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