Biplob Biswas

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Education

The Ohio State University Aug. 2018 – Present
Ph.D. candidate in Computer Science and Engineering *Columbus, OH*

- Advisor: Dr. Rajiv Ramnath
- Research Interest: Natural Language Processing, Text Generation, Information Retrieval
- Thesis Title: Improving Response Automation for Customer Communication through Document Categorization and Information Retrieval
- Courses Taken: Machine Learning, Data Mining, Parallel Computing, Neural Networks, Speech and Language Processing, Social Media and Text Analysis
- GPA: 3.89 / 4.00
- Expected graduation date: May 2023

Bangladesh University of Engineering and Technology Feb. 2011 – Mar. 2016
Bachelor of Science in Computer Science and Engineering *Dhaka, Bangladesh*

Experience

Machine Learning Intern Jun. 2021 – Aug. 2022
Emplifi *Columbus, OH*

- Designed and developed a **knowledge-grounded response generation framework** to automatically answer user queries in a customer care setting (Real-world data) and deployed it as an API service. *[AWS, Docker, Python, PyTorch, HuggingFace]*
  - Employed neural information retrieval (IR) techniques to collect knowledge from historical unstructured data and blended that information into generated responses through a fine-tuned GPT-2 model.
  - Formulated a novel ranking mechanism for better response selection from multiple generations.
  - The model generates **12% more informative and 15.3% more semantically similar responses** than that of vanilla GPT-2 (contemporary state-of-the-art).
- Developed **a paraphrasing model and corresponding web service** to introduce diversity in the business response template. *[AWS, Docker, Python, Python]*

Graduate Research Associate Aug. 2021 – Present
The Ohio State University *Columbus, OH*

- Designed and developed an **explainable deep-learning model - TransICD** (Code) to predict ICD codes from a patient discharge summary (MIMIC-III data).*[Python, PyTorch]*
  - The model achieves stable **micro-AUC and micro-F1 scores of 0.92 and 0.64** respectively with 1.1% and 2.5% increases over the corresponding metrics of LEAM (contemporary state-of-the-art).
- Developed a tool to extract and analyze pre-installed applications in Android Firmware *[Python, MySQL]*

Graduate Teaching Associate Aug. 2018 – May 2021
The Ohio State University *Columbus, OH*

- Instructor of "Introduction to Computer Programming in C++" (Spring'20, Summer'20, Autumn'20 and Spring'20)
- Instructor of "Modeling and Problem Solving with Spreadsheets and Databases" (Autumn'18 and Spring'19)

Engineer, Research and Development Mar. 2016 – Jul. 2018
KONA Software Lab Limited (in collaboration with KONA I, Seoul, Korea) *Dhaka, Bangladesh*

- Developed the front-end of the **leading Android payment application of Bangladesh NexusPay (1M+ Downloads)** which supports various transaction interfaces including NFC, QR-code and online payment. *[Android, Java]*
- Developed a Nexgo POS application to facilitate the transaction from an Android payment application. *[C]*

Leadership

- Led a team of graduate students to employ a **deep reinforcement learning model for a question-answering task** in customer care service.

Technical Skills

Languages: Python, Java, C, C++
Frameworks & Libraries: PyTorch, Keras, Tensorflow, HuggingFace, Scikit, Scipy, NLTK, Gensim
Platforms: Android, AWS, Docker
Tools: Git, Jira, Trello, PyCharm, IntelliJ Idea, Eclipse
Database: Oracle, MySQL, JSON

Publications

- **Retrieval Based Response Letter Generation For a Customer Care Setting**, Biplob Biswas, Renhao Cui, Rajiv Ramnath. In Proceedings of the 2022 Conference of the North American Chapter of the Association for Computational Linguistics (NAACL): Human Language Technologies: Industry Track, July 2022
- **TransICD: Transformer Based Code-wise Attention Model for Explainable ICD Coding**, Biplob Biswas, Hoang Pham, Ping Zhang. In International Conference on Artificial Intelligence in Medicine (AIME) Jun 2021
- **Towards Simulating Non-lane Based Heterogeneous Road Traffic of Less Developed Countries**, Q. M. Alam, B. Sarker, Biplob Biswas, K. H. Zubaer, T. Toha, N. Reza and ABM A. Al Islam. In ICT4S, May 2018.