

# Ahnaf Farhan

[www.linkedin.com/in/ahnafFarhan](https://www.linkedin.com/in/ahnafFarhan)

[github.com/rownak](https://github.com/rownak)

rownak.utep@gmail.com

609-847-9576

## EDUCATION

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- **PhD & MS in Computer Science** El Paso, Texas  
GPA: 3.93 (36 credit hours); The University of Texas at El Paso Aug. 2017 – Dec. 2023 (Exp. Graduation)
- **BSc. in Computer Science and Engineering** Sylhet, Bangladesh  
GPA: 3.60 (170 credit hours); Shahjalal University of Science and Technology Jan. 2011 – July. 2015

## TECHNICAL SKILLS

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- **Languages:** Python, Java, C/C++, Matlab
- **Machine Learning Tools::** TensorFlow, Keras, Pytorch, NLTK, Spacy, Scikit-learn, BERT
- **Framework/Open Source Tools:** Django, Hibernate, Servlet, Apache Nutch, Apache Solr, AWS
- **Web Development::** HTML, CSS, JavaScript, AngularJS, REST Api
- **Database:** MySQL, Oracle 10g.
- **Operating System:** Unix/Linux(Ubuntu Server), Windows, MacOS.
- **Others:** Latex, Git

## PROJECTS

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- **Online Machine Learning Tool [2021]:** Full-stack development of a website for students to assist them in learning and executing machine learning algorithms. The website is currently being used by around 30 students from two different universities in USA. Development Environment: **Django, REST Api, scikit-learn, AngularJs, AWS.** [Github link](#)
- **Image Retrieval System [2018]:** Developed an Image Retrieval System to facilitate the user to search and retrieve images from a large structured database. This structured database is created by retrieving images and related text from multiple web-pages and their metadata. Development Environment: **Python, Word2Vec, Keras.** [Github link](#)
- **Bangla OCR [2015]:** Developed an Optical Character Recognition application using **C** to digitize scanned documents written in Bangla Language. Introduced a novel "curved scanning" technique that can segment characters with **98%** accuracy. The character recognition training is performed using the **KNN** algorithm. [Github link](#)
- **SUST Backgammon [2015]:** Developed a Backgammon game in **Java** using **Minimax** Algorithm and **Java Swing.** [Github link](#)
- **Tourist Friend [2014]:** Participated in a Java contest by developing an **Android app** that helps tourists find popular tourist spots, photos, and general information venues. Development Environment: **Android, Servlet, and Hibernate.** [Github link](#)
- **Document Similarity and Plagiarism Finding [2014]:** Developed a plagiarism checker in **Java** to find similarity between students' assignments. [Github link](#)
- **Stack Overflow User Recommendation [2013]:** Implemented **KNN** algorithm in **Java** for finding similar users in StackOverflow website based on the programming language usage and debugging queries. Development Environment: **Java, StackOverflow API.** [Github link](#)

## WORK EXPERIENCE

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- **Software Engineer** Dhaka  
Chorki Limited Aug 2015 - Dec 2015
  - Collaborated with a search engine team in the development of a web crawling program using **Apache Nutch** and an indexing program using **Apache Solr** for news and product search customized for Bangla language.
  - **Technology:** JAVA EE, Apache Nutch, Apache Solr.

## RESEARCH EXPERIENCE

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- **Computer Vision** The University of Texas at El Paso (UTEP)  
*Discovery Analytics Lab* *Jan 2018 – Present*
  - **Temporal Contextual Embedding of Objects in Video:**
    - \* Conducted research to formulate and introduce low-dimensional **vector representations for visual objects** within video data using a **diffusion-driven** technique.
    - \* Attained a cluster consistency score of **0.56** on the COCO dataset and a **0.66** system-human correlation score on the Scene250 dataset. Integrating our temporal contextual model with **ResNet50** features significantly enhanced the contextual video object classification accuracy from **94% to 98%**.
    - \* Temporal visual object representations can be used to identify contextual object relationships, summarizing videos, and **prediction of upcoming events**.
    - \* Development Environment: **Python, TensorFlow, Keras, Scikit-learn, YOLOv4, ResNet50.**
- **Natural Language Processing** UTEP  
*Discovery Analytics Lab* *Jan 2019 – Present*
  - **Temporal Word Embedding:**
    - \* Conducted research and formulated a temporal word embedding model based on **diffusion-influenced** word frequencies in timestamped text documents. Explored temporal embedding using **BERT** model for analysis.
    - \* Using our temporal model on the **NYTimes news dataset**, we achieved **0.6 hit@k** in predicting future word neighbors, outperforming BERT's temporal embeddings which result in **0.2 hit@k**. This advanced temporal word embedding is crucial for **forecasting future trends**.
    - \* Development Environment: **Python, SciPy, TensorFlow, PyTorch, Word2Vec, Glove2Vec, BERT.**
  - **Biomedical Entity Embedding:**
    - \* Developed **biomedical entity embeddings** by training the text from **PubMed abstracts** to extract unseen far-fetched relationships between the biomedical terms.
    - \* The biomedical entity embeddings would help biomedical scientists to explore connected entities in large unstructured biological knowledge bases.
    - \* Development Environment: **Python, SciPy, TensorFlow, Gensim, and Word2Vec.**
- **Cyber Security** UTEP  
*Discovery Analytics Lab* *May 2021 – Dec 2021*
  - **Network Embedding:**
    - \* Conducted research to develop a **network embedding model** that will help us investigate anomalous activities in networks to predict and prevent potential attacks.
    - \* Development Environment: **Python, and TensorFlow.**

## PUBLICATIONS [[GOOGLE SCHOLAR PROFILE](#)]

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- **Temporal Contextual Embedding of Objects in Video:** Under review at KAIS journal (Impact factor 3.3)
- **Temporal Word Embedding with Predictive Capability:** Published in KAIS journal (Impact factor 3.3)
- **Diffusion-based Temporal Word Embedding:** Scientific Document Understanding workshop at AAAI 2021
- **VizObj2Vec- Contextual Representation Learning for Visual Objects in Video-frames:** IEEE BigData Conference 2020 (acceptance rate 17%)
- **Why Max and Average Poolings are Optimal in Convolutional Neural Networks:** Technical Report, 2018
- **An efficient way for segmentation of Bangla characters in printed document using curved scanning:** 5th International Conference on Informatics, Electronics and Vision (ICIEV), 2016

## LEADERSHIP AND CO-CURRICULAR ACTIVITIES

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- **Vice-President of Upsilon Pi Epsilon UTEP [2021-Present]:** Conduct programming workshops (e.g. Python for Data Science) and organize mock presentation opportunities for students.
- **Secretary of Bangladesh Students Association, UTEP [2018-2019]:** Organize cultural events.
- **Member of SUST ACM Student Chapter [2011-2015]:** Conduct programming workshops (e.g. Java for Software Engineer) and participated in programming contests.
- **Java Workshop:** Conducted workshop on Object Oriented Programming for undergrade at SUST and NEUB.
- **Workshop Participation:** Participated in the 21st Joint UTEP/NMSU Workshop on Mathematics, Computer Science, and Computational Sciences and presented my work on fuzzy clustering.
- **Software Contest Participation:** Therap Java Fest 2014(2nd Round).
- **Problem Solving:** Solved programming problems on different online judge like UVA Online Judge, HackerRank, Leetcode.