Muhammad Khan

E-mail: Muhammadkhan837@icloud.com - mtkhan837@gmailcom - Cell: 773-827-7729 - LinkedIn

EDUCATION

Loyola University Chicago - *BS in Software Engineering, Minor in Philosophy* — *August 30th, 2021- Current 3.9 GPA*

Harry S Truman College - *Dual Enrollment (While in High School)* — *June 5th, 2019 - June 11th,2021 4.0 GPA*

Nicholas Senn High School - *High School Diploma* — *Aug 2018 - May 2021*

PUBLICATION

- M Khan, et al, "Identification and Analysis of the Spread of {Mis}information on Social Media"(CSoNET),* 2023

WORK AND VOLUNTEER EXPERIENCE

The Loyola University of Chicago

Computer Vision and Security Researcher — *September 2023 - Current*

- Developed object detection solutions with image segmentation, with a goal of distributing public health resources to Nigerian communities combating malaria.
- Coordinated satellite data collection missions, reducing cloud interference and improving data accuracy through precise monitoring of atmospheric conditions
- Trained and fine-tuned VideoMAEv2 models, achieving 65% precision in detecting human-initiated violence by integrating UniformerV2 and VideoSWIN for superior spatial-temporal analysis.
- Constructed machine learning models (Mask-R CNN, Faster-RCNN) using Python, boosting detection accuracy by 18% through novel training methodologies via satellite data collection and enhanced customized datasets
- Expanded research to bridge AI, biophysics, philosophy, and psychology, exploring the cognitive mechanisms behind innate human violence detection.
- Utilized eye-tracking glasses to collect annotated videos, training models to replicate human gaze patterns and improving violence detection precision.
- Created an IRB-approved proposal involving human subjects, reinforcing model performance by incorporating temporal salience data from visual annotations.
- Implemented Python and JavaScript solutions to process Harmonized Sentinel-2 satellite data, classifying settlements and geological features with spectral band operations.
- Maintained and optimized server integrity with regular resource monitoring and dependency management, ensuring 99.9% uptime and peak performance.

Cybersecurity (AI/ML) Researcher — *January 2022 - September 2023*

- First-authored a research publication accepted at the 12th International Conference on Computational Data and Social Networks, contributing novel insights into misinformation propagation on social media.
- Led a team of graduate students and seniors, advancing research on COVID-19 misinformation propagation through a Dr. Scholl Foundation-funded project involving a 4-student undergraduate team.
- Developed Python software leveraging Twitter APIs to collect tweets and metadata, managing and processing ~50 million data points for accurate information/misinformation classification.
- Created optimized programs in Python and Java to remove redundant data (e.g., retweets) and sequester relevant information using unique tweet IDs.
- Modified and fine-tuned cutting-edge algorithms such as BERT to automate misinformation detection, improving classification accuracy up to 95%
- Engineered workarounds for API resource limits, employing dimensionality reduction and data compression techniques (e.g., coresets) to handle high data volumes efficiently.
- Proficient in Python, Java, TensorFlow, PyTorch, MMLabs, Pandas, NumPy, and Matplotlib for machine learning, data analysis, and visualization.

Computer Vision Research Fellow — *May 2023 - June 2023*

- Identified and integrated video transformers and datasets (Moments in Time, Kinetics, Something-Something V2) to develop a text-guided action recognition model for complex video analysis.
- Designed and implemented a Python configuration file to train the VideoSWIN Transformer using MMLabs repositories, achieving successful deployment.
- Diagnosed and resolved networking issues on Lambda Server, implementing alternative network solutions to ensure uninterrupted operations.

- Leveraged Argonne National Laboratories' Polaris supercomputer to train the VideoSWIN model on the Something-Something V2 (SSV2) dataset, accelerating research timelines.
- Collaborated closely with lab members, maintaining consistent progress and alignment across project deliverables.
- Developed deep expertise in state-of-the-art architectures and datasets, gaining advanced knowledge to train and fine-tune vision transformers effectively.

GlobeMed - Director of Finance *June 2022 - May 2023*

- Secured over $5,000 in funding by creating and submitting detailed funding requests on behalf of the chapter.
- Collaborated with the Director of Campaigns to acquire 4+ fundraising spots, ensuring continuous availability of funds for events and initiatives.
- Advocated successfully for chapter funding at Student Activities and Greek Affairs (SAGA) hearings, achieving a 20% increase in budget allocations compared to previous years and expanded vendor access to student organization
- Developed an annual budget in partnership with the executive board, optimizing fund distribution across operations, events, and outreach activities.

Private Tutor *Sep 2021 - Feb 2022*

- Elevated student performance from C averages to A- grades by providing personalized, one-on-one academic support in math.
- Designed tailored lesson plans aligned with students' individual learning styles, resulting in 30% improvement in test scores on average.
- Identified and closed knowledge gaps by adapting teaching strategies, boosting students' confidence and comprehension.
- Taught essential skills such as study techniques, time management, and exam strategies, enabling students to perform consistently better in high-pressure situations.
- Facilitated seamless remote learning through Zoom and Google Classroom, ensuring 100% attendance and engagement during virtual sessions.

Chemistry Research Lab Intern *July 2019 - August 2019*

- Synthesized N-Heterocyclic ligands through multistep chemical processes, achieving a 95% purity rate in final products.
- Operated advanced analysis equipment, including NMR and GC-MS, to accurately verify chemical compositions and structure.
- Mastered the use of diverse lab equipment and implemented proper sanitation protocols, ensuring compliance with safety standards and minimizing contamination risks.

Nicholas Senn High School

Local School Council Student Representative *January 2020 - December 2020*

- Represented the student body at Local School Council (LSC) meetings, addressing key issues related to rules, staff, and curriculum, and influencing decisions on proposals by contributing over 10 actionable suggestions.
- Facilitated discussions on public comments regarding school operations, leading to the implementation of three new solutions aimed at improving student engagement.
- Assisted in developing a Continuous Improvement Work Plan (CWIP), outlining strategic initiatives for school enhancement across leadership, culture, and curriculum areas.
- Participated in the selection process for assistant principal candidates, contributing to interviews that led to hiring individuals with a 90% satisfaction rate from faculty and staff.

AWARDS

- Dean's List **(2021 - 2023)**
- Model UN 2021 Best Delegate **(2021)**
- High Honor Roll **(2018 - 2021)**
- QuestBridge Match Finalist **(2020)**
- IB Completion with Distinction **(2020)**
- Verizon Innovative Learning Second Place Finalist **(2018)**
- **David Prasse Scholarship (2021 - 2025)**
- **John Grant Health Equity Award - 2025**

SKILLS, LICENSES & CERTIFICATIONS

• Bilingual in Urdu and English • Python • Java • Data Analysis and Visualization • AI Research and Development • • Basics of Health Privacy • HIPS for Social and Behavioral Investigators • Social and Behavioral Research Conduct •