Taneem Ullah Jan

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RESEARCH INTERESTS

Interested in formulating, developing, and advancing computer graphics and vision systems, specifically for neural head avatars, digital human representations and video generation.

EDUCATION

University of Engineering and Technology Peshawar, Pakistan

Bachelor Studies in Computer Science   Sep. 2018 – Sep. 2022

Thesis: HTML Code Generation from Images with Deep Neural Networks
Advisor: Dr. Zakira Inayat
CGPA: 3.58/4.0

PUBLICATIONS

Taneem, U. J., and Ayesha, N., Beyond CNNs: Encoded Context for Image Inpainting with LSTMs and Pixel CNNs. 2024. ICTIS-24 and (IJIST VOL. 6 NO. 5 Special Issue 2024). [link]

Taneem, U. J., and Zakira, I. HTML Code Generation from Images with Deep Neural Networks. 2022. JEAS UET Peshawar. [link]

PROFESSIONAL EXPERIENCE

Research AI Engineer   Jan. 2023 – Dec. 2023
BHuman AI

- Led the development of personalized Generative AI for 1–to–infinity conversational videos. Applied deep learning, computer vision, and graphics to innovate Lip-Sync, Neural Head Avatar, and Image Reenactment algorithms. The goal was to elevate conversational videos by making them natural and personalized.

Undergraduate Research Assistant   Jan. 2022 – Oct. 2022
Advisor: Dr. Zakira Inayat   CS&IT AI Lab UET Peshawar

- Worked on deep generative models, including transformers for vision and text, and image processing through deep neural networks.
- Conducted studies on mathematical optimization and evaluation techniques to improve the consistency of machine learning models.
- Made notable contributions to research in image similarity and captioning, leading to the successful publication of my thesis in the UET JEAS journal under my advisor's guidance.

Intern Machine Learning Engineer   Aug. 2021 – Nov. 2021
[*web link*]   NAECO Blue GmbH

- Conducted research and evaluation study of intelligent and numerical weather models and their APIs to support the company's data needs. This led to the implementation of a data pipeline that reduced research and development time by nearly 50%.
- Developed analytical functions and machine learning models to enhance the selection of optimal spatial and temporal resolution data for specific locations with greater accuracy.

RESEARCH PROJECTS	**LipSyncFace**: High-Fidelity Audio-Driven and Lip-Synchronized Talking Face Generation

LipSyncFace: High-Fidelity Audio-Driven and Lip-Synchronized Talking Face Generation

June 2024 – Present

- Developed a two-stage framework for audio-driven talking face generation, addressing the challenge of visual quality in lip synchronization.
- Proposed a face generation network to encode visual face information and synchronize lip movements with audio.
- Enhanced face video quality with a high-resolution decoder, improving realism by $20 - 30\%$ over previous methods with fastest inference time.

lipsync2: Talking Face Generation with Most Accurate Lip Synchronization

Aug. 2023 – Dec. 2023

- With the use of neural rendering and GANs, $lipsync2$ was focused on generating highly realistic talking head videos with precise lip synchronization.
- By using state-of-the-art mask modeling and lip–sync algorithms, around 26% precision was achieved over $Wav2Lip$ in aligning lip movement with associated audio.
- Our ensemble network approach separates masking, alignment, and face generation, ensuring a seamless visual experience.

face2face: One–Shot Talking Head Video Generation from a Source Image   Jan. 2023 – Apr. 2023

- Developed a neural refinement-based motion transfer method to generate realistic, dynamic talking head videos from a single image, driven by input videos.
- Worked on a pre-trained unsupervised motion synthesis module to estimate hidden motion using flexible grids, to address the challenge of pose gaps between source and target images.
- This method achieved superior performance on benchmarks, exhibiting noticeable improvements of $5 - 10\%$ on animation metrics compared to the existing approaches.

face–swapping: Swapping Faces in a Video from a Source Image   May. 2023 – Aug. 2023

- Developed an image reenactment and neural head avatar system capable of generating realistic face swapped videos from a single image.
- This project aimed to develop a framework that transfers the identity of any source face into a target while preserving the target's unique features, such as eye contact and facial expressions.
- Achieved $1080p$ resolution output videos without using $StyleGAN$ or similar external models.

SKILLS

- **Programming Languages**: Python, C++, MATLAB, MySQL, LaTeX, Bash Scripting
- **Frameworks/Packages**: PyTorch, TensorFlow, Keras, NumPy, OpenCV, Scikit–Learn
- **Developer Tools**: Git, WandB Monitoring Dashboards, GCP, AWS (*Model Training*)
- **Conceptual Topics**: Head Avatars & Digital Humans, Neural Rendering & Synthesis

AWARDS & HONORS

- **Young Undergrad Researcher Award** for Bachelor Thesis in Computer Science   (2022)
- **Ranked 2nd**, BS Computer Science; Batch 18th University of Engineering & Technology   (2022)
- **Head of the Technical Team** at Google Developer Student Club for two years   ('20-21)
- **Ranked 2nd**, Intermediate Computer Science, Government College Peshawar Batch 2016th ('18)
- Language Ambassador for Pashto at Cohere For AI's AYA Project   (2023)