Philadelphia, PA

Danial Samadi Vahdati

My Personal Website

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Summary

- Published 2 papers using Deep Learning to detect Synthesized media in Computer Vision and Pattern Recognition Workshop 2023 and Electronic Imaging 2023
- Worked as one of the leading researchers in multiple research grants from NSF and other organizations exceeding over 3,000,000 dollars in funding
- Improved Legacy code for detecting GAN generated images using a CNN by 10% by introducing Self Supervised Learning
- Trained and fine Tuned a Text to image stable diffusion model to create visually convincing nature scenes and urban landscapes
- Created a synthetic video data set with 8,000,000 frames including generation methods such as Transformers, Diffusion models and Neural Radiance Fields
- Trained two junior lab members in using PyTorch Lightning and Generative AI specifically Diffusion Models
- Developed an Algorithm for detecting manipulated talking head videos using only the facial landmarks with a 98% accuracy of detection

Employment

Research Assistant — **Drexel Multimedia and Information Security Lab** — **Jan 2021- Present**

- Completed a Project for detecting attacked talking head videos and reaching a detection accuracy of 98% by using comparative distance analysis in human facial features
- Created an extensive data set of Deepfake videos created with DeepFacelabV2 consisting of 10,000 videos for Deepfake detection
- Created a comprehensive data set of talking head videos including 4 generation methods with 432 videos per generation methods
- Developed an algorithm for detecting GAN generated images using the semantic features of human face with an accuracy of 93%
- Fine-tuned the model previously used in the lab for synthesized images source attribution to increase the classification accuracy by 3 percent when migrated the code to TensorFlow v2
- Created a synthetic video data set with 8,000,000 frames including generation methods such as Transformers, Diffusion models and Neural Radiance Fields
- Trained and fine Tuned a Text to image stable diffusion model to create visually convincing nature scenes and urban landscapes

Languages and Technologies

- C++; C; Python ; Matlab;
- Tensorflow, CUDA, Pytorch ,Pytorch Lightning, Docker
- Deep Learning, Self Supervised Learning, Machine Learning, Generative AI, Large Language Models, Stable Diffusion, Diffusion Models, GAN, Generative Adversarial Networks, Neural Radiance Fields, NeRF, Deepfake, Deep fake, CNNs, Convolutional Neural Networks, Knowlege Graphs, Scene Graphs, Forgery Detection, Synthetic media Detection, Image and Video Synthesis, FastAI, Big Data, Sci-kit Learn,
- Digital Signal Processing, Signal Processing, Image Analysis, Git, DeepfacelabV2, VScode

Education

- **Ph.D. in Electrical and Computer Engineering**
  - Drexel University, *Philadelphia, PA* Winter 2021 - Present
- **B.S. in Electrical Engineering**
  - Imam Khomeini International University, *Qazvin, Iran* Fall 2016 - Spring 2020
  - GPA: 3.02/4.0

Publication and Awards

- Vahdati, Danial Samadi, Tai Duc Nguyen, and Matthew C. Stamm. "Defending Low-Bandwidth Talking Head Videoconferencing Systems From Real-Time Puppeteering Attacks." Proceedings of the **IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2023**
- Vahdati, Danial Samadi, and Matthew C. Stamm. "Detecting gan-generated synthetic images using semantic inconsistencies." **Electronic Imaging 35 (2023): 1-6**
- Top 1% of Graduating Class in July 2020
- Best Programming Project for Digital Logic Imam Khomeini International University 2019
- **Student of the Year Award 2018** Awarded first prize for Student of the year due to prolific Activity in college of Engineering's research laboratory for Signal Processing

Technical Experience

Projects

- **Synthetic Video Detection**(2023) Detecting Synthetic Videos using Existing CNNs and designing a new AI Architecture for detection with high accuracy using Python, Pytorch, Pytorch Lightning
- **Puppeteering Attack Detection** (2023) Detecting whether a talking head video is generated by the supposed user or attacked by a third party Using Facial Recognition and comparative distance analysis
- **Deepfake Detection** (2022). Detecting if a particular video is created using Deepfaking methods such as Deepfacelabv2 or not using Deep learning and Reinforcement Learning with Tensorflow v2 and Python
- **GAN source Attribution** (2022). Attributing the source of the synthesized image to the GAN used for creating it using Deep Learning through Tensorflow v2 and Python
- **Synthesized Image detection** (2021). Detecting if an image is GAN-synthesized or not using the inconsistencies found in extracted Facial Features using Convolutional Neural Networks created with Tensorflow v2, Python, Pytorch, OpenCV and Google MediaPipe

Hobbies and Interests

- Recreating new published research to compare results to the paper and stay up to date with the state of the art technology in the areas of generative media
- Taking on programming challenges published in public websites in python or c++
- Strength Training
- Creating Generated Videos and Images using the latest free to access technology