Anwesh Badapanda

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Education

Bennett University — Greater Noida, India
Bachelor of Technology : Computer Science Engineering — *Jul 2019 - May 2023*
CGPA: 9.11/10.00

Experience

Indian Institute of Technology Delhi — New Delhi, India
Research Assistant (Advisor: Prof Vireshwar Kumar) — *Jun 2023 - Current*

- Developing **machine learning and deep learning classifiers** and **anomaly detectors** for **intrusion detection** in In-Vehicular Networks.
- Developing a **novel adversarial attack technique** to bypass traditional ML based intrusion detection systems.
- Contributing to the **development of a novel algorithm** to convert network traffic logs in Controller Area Networks to images.
- Researching **unsupervised spatio-temporal computer vision** approaches to identify attacks from network traffic images.

Georgia Institute of Technology — Atlanta, Georgia
Research Intern (Advisors: Prof Wenke Lee and Prof Saman Zonouz) — *Sep 2022 - May 2023*

- Developed a **Variational Autoencoder** with **multi-head attention and physics informed losses** to identify attacks and anomalies in **Cyber-Physical Systems.**
- Achieved a **detection accuracy of 98.3%** and a **false positive rate of 0.8%**, over 11 different industrial processes, beating current state of the art methods.
- Investigated **anomaly detection** in PowerGrid Human Machine Interfaces through the use of segmentation models such as **UNet and Mask-RCNN**.
- Contributed in the development of a tool to **monitor and analyze SCADA processes to detect malicious activities** using Windows Process Monitor.

Deloitte India — Remote
Data Science Intern — *Jul 2022 - Dec 2022*

- Performed **predictive and descriptive analytics** for the Audit & Advisory division.
- Used **Python and Microsoft Excel** to preprocess raw data provided by clients.
- Created dashboards on **PowerBI** to visualize and analyze data.
- Assisted Advisory Management team in the **analysis and visualization** of **payroll data** for multiple clients across multiple industries.

Preprints

- Moses Ike, Keaton Sadoski, **Anwesh Badapanda** et al. **"Bridging Both Worlds in Semantics and Time: Domain Knowledge Based Analysis and Correlation of Industrial Process Attacks."** arXiv:2311.18539 [cs.CR]
- Pulkit Vyas, Chirag Saxena, **Anwesh Badapanda**, Anurag Goswami. **"Outdoor Monocular Depth Estimation: A Research Review."** arXiv:2205.01399 [cs.CV]

Projects

Video Based Human Activity Recognition
https://github.com/anweshb/activity-recognition

- **Preprocessed over 1000 video clips** by extracting **resized and normalized frames** using custom functions, ensuring **model compatibility** and **performance**.
- Developed a **spatio-temporal attention based neural network** to classify video sequences into one of seven activities.

- Used **temporally distributed** custom CNN layers for **spatial feature extraction** and multi-head attention block for **temporal feature extraction**.
- Achieved an **average accuracy of 98.37% with 0.99 average precision, recall and F1 scores** over all seven classes.

Super-Resolution for Lung CT Scans
https://github.com/anweshb/CT_SRGAN

- Implemented a **Super-Resolution Generative Adversarial Network** for upscaling **CT Scans of lungs** with a 2x upscaling factor.
- Developed a **custom training loop** and content loss function to maximize **perceptual similarity** by using **VGG19 feature maps**.
- Achieved a **PSNR score of 30.074** and **SSIM score of 0.963**, and made comparisons to classical interpolations techniques.

Monocular Depth Estimation and Object Detection
https://github.com/anweshb/GAIP_Project

- Developed a visual aid tool to help the visually challenged avoid obstacles using **Depth Estimation and Object Detection**
- Used pre-trained MiDAS model and fine-tuned **YOLOv5** to custom dataset and achieved a **mAP of 67%**.
- Deployed the project to **Streamlit** to demonstrate possible real-time use.

RoboCop
https://github.com/anweshb/NCoders-Robocop

- **Developed** a robust facial recognition system using **OpenCV** for efficient intruder detection.
- **Implemented** the model on a **Raspberry Pi** for real-time, on-device functionality, ensuring practical usability.
- **Integrated** a local image database with **Firebase**, enabling convenient viewing of detected faces via a dedicated mobile application.

Achievements and Awards

- Recipient of **academic excellence scholarship** worth a total of 420,000 INR over 4 years at Bennett University.
- In the **dean's list for a total of 4 semesters** for **ranking in the top 1%** in the School of Computer Science at Bennett University.

Positions of Responsibility

Co-President and Co-Founder — Greater Noida, India
Bennett Artificial Intelligence Society — *Jan 2020 - Aug 2022*

- Co-founded a club to promote **undergraduate research** in the field of **Artificial Intelligence.**
- Organized workshops, faculty talks, weekly reading groups and other events.

Undergraduate Teaching Assistant — Greater Noida, India
School of Computer Science — *Mar 2022 - May 2022*

- Conducted labs for **Object Oriented Programming with Java(CSET104)** course.
- Handled student inquiries and concerns, providing **clear and accurate explanations** to resolve doubts related to course materials, assignments, and assessments.
- Assisted in organizing and **preparing lab assignments**, ensuring accuracy and clarity in instructions, and subsequently **graded student submissions**.

Skills

Programming Languages: Python, Java, C++
Frameworks and Libraries: Tensorflow, Keras, PyTorch, Scikit-learn, Tensorboard, CARLA