Aravind Cheruvu

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Summary

Graduate student at Virginia Tech currently researching in the emerging space of Computer Vision, Deep Learning and Security and seasoned consultant with 4.5 years of Industry experience in Oracle HCM Cloud Transformation.

Education

- **Virginia Polytechnic Institute and State University(Virginia Tech)**   Blacksburg, Virginia
  M.S. in Computer Science (Thesis): GPA: 3.66/4.00   *Aug. 2021 – May. 2023**

  Graduate courses: Data Analytics, Deep Learning, Hot Topics in Security and AI, Theory of Algorithms, Defenses Against ML Powered Adversaries

- **Jawaharlal Nehru Technological University (VNR VJIET)**   Hyderabad, India
  Bachelor of Technology in Information Technology: GPA: 8.51/10.0   *Aug. 2012 – May. 2016*

Technical Skills

- **Programming Languages:** Python, Java, C, C++, HTML/CSS, SQL
- **ML Frameworks:** PyTorch, TensorFlow, Numpy, Scikit-Learn, Pandas, R, Apache Airflow, wandb, Hugging Face
- **Developer Tools:** SQL Developer, VS Code, Eclipse, Netbeans, Android Studio, Weka
- **Technologies/Frameworks:** MS-Office, Linux, GitHub, Java Swing, AWT
- **Oracle Tools/Software:** Oracle SQL, Oracle HCM Cloud HR and Payroll Module, Payroll Parallel/Reconciliation Tool(Data Analysis), HCM Extracts, Oracle BI Reports, Fast Formulas

Projects

- **Evaluation of SOTA Text to Image Generative Models in Deepfake scenario**
  - Implementation of the StyleGAN2, Latent Diffusion Models(LDM) and DALL-E mini architectures guided by text-based manipulation using Contrastive Language Image Pre-training(CLIP)
  - Evaluation of the robustness of Text to Image Generative methods against Deepfake detection tools.
- **Attack the Defense: How safe are Adversarial Proactive defenses against Deepfake attacks?**
  - Designed and implemented an attack scenario using wavelet denoising and super-resolution to understand the robustness and verify the transferability of specific Proactive defense method ("Disrupting Deepfakes") used to disrupt STARGAN Deepfake manipulation to understand the real threats.
- **System and Method to Generate Time-Profiled Temporal Pattern Tree**
  - Designed and patented (Indian Patent No. 397728) a cost and compute efficient temporal tree structure to store time-series transactional data and implemented a novel similarity-profiled association rule mining algorithm to reveal interesting patterns from temporal transaction databases. This method reduces the execution time by 90% and memory utilization by 80% when compared to the Naive approach.

Professional Experience

- **Virginia Tech**   Blacksburg, Virginia
  Graduate Research Assistant   *Dec. 2021 - May. 2023**

  - A year of research experience in "The Design and Study of Proactive Defenses Against Deepfake Attacks" - Masters research thesis advised by Dr. Bimal Viswanath. Developed a novel algorithm using state-of-the-art computer vision and Deep learning algorithms to protect user images and videos from creating Deepfakes. Research work is planned to be published in a Top tier Security conference in 2023.
  - Extensive knowledge of the latest Generative Adversarial Network(GAN) models based on StyleGAN, Convolutional Neural Networks, Shared Auto-Encoders, Residual Net, and U-Net architectures used in Deepfake manipulation and Deepfake detection methods executed in Multi-GPU Setting.
  - Extensively implemented state-of-the-art deep learning methods for Face detection, Landmark/Keypoint detection, Edge detection, and Segmentation for facial images and videos.

- **Deloitte Consulting**   Hyderabad, India
  Senior Consultant   *Dec. 2016 - Jul. 2021*

  - Certified Oracle HCM Cloud transformation consultant with 4.5 years of demonstrated techno-functional expertise specialized in capturing business use cases, understanding requirements, and performing fit-gap analysis to design scalable 50+ Technical RICEF objects and business process solutions.

- Strategized and executed Payroll Parallel/Reconciliation testing cycles for 5 successful client implementations to uncover system implementation defects, understand Financial and business process impacts of Go-live and Post Production, and recommend mitigation strategies.
- **Payroll Reconciliation:** Led planning and execution of Payroll Compare cycles for multiple clients to perform trend analysis of $MM employee payrolls to test data integrity and understand Go-Live and Post-Production impacts of Payroll, Benefits, Time(TL), Absence, and Compensation systems using SQL and Excel analytics.
- Developed and streamlined Payroll Compare Analysis and Executive Reporting Tool which extracts and uses HR and Payroll run data between Legacy and simulated Test systems to produce Payroll Compare reports and Executive Dashboards to extensively perform Payroll data analysis.
- **Payroll RICEF:** Supported Payroll BR100 configurations, Coordinated and executed SIT and UAT testing cycles. Captured Business requirements and proposed Functional design specifications for 10+ Payroll inbound and outbound integrations to Kronos, Infor, Equifax, BAML, etc. and 20+ payroll Element fast formulas
- **Technical Developer:** Worked as a Technical team member implementing key out-of-box integrations using HCM Extracts to Kronos and Benefits systems, BI Publisher Reports using eText and RTF templates and developed Payroll Fast Formulas.

- **Other Research Collaborations**   Hyderabad, India
  Machine Learning Researcher   *Jun. 2014 - Sep. 2021*

  - Have been part of several research collaborations with Academia and published 15+ research publications in the areas of Temporal Data Mining, and Network Security.
  - **Patent: System and Method for Diagnosis of Diseases From Medical Images** - Designed and Implemented a novel classical machine-learning classification model to detect Covid-19 from Chest X-Ray images with incremental Feature clustering and Fuzzy membership similarity based dimensionality reduction strategy. The Model had a classification accuracy 95%.
  - **Feature Clustering for Anomaly Detection Using Improved Fuzzy Membership Function** Designed and developed a novel machine learning classification algorithm to perform a Network-based Intrusion Detection on NSL KDD dataset. The Novel algorithm was able to detect the U2R and R2L attack samples given the rarity of those samples in the unbalanced dataset.

- **Tata Consultancy Services**   Hyderabad, India
  Assistant System Engineer - Trainee   *Jun. 2016 - Sep. 2016*

  - Trained in E-Business Suite, Oracle Business Intelligence EE and Oracle Data Integrator tools.

Certifications:

- Certified Oracle Cloud Payroll implementation specialist 2019 from Oracle University.
- Certified in SQL Fundamentals from Oracle University.
- Certified in Introduction to Python Programming from Coursera.

Publications

- Aljawarneh, S.A., Radhakrishna, V., & Cheruvu, A. (2018). VRKSHA: a novel tree structure for time-profiled temporal association mining. Neural Computing and Applications, 1-29.
- Radhakrishna, Vangipuram, P. V. Kumar, Vinjamuri Janaki and Aravind Cheruvu. "A DISSIMILARITY MEASURE FOR MINING SIMILAR TEMPORAL ASSOCIATION PATTERNS." (2017).
- Shadi Aljawarneh, V. Radhakrishna, and Aravind Cheruvu. VRKSHA: A Novel Multi-Tree Based Sequential Approach for Seasonal Pattern Mining. In Proc. of ICEMIS, 2018
- Gunupudi Rajesh Kumar, Nimmala Mangathayaru, Gugulothu Narsimha, and Aravind Cheruvu. 2018. Feature Clustering for Anomaly Detection Using Improved Fuzzy Membership Function. In Proc. of ICEMIS, 2018
- S. A. Aljawarneh, V. Radhakrishna and A. Cheruvu, Extending the Gaussian membership function for finding similarity between temporal patterns. In Proc. of ICEMIS, 2017
- Shadi Aljawarneh, Vangipuram Radhakrishna, and Aravind Cheruvu. Nirnayam: fusion of iterative rule based decisions to build decision trees for efficient classification. In Proc. of ICEMIS, 2019