Rajapriya Mariappan

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Education

University of Alberta **Edmonton, Canada**
Master's in Multimedia, Computer Science *Sept 2024 - May 2026*
Eligible for 8-month Co-op / full-time placement – GPA 3.8

Skills

- **Programming Language:** Python, JavaScript (Angular, React.js, Node.js, TypeScript), Tailwind; experience with full stack development and REST APIs
- **Machine Learning & Computer Vision:** OpenCV, Scikit-learn, NumPy, Pandas, Matplotlib, Mediapipe, Mask R-CNN, LlaMa, Optical Flow, LSTM, Attention Models
- **Project Management:** SDLC methodologies (Agile, Waterfall), Jira, Confluence, ServiceNow, Azure Boards.
- **Version Control & DevOps:** Docker, Git, GitHub, Jenkins, Azure DevOps
- **Cloud Platforms:** AWS (Cloud AI), Azure

Key Achievements

- Developed an AI-based real-time Freshness Monitoring Tool using SSDLite MobileNetV2 and OpenCV, reducing grocery waste by 20%
- Proposed and implemented a hybrid sign language recognition system achieving 98.82% accuracy using LSTM, optical flow, and MediaPipe Holistic.
- Engineered a segmentation and inpainting pipeline combining Mask R-CNN and LlaMa to reconstruct occluded livestock images.
- Developed scalable NLP-based workout Q&A generation using GPT-3.5 + LangChain surpassing manual QA efficiency.

Certifications

- **AWS Cloud AI Practitioner**
- **PCEP by Python Institute**

Awards

Individual Awards

- Special Mention of TATA Innovista, Star Individual Award, Excellence Award

Team Awards

- Winner of Tata Consultancy Services Innovista, Star Team Award

Experience

TATA CONSULTANCY SERVICES - Retail Research Center

April 2019 – August 2024

Software Developer *Retail Strategic Initiative*

- **Freshness Monitoring Tool** Built an vision-driven solution using OpenCV and SSDLite MobileNetV2, React for perishable monitoring, delivering actionable insights on shelf-life analysis.
- **Collaborative Design Platform** Developed a VR platform for garment designers to use DALL-E with voice commands for pattern and color application, enabling real-time visualization and collaboration.
- **Mixed Reality Store Layout Design** Designed a tool for merchandising designers to build 2D store layouts viewable in immersive 3D via HoloLens, integrating planograms, analytics, and layout modifications through eye-gazing and voice commands.

- **Mixed Reality Development** Developed a mixed reality experience for Optumera NRF using Unity, C#, and MRTK (HoloLens), enabling price optimization and assortment visualization. Allowed users to manipulate product prices and observe impacts on similar products while integrating store metrics and KPIs.
- **Virtual Reality Development** Created immersive experiences with AFRAME and THREE.js for the Oculus Quest Pro, enhancing virtual merchandise design workflows.
- **Augmented Reality Development** Created an AR model viewer to enhance product visualization.
- **Appointment Connect Portal** Developed a dynamic scheduling system using Angular for retail stores, enabling customer bookings based on store capacity and traffic.
- **2D-3D Web Digital Display Assistant** Developed a visual merchandising tool integrating real-time performance analytics for optimizing apparel placement, including KPIs and heatmaps for rapid design modifications.

TATA CONSULTANCY SERVICES - Nielsen Enrichment Studio

January 2012 – March 2019

Software Developer

- Designed and enhanced the Nielsen Integration Service Platform, facilitating seamless data input from third-party clients and streamlining data transformation, processing, warehousing, and reporting workflows.
- Collaborated with stakeholders to refine functional requirements
- Improved application front-end functionality, prepared test cases for validation, and ensured high-quality deliverables through iterative client interactions and feedback.
- Collaborated with product leadership teams, UX designers, architects, and product owners to develop scalable data transformation solutions aligned with evolving business needs.

Course Projects

AI-Driven Question Generation for Personalized Endurance Coaching

- Developed an AI-powered question generation system for CoachMO, an endurance coaching platform. Utilized OpenAI GPT-3.5 with a hybrid Few-shot + Chain-of-Thought (CoT) prompting technique to generate contextually relevant and logically structured questions based on workout data in JSON format. Integrated LangChain for robust API management and DeepEval for multi-dimensional question quality evaluation, achieving high accuracy benchmark, surpassing traditional manual methods.
- Engineered a scalable question-generation pipeline tailored to diverse workout attributes.
- Optimized question quality using Few-shot + CoT prompting techniques.
- Evaluated outputs with DeepEval Framework across metrics like Quality, Relevance, and Coherence.

Segmentation and Reconstruction of Occluded Objects Using Mask R-CNN and LlaMa

- Developed a pipeline for segmenting and reconstructing images of cows obstructed by cage lines using Mask R-CNN for precise object segmentation, Canny Edge Detection and Hough Line Transform for cage line identification, and LlaMa (Large Mask Inpainting Model) for seamless inpainting. The solution improved image clarity and integrity, enabling enhanced livestock monitoring and automated health analysis systems.
- Designed and trained a Mask R-CNN model on augmented datasets.
- Implemented edge and line detection algorithms for occlusion handling.
- Integrated LlaMa for artifact-free image reconstruction.

Metaverse Art Gallery Museum

- Designed and developed an immersive virtual art gallery leveraging A-Frame.
- Enabled real-time user interaction and collaboration in a cross-platform metaverse environment accessible via VR, PC, and mobile devices.
- Implemented scalable WebXR-compliant 3D environments with optimized WebGL rendering and dynamic asset integration.

AI-Powered Sign Language Recognition with Hybrid Deep Learning

- Proposed a hybrid deep learning system combining MediaPipe holistic keypoint extraction, optical flow analysis, and a multi-head self-attention model for real-time sign language recognition.
- Extracted 258 hand and body keypoints using MediaPipe Holistic, and enhanced temporal dynamics by appending average optical flow vectors to each frame's features.
- Trained LSTM model to classify ASL glosses using the WLASL dataset of over 21,000 videos.
- Achieved up to 98.82% classification accuracy, demonstrating superior performance in capturing spatiotemporal gesture patterns and signer variability.