

BASSAM BELDJOUDI

AI RESEARCH ENGINEER – APPLIED AI/VISION

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SUMMARY

Software Engineer with strong background in C++ and Python development for real-time systems. Core contributor to complex virtual avatar simulation. Experienced in building vision algorithms for object detection, and tracking. Strong background in developing proof-of-concept systems from scratch and solving complex technical challenges independently.

EXPERIENCE

AI Research Engineer

Mind Machine Learning | San Francisco, CA (Remote) | Aug 2023 - Present

Core technical developer creating proof-of-concept virtual avatar technology for patented simulation system **to provide a foundation for training large embodied language models.**

Perception System

- Architected and built multi-camera panoramic vision system from scratch for human visual field replication
- Implemented foveal vision simulation (focus/peripheral vision modeling)
- Implemented night/low-light vision (mesopic) simulation with custom shaders

Virtual Avatar Development

- Built real-time 3D avatar control system in Unreal Engine 5 with motion capture control integration and inverse kinematics system for realistic joint movement.
- Integrated Steam Audio for 3D spatial hearing
- Achieved real-time performance for demonstrations.
- Developed data collection pipelines for vision and hearing system outputs.
- Prototyped avatar grasping and interaction mechanics.

Technical Achievements

- Led platform migration from Swift/SceneKit to Unreal Engine 5
- Optimized vision pipeline for consumer hardware
- Ported Pink Trombone (vocal synthesis) from JavaScript to Swift
- Designed reinforcement learning architecture for voice control (partial implementation swift/python bridge)

Graduate Research Assistant

University of Jijel | Algeria | 2021

Developed intelligent video surveillance proof-of-concept with advanced tracking capabilities

- Developed intelligent video surveillance system with panoramic view tracking
- Integrated YOLOv4 + DeepSORT for real-time pedestrian detection and tracking
- Implemented custom background subtraction algorithm for motion detection

TECHNICAL SKILLS

Programming Languages: C++, Python, Swift, Metal

Computer Vision: OpenCV, Image Stitching, Multi-camera Processing, Object Detection/Tracking

3D/Graphics: Unreal Engine 5, SceneKit, Shader Programming, Motion Capture Integration, Real-time Rendering

Machine Learning: PyTorch, TensorFlow, Neural Network Architecture, Model Training

Tools & Systems: Git, Linux, Windows, macOS Development, Performance Profiling

EDUCATION

Master of Science - Artificial Intelligence | 2021

University of Jijel, Algeria

Thesis: Adaptive Panoramic Background Model for Pedestrian Detection, Tracking and Counting

Bachelor of Science - Computer Science | 2019

University of Jijel, Algeria

Professional Development | 2022

Wiley Edge Training - Python, SRE, DevOps

LANGUAGES

French (Native) • English (Fluent) • Arabic (Native)