BAHADIR KUŞ

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Professional Summary

Results-oriented **Simulation Developer & Technical Designer** with a proven track record of engineering high-fidelity training systems. Founder of a med-tech startup, successfully delivering clinically validated surgical simulators using **Unity**, **VR**, **embedded systems**, and **custom haptics**. Expert in bridging the gap between physical hardware and virtual environments, from PCB design to real-time physics implementation. Specialized in bringing complex technical titles to fruition with a focus on stability and scientific accuracy.

Technical Skills

Core Development: C# (Expert), **Unity**, **VR/XR Development**, OOP, Finite State Machines (FSM), Physics Simulation
Hardware/Embedded: Arduino/ESP32, **KiCad** (PCB Design), Sensor Fusion, Serial Communication (C++), Haptics
Optimization & Build: VR/Mobile Performance Optimization, Object Pooling, Build Pipelines (PC, Android, iOS)
Game Engine Tech: Real-time CSG (Mesh Cutting), NavMesh AI, Softbody Dynamics, Particle Systems
CAD & Manufacturing: Fusion 360, SolidWorks, 3D Printing, CNC Milling, Laser Cutting, Sheet Metal Design

Professional Experience

Prosthetic Worlds *Winnipeg, MB & Turkey*
Founder & Lead Simulation Architect *2022 – Present*

- Spearheading the R&D of hybrid surgical simulators. Managing the full product lifecycle from prototyping to deployment.

Project: Hybrid Arthroscopy Simulator (Hardware-Software Integration)

- **System Architecture:** Architected a high-fidelity simulation in Unity URP using **Real-time CSG** algorithms for accurate soft-body cutting and tissue deformation.
- **Embedded Integration:** Designed custom PCBs and firmware to bridge Unity with industrial hardware (BTS7960 drivers, ACE128 encoders), ensuring low-latency communication.
- **Engineering Solution:** Resolved critical electromagnetic (EM) interference issues by redesigning the chassis using non-ferrous materials and optimizing sensor placement for 97-100% accuracy.

Project: Total Knee Arthroplasty (TKA) VR Simulation

- **VR Optimization:** Optimized surgical workflow for standalone **Meta Quest** hardware via rigorous draw-call reduction, texture baking, and occlusion culling.
- **System Logic:** Designed a robust Task Management System using Finite State Machines (FSM) to validate user actions against surgical protocols.
- **Validation:** Successfully shipped software used in clinical utility studies; validated by orthopedic surgeons.

Amazoi Software *Ankara, Turkey (Hacettepe Technopolis)*
VR/AR Developer *2022*

- **AR Development:** Developed "Covid-19 Awareness," an educational AR module using **Vuforia** and NavMesh AI agents.
- **Mission Control:** Developed a modular networking framework enabling instructors to manage **VR training scenarios** in real-time.

Mojo Import Export *Kampala (Project Based)*
Technical Consultant & System Analyst *2023 (6 Months)*

- Directed digital transformation. Built and deployed a digital infrastructure for real-time monitoring of inventory and production metrics.

Bionluk & Indie Projects *Remote*
Freelance Game Developer *2019 – 2022*

- **Mobile Game Development:** Managed the complete production pipeline for 8+ mobile titles (e.g., *Redline Drag Racing*). Implemented vehicle physics, localization systems, and optimized builds for App Store/Google Play.
- **Simulation R&D:** Utilized Lidar Scanning to create a "Digital Twin" Fire Evacuation simulator for PC with diegetic UI.

Selected Publications

Medicine (Baltimore) (2024): "A comparative study on real surgical performance in total knee arthroplasty..."

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC11596432/pdf/medi-103-e40615.pdf

Education

Uşak University *Turkey*
Undergraduate Studies *2018 – 2019*

- The program was discontinued to pursue full-time professional and entrepreneurial work in Unity-based real-time simulation and hardware–software integrated systems.

Gaziantep Chamber of Commerce High School *Turkey*
Information Technologies *2014 – 2018*

- Acquired a strong technical foundation in software development, enabling immediate transition into professional projects.