

# Kaan ERGUN, PMP

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As an experienced Embedded Software Developer, I've extensively worked with Xilinx FPGAs and Texas Instruments' Microcontrollers, focusing particularly on advanced technologies such as Computer Vision and AI. I also possess skills in embedded system design, PCB (both schematics and layout), and robotics. My passion lies in learning and innovating new technologies. Commended for my team spirit and inherent leadership, I derive immense satisfaction from aiding colleagues in troubleshooting and problem-solving.

## EXPERIENCE

### Procrutment Karlstad AB, Jönköping – *Senior Embedded Developer*

2022 May – Present

Procrutment is a staffing firm through which I secured a contractual assignment with Hitachi Energy (HVDC), managed by AFRY. During my tenure at Hitachi Energy, my primary responsibility was to revamp obsolete hardware. This included testing the refactored devices and documenting their specifications and functionalities. A significant portion of my role also involved FPGA development and the establishment of unit test systems. I regularly utilized VHDL and Python, as these were the predominant languages used for development. Having already been well-versed with Xilinx Vivado, my experience at Hitachi Energy allowed me to expand my knowledge base to include Xilinx ISE and Diamond Lattice, both integral tools for FPGA development.

### SKYMARK Aerospace, Ankara - *Product Manager/Developer*

2021 Sep – 2022 Apr

SKYMARK is an aerospace enterprise with a focus on high-precision CNC milling. I had the privilege of establishing and leading their newly formed Research and Development department. As the team leader and product manager, I spearheaded various Proof of Concept (PoC) designs, the specifics of which are largely covered by Non-Disclosure Agreements. These PoC designs heavily incorporated elements of FPGA, microcontrollers, and AI technologies. As an auxiliary project, my team and I constructed an IP camera with customized optics based on a popular Single Board Computer (SBC), akin to the Raspberry Pi. Our competence and dedication were recognized by TUBITAK, which entrusted us with the management of a project with an approximate budget of 5 million Turkish Lira.

### Kivvi R&D LTD, Ankara - *General Manager/Developer*

2016 Jan - 2021 Sep

Kivvi is a startup that I founded, specializing in creating turnkey solutions for image processing and artificial intelligence applications. Our work involves designing and implementing Printed Circuit Boards (PCBs) adhering to industrial standards, with a special emphasis on ensuring Electromagnetic Compatibility (EMC).

One of our notable projects involved developing an Unmanned Ground Vehicle (UGV) imaging system based on FPGA, specifically using the Xilinx Zybo development board. These projects highlight our commitment to delivering high-quality, innovative solutions in the domain of image processing and AI.

## COMPETENCE OVERVIEW

### Languages

VHDL, C, C++, C#, Python,  
SQL + DB-Design, HTML,  
CSS, JavaScript, JQuery,  
AJAX

### Frameworks and OS

OpenCV, TensorFlow, Keras,  
Yolo, Deepstream, CUDA,  
OpenCV, React-Native,  
Linux, Petalinux,  
Linux4Tegra

### Tools

Vitis AL, VivadoHLS, SdSoC,  
Altium Designer, Proteus,  
Solidworks, FreeCad,  
MatLab, SciLab, VS Code,  
Github

## AWARDS

### Graduation Project

(2016)

I designed a 3G-enabled drone that streams video and provides telemetry via a mobile app, a project which earned me a faculty degree.

### Entrepreneurship Award

(2018)

I collaborated with HAVELSAN as a solution partner on a project involving an FPGA-based imaging system. For my contributions and innovative thinking, I was awarded the 'Entrepreneur of the Year' by TESUD.

## **Hacettepe University, Ankara - *Laboratory Assistant***

2010 - 2016

I had the opportunity to serve as a volunteer student lab assistant in the Physics Department at Hacettepe University. During this tenure, I was involved in various projects encompassing embedded system design and mechanical engineering. In addition to these, I also ventured into the realm of optical designs, translating theoretical concepts into practical, functional models.

My experience with Thorlabs products proved instrumental in this regard, as I successfully constructed several optical devices. These included a laser beam profiler and a fiber-optic light path for Near-Infrared (NIR) applications. This hands-on experience in the lab greatly broadened my practical skills and reinforced my theoretical understanding.

## **CorlamLabs, Ankara - *R&D Engineer***

2013 sept–2014 sept

I had the opportunity to design and develop an embedded device specifically tailored for fetal ECG monitoring. The printed circuit board (PCB) for this device was meticulously designed using Proteus. The central processing unit chosen for this project was the Texas Instruments msp432 microcontroller, chosen for its efficiency and reliability.

This complex project required creating a suite of libraries and software rooted in C++. To ensure seamless communication between subsystems like Bluetooth and the ADC, we leveraged USART and I2C protocols.

On the software front, we employed the Windows Phone 8 platform for mobile application development. Utilizing the robust and versatile Visual Studio, we wrote the mobile application in C#, ensuring the app's compatibility with the device.

In addition to this, MATLAB was used to build software modules, a critical component to track various heart conditions effectively. This allowed the device to not only monitor but also interpret and analyze the ECG data, providing a comprehensive solution for fetal heart monitoring.

## **EDUCATION**

### **Hacettepe University, Ankara - *B. Sc. in Physics Engineering***

2009 - 2016

My academic pursuits were primarily concentrated on computational physics, microprocessor programming with 8085 Assembly, and the theory of both analog and digital circuits. I supplemented this core knowledge with elective courses in computer vision and embedded systems. Through these electives, I gained valuable skills in embedded software development, VHDL, and High-Level Synthesis, using tools like VivadoHLS.

My comprehensive understanding and practical application of these fields culminated in a distinguished graduation project, for which I was honored with a faculty degree. This achievement is a testament to my rigorous academic preparation and my dedication to my studies.

## **Kırıkkale University, Kırıkkale - *Computer Programming***

2013 - 2015

At Kırıkkale University's Computer Programming, I gained proficiency in a broad range of programming languages and systems. C# and SQL were at the heart of the primary curriculum, while Java was extensively used in the mobile development modules. My exposure to embedded systems further broadened my skillset, where I honed my expertise in C++ and VHDL.

As part of my final year project, I designed and developed a full-featured website and mobile application, applying the knowledge and skills I had acquired throughout the course. This experience allowed me to demonstrate my abilities in real-world applications, cementing the foundation for my future career in computer science.

### **PROJECTS**

#### **Mobile Facial Recognition System - MFR**

MFR is a comprehensive solution for facial recognition applications. The system employs the Vuzix Blade for camera functionality and Head-Up Display, while a Jetson Nano is utilized for processing video streams and generating a response upon recognizing familiar faces. The system is particularly suitable for use in high-security areas such as airport security checkpoints and stadium entrances. The software has been crafted in C++ and Python, with AI computations for facial detection performed using TensorFlow and Keras.

#### **Unmanned Ground Vehicle - ZK-16**

ZK-16 is a versatile 4x4 Outdoor Unmanned Ground Vehicle (UGV). The control software, based on the Robot Operating System (RoS), operates on a Jetson TX2. It incorporates built-in LIDAR and GPS for positioning, and 9 Degrees of Freedom (9DoF) sensors for detecting rollovers. The control unit of ZK-16 is FPGA-based, with the BASYS-2 board serving as the FPGA control board. This FPGA not only processes the data from the 9DoF sensor and GPS but also regulates the DC motor control signals.

#### **Surround View System**

MANTIS represents an FPGA-centric surround view system. We used the Zybo Z-7020 development board from Digilent for the embedded software development process. During the project, applications based on SDSOC and C++ OpenCV (xfopencv) were conceived and implemented. High-Level Synthesis (HLS) and Petalinux also played significant roles in this endeavor. Following the completion of embedded software development, a bespoke PCB was designed and manufactured specifically for this project.

## **Automotive Grade Climate Controller Unit**

A Climate Control Unit (CCU) controller encompasses various in-built sensors such as those for temperature, humidity, and altitude. It amalgamates the readings from these sensors to determine whether to heat, cool, or circulate air. For this project, our client expressed a preference for Atmel. Consequently, we opted to utilize the AtMega2560 and chose C++ as the programming language. Atmel Studio served as the Integrated Development Environment (IDE) for this endeavor.

## **3D Printer - Gorilla XL**

Gorilla XL is a Fused Deposition Modeling (FDM) 3D printer that I meticulously designed and manufactured. The underlying hardware is built around the AtMega2560 microcontroller, and its firmware is derived from the Marlin firmware, known for its reliability in 3D printing applications.

The printer features a dual-extruder system with a single endpoint, optimizing printing efficiency without compromising quality. The mechanical design of Gorilla XL utilizes a CoreXY configuration, constructed with robust aluminum sigma profiles, ensuring the printer's precision and durability.

## **Website - Kivvi**

Kaanergun.com is a personal website that I've developed using WordPress. It's a fun project where I pen down my thoughts, share experiences, and provide insights into my professional journey. Essentially, it functions as a dynamic CV or resume, offering a real-time overview of my expertise and accomplishments. It offers me a unique platform to interact with my audience and share my knowledge in a more informal, personalized manner.