[별표1]

**Undergraduate Research Program Report**

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| **Department** | | **Full name** | **Student number** |
| Information and Communication Engineering | | Satiyev Elton | **12244853** |
| **Research title** | Intelligent Embedded Sytem Laboratory | | |
| **Research period** | (24.09.02) ~ (24.12.12) | | |
| **Summary of Research Findings** | | | |
| During our participation in the Intelligent Embedded System Laboratory, our team, which included myself and another student, engaged in hands-on research and development activities that integrated edge computing and artificial intelligence using modern hardware and software tools. The main projects we worked on are as follows:  **Gesture-Controlled Bulb using YOLO and Arduino Nano 33 BLE Sense**:  Developed a system to control a bulb through hand gestures recognized via a YOLO-based AI model.  **Fall Detection System using Arduino Nano 33 BLE Sense, Raspberry Pi 4, and AI with TensorFlow**:  Designed a wearable fall detection system to recognize and respond to accidental falls. Utilized TensorFlow to train a lightweight AI model for accurate fall recognition, ensuring efficient processing. Used a Raspberry Pi 4 as an edge device for data acquisition and processing.  Additionally, we worked on configuring the **NVIDIA Jetson AGX Xavier** and deploying AI models, focusing on optimization for real-time inference. These projects provided insights into: AI model deployment on edge devices and cloud integration. Optimizing AI models for efficient processing on NVIDIA platforms. | | | |
| 2024.12.24  Name : (sign)  **인하융합연구원장** 귀하 | | | |

[별표2]

**Undergraduate Research Program Activity Journal**

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| **Department** | Information and Communication Engineering | | **Student number** | | **12244853** | **Name** | Satiyev Elton  **(sign)** | |
| **Participation**  **program name** | **2024-2 (Electrical and Computer Engineering Department, IESL813 Laboratory, Professor in charge: Prof. Deok-Hwan Kim)** | | | | | | | |
| **Main role** | **AI and Data Processing Engineer** | | | | | | | |
| **Activities** | **Date/time**  **(activity hours)** | **Place** | | **Activity details** | | | | **Note** |
| **2024.9.6**  **14:00~17:00 (3H)** | **IESL 816** | | **Introduction to edge computing**  **concepts and Arduino basics.** | | | |  |
| **2024.9.13**  **13:00~17:00 (4H)** | **IESL 816** | | **Worked on setting up Arduino IDE and basic LED control projects.** | | | |  |
| **2024.9.26**  **13:00~18:00 (5H)** | **IESL 816** | | **Completed Arduino sensor integration**  **and tested real-time data logging.** | | | |  |
| **2024.10.4**  **14:00~22:00 (8H)** | **IESL 816** | | **Implemented and tested gesture**  **recognition with YOLO and Arduino**  **Nano 33 BLE Sense.** | | | |  |
| **2024.10.11**  **16:00~22:00 (6H)** | **IESL 813** | | **Set up RaspberryPi and performed GPIO programming for sensor interfacing.** | | | |  |
| **2024.10.18**  **13:00~18:00 (5H)** | **IESL 813** | | **Developed edge AI integration using**  **Raspberry Pi as an intermediate device**  **for gesture control.** | | | |  |
| **2024.11.1**  **14:00~20:00 (6H)** | **IESL 813** | | **Worked on integrating Raspberry Pi withcloud platforms for data logging and**  **visualization.** | | | |  |
| **2024.11.15**  **13:00~19:00 (6H)** | **IESL 813** | | **Designed and validated a fall detection**  **system using AI, Raspberry Pi 4, and**  **Arduino Nano 33 BLE Sense.** | | | |  |
| **2024.11.22**  **13:00~18:00 (5H)** | **IESL 813** | | **Conducted testing of AI models for gesture and fall detection on edge devices.** | | | |  |
| **2024.11.29**  **15:00~19:00 (4H)** | **IESL 813** | | **Reviewed and finalized code optimizationfor edge AI systems.** | | | |  |
| **2024.12.6**  **13:00~19:00 (6H)** | **IESL 813** | | **Configured NVIDIA Jetson Xavier**  **hardware and software using NVIDIA**  **JetPack SDK.** | | | |  |
| **2024.12.12**  **16:00~22:00 (6H)** | **IESL 813** | | **Deployed and optimized AI models on NVIDIA Jetson Xavier using TensorRT.** | | | |  |
| **Total activity time** | **64 Hours in total** | | | | | | | |
| **Professor**  **Check and sign** | **(sign)** | | | | | | | |

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