

# JAKHONGIR NODIROV

Robotics / Computer Vision Engineer

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## SUMMARY

Computer Vision / AI engineer with hands-on robotics experience – ROS2 navigation and SLAM, sensor integration (LiDAR, encoders, motor control), and embedded deployment on Jetson and microcontroller platforms. Full-cycle experience from perception model research through real-time edge inference, including production deployment of CNN-based vision systems on embedded hardware. Author of 2 peer-reviewed publications on 3D volumetric segmentation. Comfortable across the robotics stack: perception, control, and on-device optimization.

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## TECHNICAL SKILLS

- **Robotics:** ROS2, MicroROS, SLAM, Nav2, sensor integration (LiDAR, encoders, motor drivers), real-time control
- **Embedded/Edge:** Jetson Nano, Raspberry Pi, ESP32, TensorRT, ONNX, Yocto, PlatformIO, Arduino/C++
- **Perception & ML:** PyTorch, PyTorch3D, TensorFlow, OpenCV, Object Detection/Segmentation/Tracking, Pose & Landmark Estimation
- **Languages:** Python, C/C++
- **Deployment/Infra:** Docker/Compose, AWS EC2/S3, Oracle Cloud, CI/CD

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## WORK EXPERIENCE

**HyVision System Inc.** Seongnam, South Korea

*AI Research Software Engineer* Jun 2025 – Present

- Own the full model lifecycle – dataset design, training, optimization, and on-device deployment – for CNN-based vision systems deployed on embedded/edge hardware in manufacturing equipment.
- Deploy trained models for real-time inference on production hardware using TensorRT/ONNX edge optimization.
- Work directly with equipment integration, translating perception model output into reliable, low-latency decisions on physical machines.

**AIVAR** Seoul, South Korea

*AI Research Software Engineer* Feb 2023 – Mar 2025

- Led development of a 3D human avatar reconstruction server application (3D morphable face/body models), deployed on AWS with Docker for consistent dev-to-production environments.
- Built and shipped a deep-learning image verification system (vector embedding search) for a government-backed digital IP-protection initiative.
- Researched and optimized CNN- and transformer-based vision models across multiple concurrent product lines; owned deployment and production monitoring.

**Gachon University – CT Lab** Seongnam, South Korea

*Graduate Researcher* Sep 2020 – Feb 2023

- Designed a novel attention-based 3D U-Net architecture for volumetric MRI tumor segmentation, published in Sensors (2022) and IEEE ICTC (2021) – see Publications.
- Contributed to applied CV lab projects including road-condition assessment and license-plate recognition.

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## SELECTED PROJECTS

**Autonomous Driving Robot (ROS2)** *Side Project*

- Designed and built a mobile robot from the ground up on Jetson Nano B01, running ROS2 Foxy, with a full software/hardware stack: motor control (TB6612 drivers), encoder feedback for odometry, RP-Lidar for range sensing, and a camera for perception.
- Implemented a web-based teleoperation interface (roslib.js) for remote monitoring and control, and advanced the platform toward autonomous SLAM and Nav2-based navigation.

### **Driver Monitoring System (DMS)** *Lab Project*

- Built a real-time perception system for an embedded/edge platform: head-pose, facial landmark, and seatbelt-detection models using CNN- and keypoint-based architectures, retrained on an augmented grayscale dataset for day-and-night reliability.
- Deployed via ONNX/TensorRT on NVIDIA Jetson, optimizing for real-time inference under embedded hardware constraints.

### **Semiconductor Wafer Defect Inspection** *HyVision, 2025*

- Built a high-precision defect inspection pipeline for 8-inch and 12-inch silicon wafers using CNN-based object detection, segmentation, and anomaly detection models, deployed on industrial edge GPUs inside wafer inspection equipment.
- PyTorch, ONNX/TensorRT edge optimization · Deployed in production for continuous, high-precision defect detection with a low false-positive rate.

### **Consumer Electronics Surface Inspection** *HyVision, 2025-2026*

- Built an end-to-end automated defect inspection pipeline (segmentation, detection, classification) for glass and metal enclosure parts, deployed on AOI machines in a tier-1 consumer electronics client's production line.
- PyTorch, ONNX/TensorRT edge optimization · Achieved fine-grained defect detection at production line speed with a low false-positive rate.

### **3D Human Avatar Reconstruction** *AIVAR, 2023-2024*

- Converted 2D images into textured 3D face/body avatars using 3D morphable face and body model architectures, with diffusion-based image correction and neural texture-matching; deployed on AWS with Docker.

### **IP Protection – Image Verification** *AIVAR, 2024*

- Built a vector-embedding image verification system for animation-character and logo IP protection using CNN-based face/feature recognition models; part of a government-backed digital IP-protection project.

### **Attention 3D U-Net for Brain Tumor Segmentation** *CT Lab, 2021-2022*

- Designed a novel attention-based 3D U-Net with multiple skip connections for volumetric MRI tumor segmentation, improving boundary-detection precision. Published in *Sensors* (2022).

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## **EDUCATION**

**Gachon University** 2020.09 – 2022.08

Master's Degree, Computer Engineering – GPA 4.17/4.5

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## **PUBLICATIONS**

- "Attention 3D U-Net with Multiple Skip Connections for Segmentation of Brain Tumor Images." *Sensors* 22, no. 17 (2022): 6501.
- "3D Volume Reconstruction from MRI Slices based on VTK." In *2021 International Conference on Information and Communication Technology Convergence (ICTC)*, pp. 689–692. IEEE, 2021.

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## **LANGUAGES**

Uzbek (Native) · English (Proficient) · Korean (Intermediate)