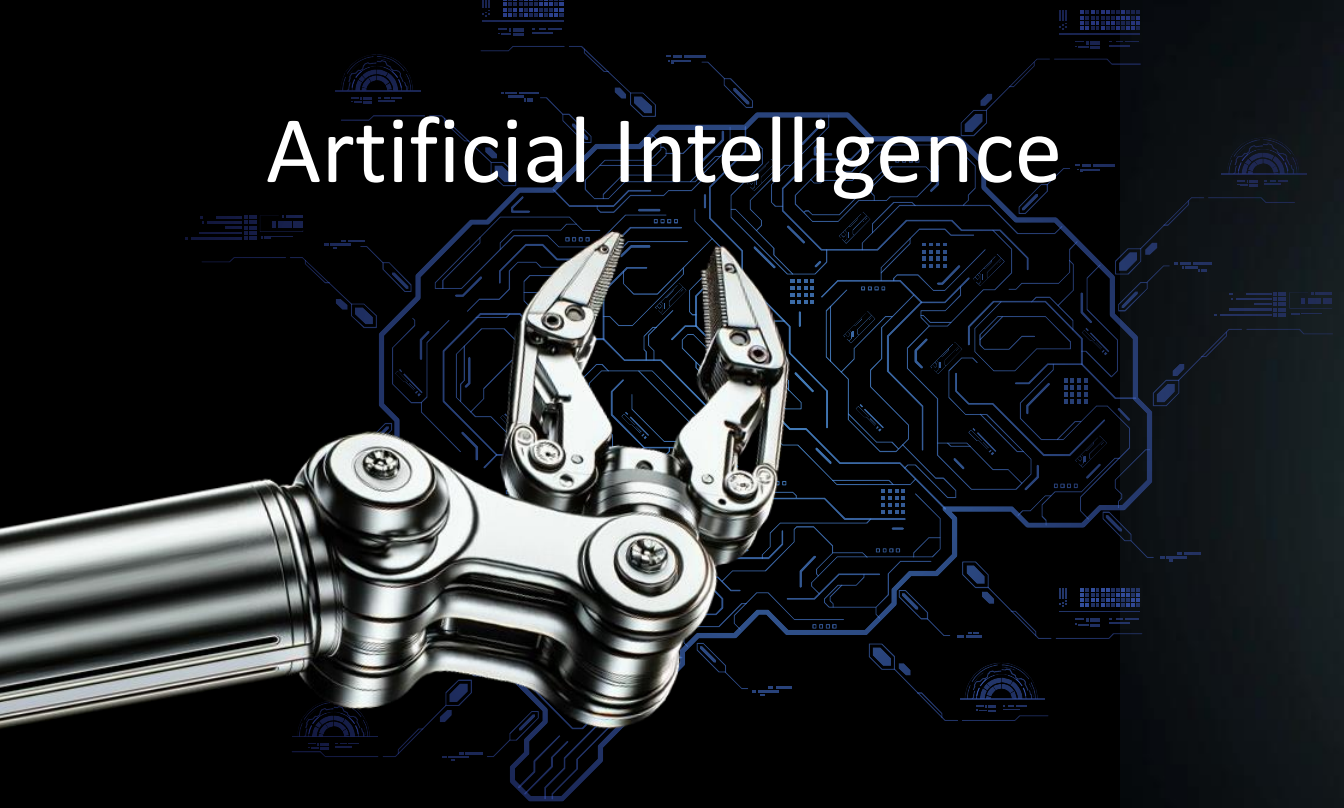
Artificial Intelligence



ROBOTICS

SOLUTIONS

AAEON AI

ARTIFICIAL INTELLIGENCE

CONTENTS

01 AAEON AI Introduction

02 Automated Security Patrol

03 Autonomous Mobile Robot

04 AI Assisted Camera Monitoring Unit

AAEON AI

AAEON AI

> AAEON Technology Inc. is an elite partner of NVIDIA, specializing in delivering innovative Edge AI computing solutions.

AAEON Technology Inc. is a prominent provider of advanced AI solutions, offering a wide range of services to cater to diverse AI needs. Whether you require assistance with AI hardware platforms, software, or complete package solutions, AAEON ensures seamless integration and deployment.

Innovative Robotics Case Studies:

Enhancing Security and Monitoring

01 **Automated Security Patrol**

02 **Autonomous Mobile Robot**

03 **AI Assisted Camera Monitoring Unit**

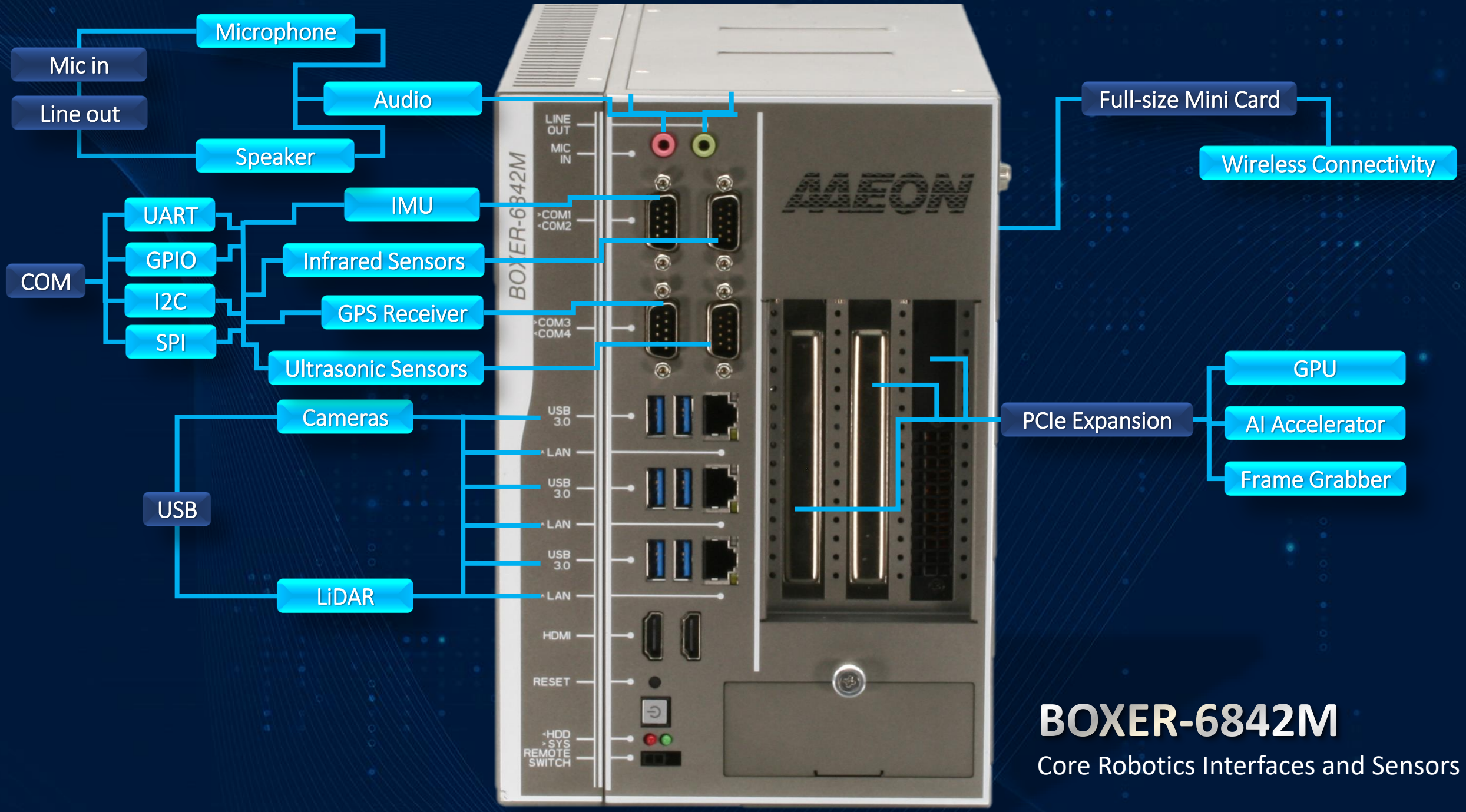
Automated Security Patrol

The robot employs advanced path planning algorithms, facilitated by its CPU, and sensor technology via its interfaces to navigate buildings and patrol designated areas.

It maps the environment using LiDAR and cameras, estimates its position, and generates optimal paths while avoiding obstacles.

It follows predefined patrol routes or inspects specific areas based on programmed instructions or schedules, adapting its strategy as needed.

Real-time monitoring via wireless communication allows operators to review captured images and intervene if necessary, while cloud integration enables advanced functionalities such as remote monitoring and data analysis.



BOXER-6842M

Core Robotics Interfaces and Sensors

Robotics Control: Embedded CPU Functions

- BOXER-6842M
- Embedded CPU
- Executes control algorithms
- Processes sensor data
- Controls overall operation
- Communicates with external systems

- Control System
- 3D mapping
- Object detection
- Environment perception
- Motion tracking
- Orientation estimation

Automated Security Patrol

- Wireless Connectivity
- Cloud storage of acquired images
- Emergency reporting to human personnel
- Remote monitoring

- Sensors
- LiDAR
- Cameras
- IMU

- Actuators
- Motorized wheels for movement
- Lights for visibility
- Speakers for audio output

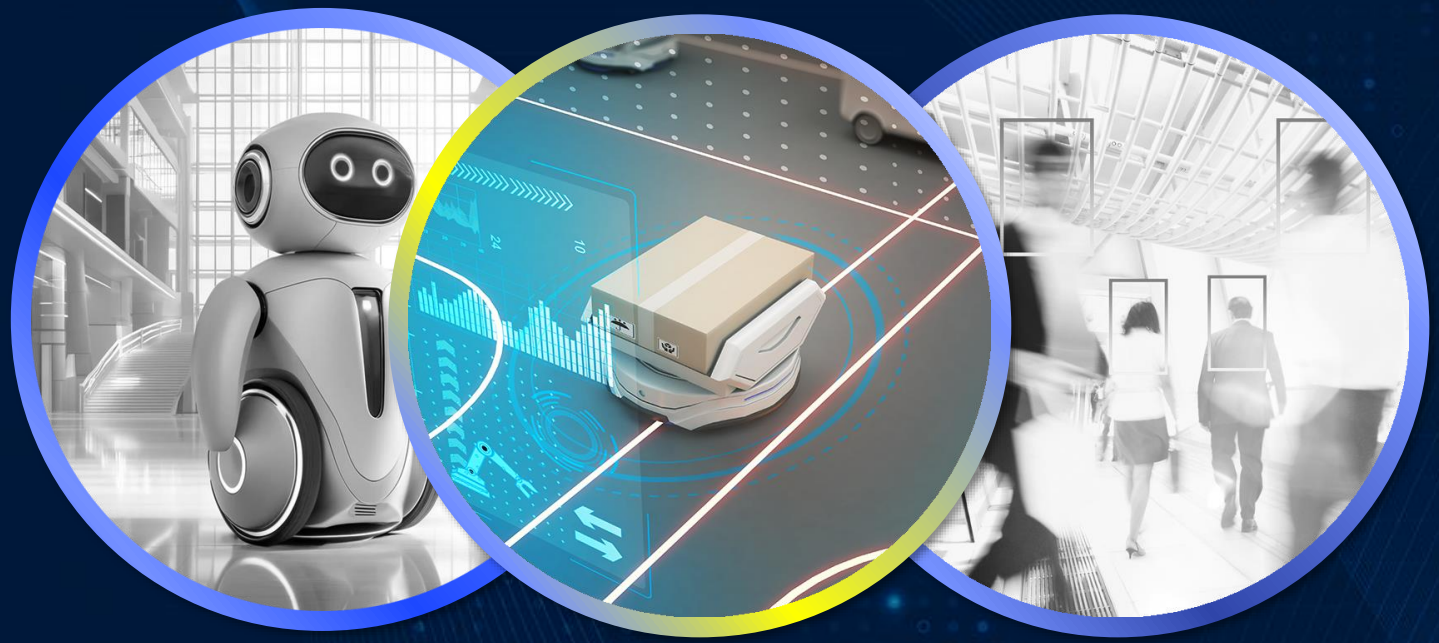
Automated Security Patrol

By integrating AAEON's BOXER-6842M, equipped with an embedded Intel® Core™ i9-9900T CPU, the application benefits from powerful processing capabilities and versatile connectivity options.

This enables efficient execution of complex algorithms for tasks such as path planning, sensor data processing, and real-time decision-making. AAEON's system's support for up to 128GB of DDR4 memory and multiple storage options ensures ample capacity and high-speed data transfer, while its multiple Ethernet ports facilitate reliable network connectivity for communication with external systems and cloud services.

The expansion slots offer flexibility for integrating additional peripherals, enhancing the application's functionality and adaptability to diverse deployment scenarios. AAEON's embedded computer serves as a reliable and flexible partner capable of meeting the requirements of a range of applications.

Innovative Robotics Case Studies:



Enhancing Security and Monitoring

01 Automated Security Patrol

02 Autonomous Mobile Robot

03 AI Assisted Camera Monitoring Unit

USB 3.2 Gen 2

Cameras

Visual perception and environment mapping

IMU

Sensor for motion and orientation

RJ-45 LAN

LiDAR

Environment mapping through laser scanning

COM

RS-232

Ultrasonic Sensors

Object detection using sound waves

RS-232/422/485

Motor Controllers

Regulate motor movement and direction

Digital I/O

Light Sensors

Detect ambient light levels

Humidity Sensors

Monitor ambient humidity

Proximity Sensors

Object detection

Temperature Sensors

Measure ambient temperature

Steering Mechanism

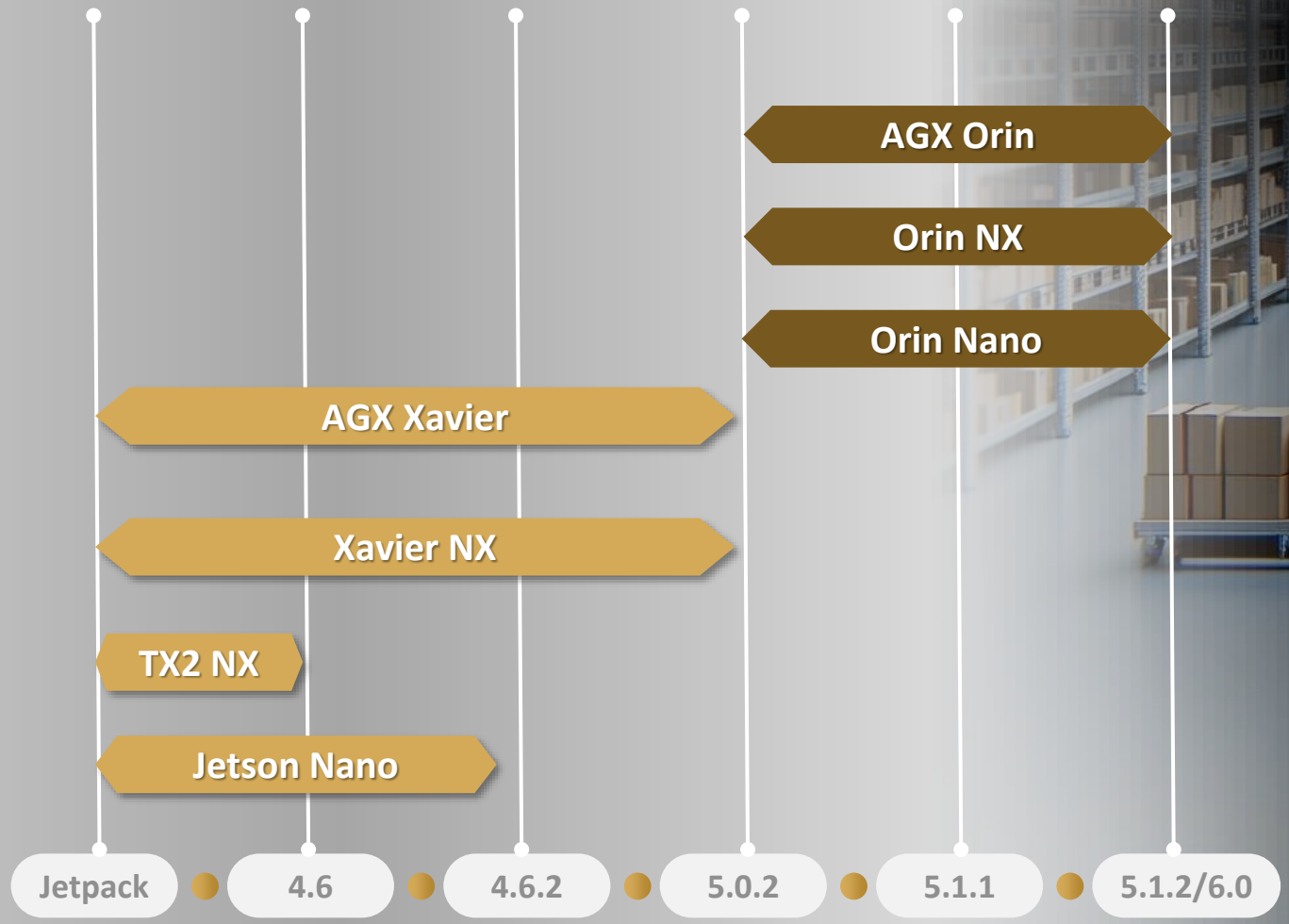
Direction control

BOXER-8641AI

Comprehensive I/O and Sensor Integration for Advanced Robotics

NVIDIA Elite Partner

NVIDIA Jetson Roadmap Overview



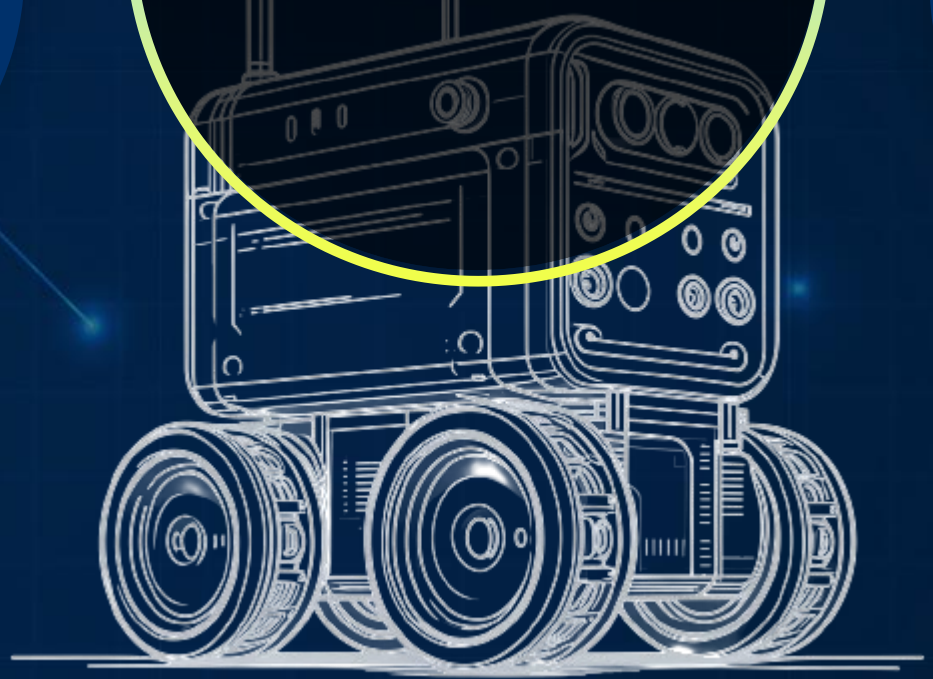
As an Elite member of the NVIDIA Partner Network (NPN), AAEON provides support for the full NVIDIA® Jetson™ SoM roadmap, including NVIDIA JetPack™ updates.

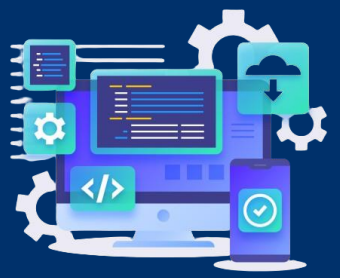
Integrated Security Technologies

Hardware Security

- TPM (IC)

SECURITY





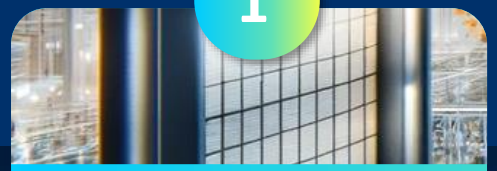
Software Security

- Secure Boot
- Disk Encryption
- Root File System Redundancy
- Rollback Protection
- OP-TEE

Deployment Scenario Smart Factory

In a smart factory environment, the Autonomous Mobile Robot (AMR) built with the aforementioned features and components could play a crucial role in executing various tasks, such as material handling, transportation, and environmental monitoring. Here's how it could operate.

1



Material Transport and Handling

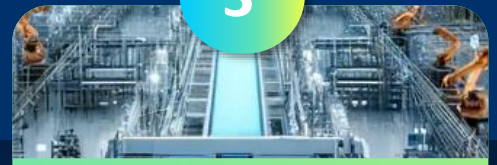
The AMR would autonomously navigate through the factory floor, transporting raw materials, components, or finished products between different workstations, assembly lines, or storage areas. Equipped with sensors like Lidar and cameras, it can safely navigate around obstacles, machinery, and workers.

2

Inventory Management

The AMR could be programmed to perform inventory management tasks, such as scanning barcodes or RFID tags to track the movement and location of goods within the factory. This information can be relayed to the central management system for real-time inventory monitoring and optimization.

3



Quality Control

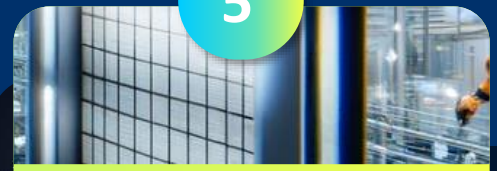
Utilizing its sensor suite, including cameras and environmental sensors, the AMR could perform quality control inspections as it moves around the factory floor. It could capture images of products, detect defects or anomalies, and alert operators or trigger automated processes for corrective actions.

4

Environmental Monitoring

With environmental sensors such as temperature, humidity, and gas sensors, the AMR can monitor the factory environment for factors like temperature fluctuations, humidity levels, and gas emissions. This data can be used to maintain optimal working conditions, ensure worker safety, and identify any environmental hazards.

5



Data Collection and Analysis

Through its communication stack, the AMR can transmit data collected from its sensors to the factory's central management system or cloud-based platforms for further analysis. This data can provide valuable insights into production processes, resource utilization, and overall factory performance, enabling continuous improvement initiatives.

Innovative Robotics Case Studies:

Enhancing Security and Monitoring

01 Automated Security Patrol

02 Autonomous Mobile Robot

03 AI Assisted Camera Monitoring Unit

AI Assisted Camera Monitoring Unit

By leveraging Innodisk's EV2M-GOM1 MIPI camera, the application is able to obtain high-quality data from a broader visual scope, with the model containing an integrated ISP to de-warp the data input.

With 26 TOPS of AI inferencing performance via its onboard Hailo AI accelerator, AAEON's single-board, based on the UP Squared Pro 710H Edge standard product, was able to detect and identify a range of objects, including people, within the unit's field of vision.

The board's low-power Intel® Processor N97 Embedded CPU provided ample processing speeds to prevent latency, despite running complex algorithms.

This example not only shows the utility of AAEON's products themselves, but also AAEON's ability to accommodate and integrate peripheral devices that suit the requirements of specific projects.

Advanced Imaging with AI Acceleration

innodisk

01

Two back-to-back Innodisk EV2M-GOM1 MIPI Fixed Focus Camera Modules with integrated ISP for fisheye de-warping

02

Onboard Hailo AI acceleration chip

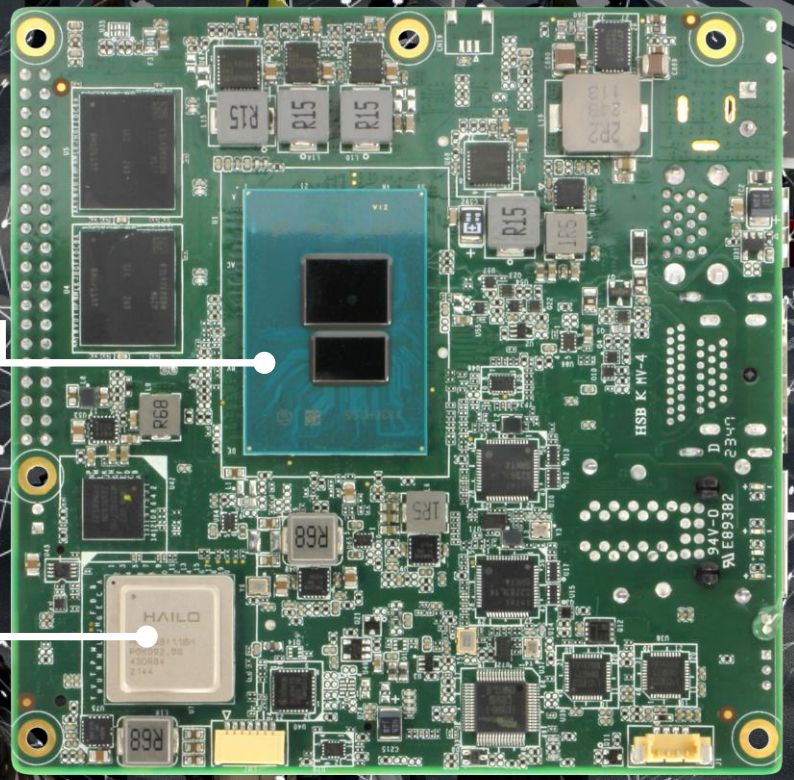
HAILO

03

AAEON developer board with Intel® Processor N97 SoC

AAEON an ASUS assoc. co.

Intel® Processor N97 Embedded CPU



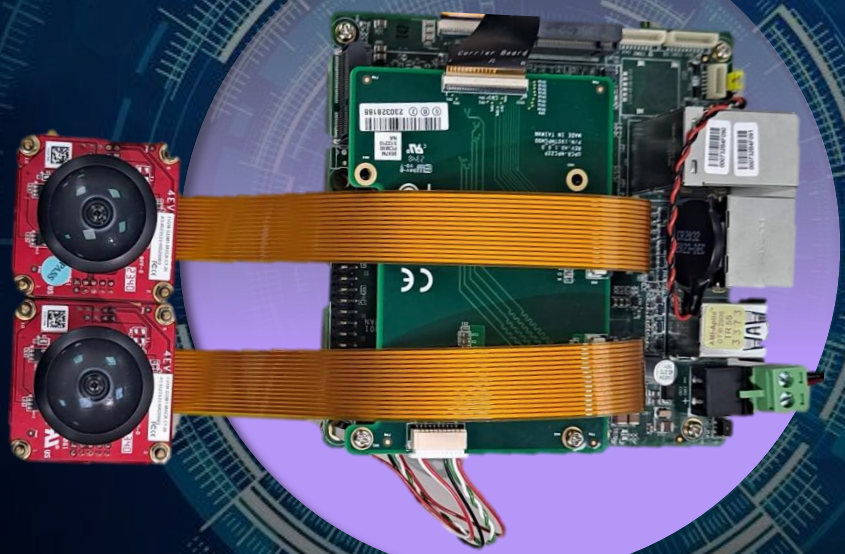
UP Squared Pro 710H

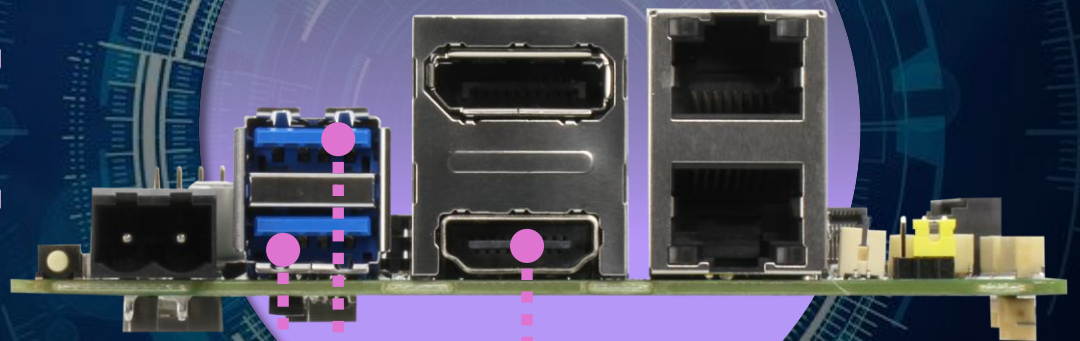
Onboard Hailo-8™ Edge AI Processor

Hailo driver support on Ubuntu OS

UP Squared Pro 710H

innodisk





MIPI-CSI via 61-Pin FPC Connector

USB for interface control

HDMI Display Output

innodisk

Two back-to-back Innodisk EV2M- GOM1 MIPI cameras set to FOV 180° Mode capture images from both front and rear vantage points, allowing for bilateral 360° coverage


HAILO
Model Build Computer
Machine Learning Frameworks
User Models
Hailo Models Zoo
Hailo Dataflow Compiler
Host Processor
User Applications
TAPPAS
Application examples
Applications Pipeline Elements
OS IP Stack
Hailo RT
PCIe
Hailo-8™ Device
Hailo-8™ Firmware
AI
Object detection model developed using Hailo Models Zoo

Real-Time Object Detection:

Integrating Cameras with AI Processing

Cameras capture images and feed data to motherboard

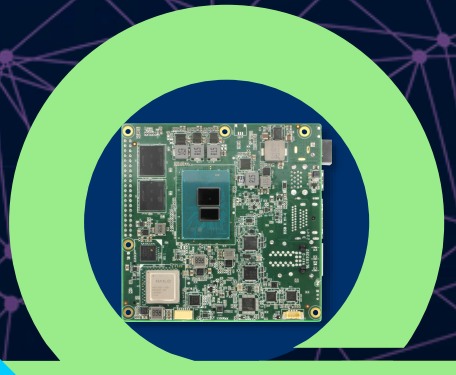


Image data analyzed and processed with Hailo inferencing model

Real-time object detection results are output via HDMI display

With AAEON,
the Future of Robotics is Now

AAEON
an ASUS assoc. co.

AAEON AI

Website: www.aaeon.com

If you have any questions, please fill out this form, and we will assign a colleague responsible for your area to contact you.

Focus • Agility • Competitiveness