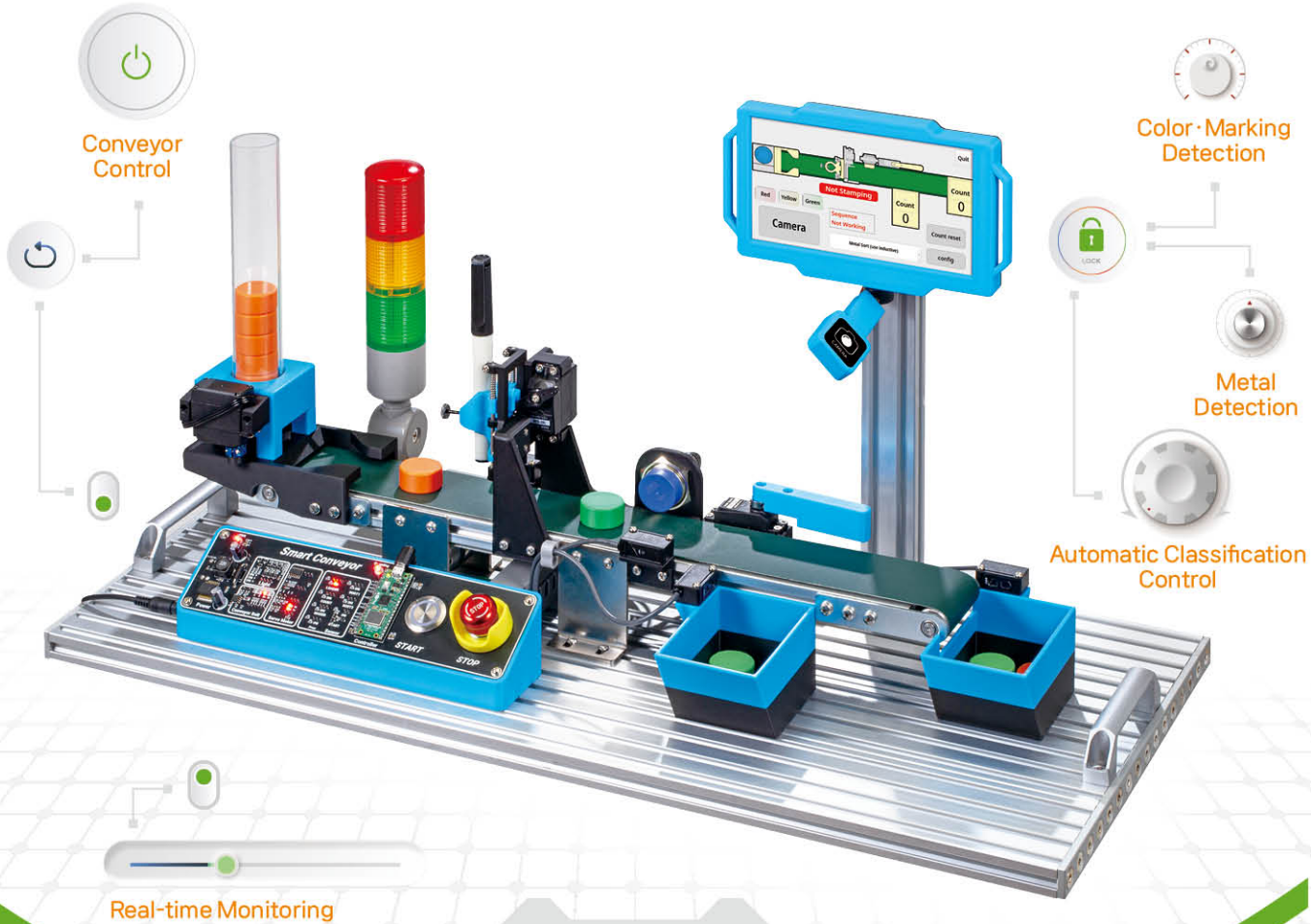
HANBACK ELECTRONICS

Since 1984

Smart Conveyor Training Equipment

XCONVEY



Homepage

HANBACK ELECTRONICS

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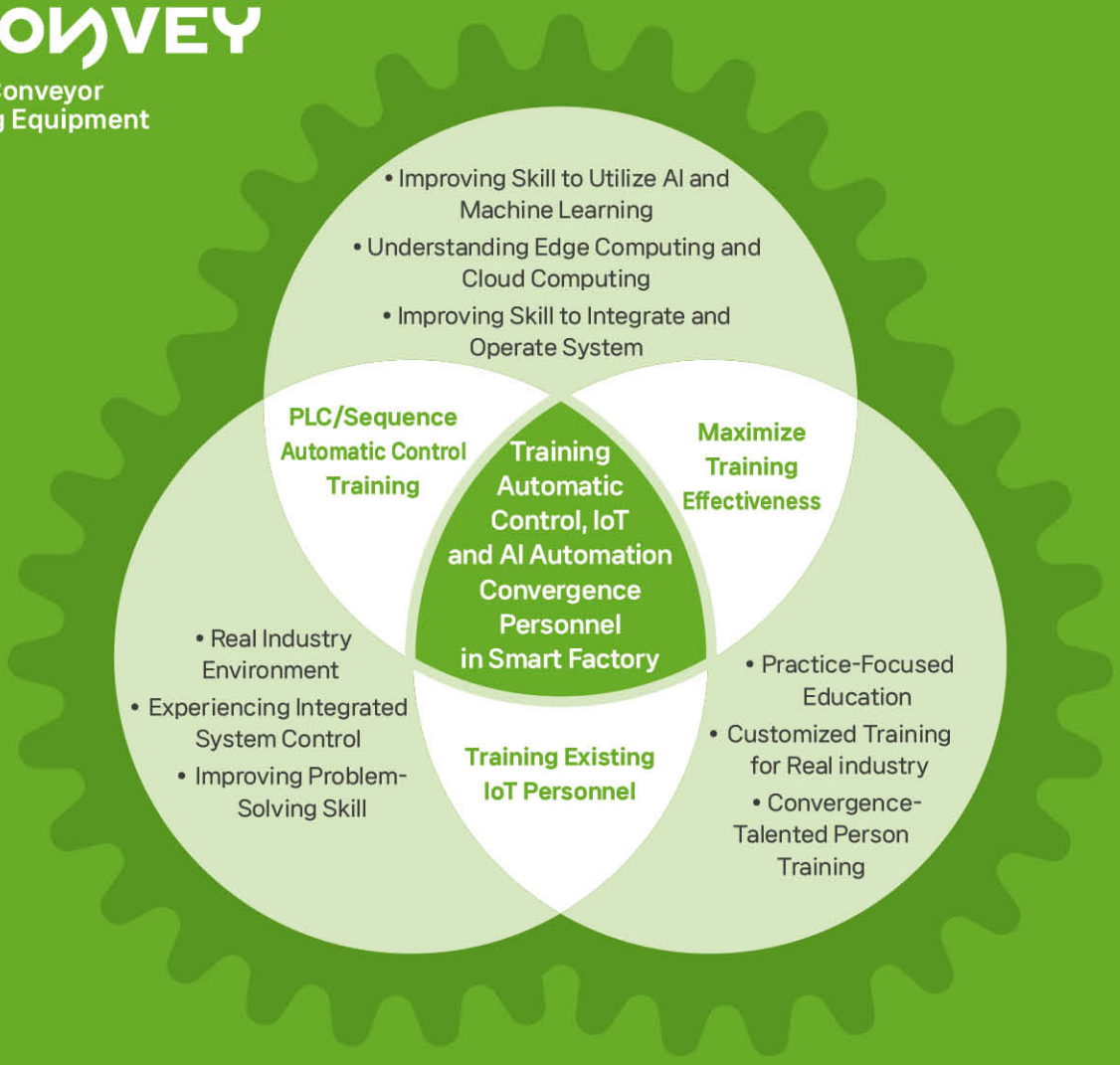

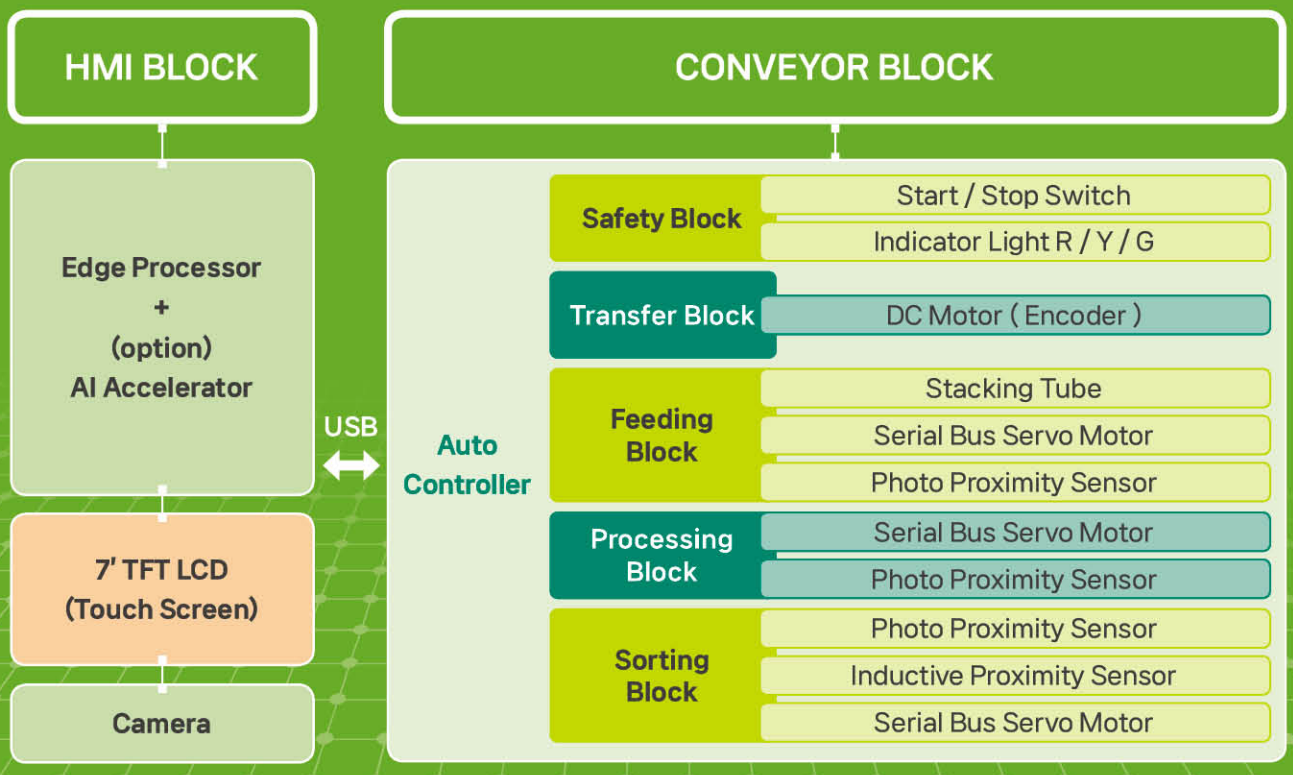

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Software Specification

List		Specifications
HMI	Linux Kernel	• aarch64 6.x
	Cloud & Connectivity	• SSH Server, Bluez, Mosquitto, S2M Bridge Server, OPC-UA Server, Modbus Server
	GUI & Vision	• PySide6, OpenCV
	Data Science & AI	• Numpy, Pandas, Scipy, Seaborn, Scikit-learn, Mediapipe
	Security	• SSL/TLS, MQTT, 2FA, AES/KDF
Pop plus Library(HMI)	Actuator Object	• Feeding, Tranfer, Processing, Sorting, Security
	Sensor Object	• Photo Proximity, Inductive Proximity, Encoder, Stop Switch
	AI	• Linear Regression, Logistic Regression, Perceptron, ANN
Auto Controller	Embedded Runtime	• REPL, Garbage Collection, PIO, LittleFS, CDC, MQTT
Pop plus Library (Auto Controller)	Actuator Object	• Feeding, Tranfer, Processing, Sorting, Security
	Sensor Object	• Photo Proximity, Inductive Proximity, Encoder, Stop Switch

Hardware Specification

List		Specifications
HMI (Human Machine Interface)	Edge Processor	• 2.4GHz Quad-core 64-bit Arm Cortex-A76 CPU • 512KB per-core L2 caches, 2MB shared L3 cache • LPDDR4X-4267 SDRAM • Dual-band 802.11ac Wi-Fi®, Bluetooth 5.0 / Bluetooth Low Energy (BLE)
	(Option) AI Accelerator	• Providing 26 TOPS in inferencing performance • Compatible with popular frameworks such as TensorFlow and PyTorch • Utilizing the neural network accelerator for executing post-processing tasks like object detection, image segmentation, and pose estimation.
	7inch TFT LCD	• IPS, Resolution : 1024 x 600 • Capacitance Touch Screen • 2ch Speaker
	2MP Camera	• Resolution : 1080p @ 30 fps • Field of View: 120 degrees diagonal
Conveyor Block	Auto Controller	• Equipped with dual Cortex-M33 or RISC-V Hazard3 cores that operate at frequencies reaching 150MHz • 520 kB of high-speed multi-bank SRAM • External Quad-SPI flash featuring eXecute In Place capability alongside a 16kB on-chip cache
	Safety Block	• Stop Switch – Emergency Power Control for the Conveyor Block • Start Switch – Metal / LED Activation
	Transfer Block	• Block for product transfer. • DC Motor equipped with an Encoder • 60 x 500mm Conveyor Belt - includes 2 rollers, a belt, a profile, and a timing pulley.
	Feeding Block	• Block for stacking products and managing supply • Photo Proximity Sensor: 1 unit • Serial Bus Servo Motor: 1 unit
	Processing Block	• Block designed to manufacture the product • Stamp (Pen) securing device • Photo Proximity Sensor: 1 unit • Serial Bus Servo Motor: 1 unit
	Sorting Block	• Block responsible for identifying and categorizing products as either metal or non-metal • Inductive Proximity Sensor: 1 unit • Photo Proximity Sensor: 3 units • Serial Bus Servo Motor : 1 unit

| Power | 12V/10A Adapter **| Size |** 690 x 320 x 350 mm

Features

- AI convergence training equipment to build a smart factory, which has structure for application implementation and provides connectivity
- Simulation environment that is a scaled-down conveyor automatic sorting system to be placed on a table
- Provides HMI with built-in touchscreen to enable sensor and actuator control in GUI environment
- Machine learning-based classification and data processing are experimentally scalable using HMI and AI accelerator
- Low-level and high-level control are possible through MicroPython, Python, Pop plus library
- Precise conveyor belt speed control using DC motor and driver
- Accomplishes sophisticated classification by quickly reading optical sensor-based object detection data
- Simplifies complex supply and classification operation using servo motor
- Provides a user-friendly interface with GUI designed on PySide6
- Supports ModBus and OPC-UA that can be integrated with PLC
- Practice with real results by detecting and classifying objects on conveyor
- Similar functions can be implemented at lower cost as PLC equipment
- Flexible scalability is provided by actively utilizing open source technologies such as OpenCV and MQTT
- Supports dashboard and remote monitoring through open source IoT platform, analytics and interactive visualization tool
- Monitors sensor data remotely and interworks with cloud collaboration system and internet messenger in case of error
- Supports factory workflow and performance analysis through real-time data dashboard and graph
- Can add new sensors and actuators easily through software modularization

Training Contents

Auto Controller

- Overview and Implementation of Conveyor Belt System
  - DC Motor and Motor Driver control
  - Conveyor speed control and direction change
- Using Optical Sensor
  - Reading sensor signal and processing data
- Control of supplying/processing/sorting device
  - Principle and control of servo motor operation
- Firmware Design
  - Thread, asynchronous control, protocol

HMI (Human-Machine Interface)

- Interworking with Serial-based Auto Controller
- GUI Design
- Real-time monitoring system implementation
  - Sensor data visualization and remote control
  - Error detection and alert system implementation

PLC Integrated Technology

- ModBus and Control Application
- OPC-UA and Control Application

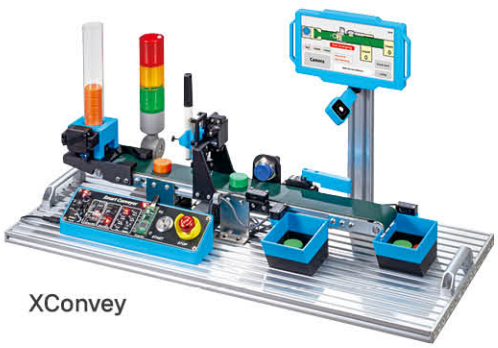
Vision Processing and Artificial Intelligence

- OpenCV
- Machine Learning
- Classification Algorithm and Data Processing
  - Implementing OpenCV-based classification logic
  - Scaling machine learning-based classification up

Cloud Service Integration and Monitoring

- Open Source-based IoT Cloud Integration
  - Implementing Cloud Dashboard
  - Data Visualization

Components



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Ethernet Cable
1ea

12V/10A Adaptor
1ea

User's Guide Book
1ea