Robotic Hardware: "CONTROLLER"

A controller is a computer composed of hardware and software, combined to enable it to carry out its assigned tasks. Below is a comparison chart in some robotic hardware controllers.

Compiled by Ahmad Firdaus Ghazali

	EDGE AI	INDUSTRIAL PC	PLC	PAC
DEFINITION	Running AI algorithms (created on the device) locally on a hardware device using edge computing.	Microcontroller-based computer (integrated CPU) that works just like laptop PCs with higher level of reliability.	Special form of microprocessor that is used to store instructions, logic, counting & timing in order to control the process operations.	Automation controller that incorporates higher-level instructions & complex automation solutions used in industrial control system (ICS).
ADVANTAGES	- Reduced costs - Security - Highly responsive - Easy to manage	- Long lifespan & Safety - Highly reliable - High processing power - Large memory capacity	- Compactness - More flexibility - Easy to learn & program - Low power consumption	- Extensive analog control capabilities - More connectivity options - Architecture is more open
REAL-LIFE APPLICATIONS	- Surveillance & monitoring purposes - Autonomous vehicles - Smart speakers - Industrial IoT	- Manufacturing - Packaging inspection and quality control - Asset tracking - Remote data collection	- Conveyor belt system - Liquid filling system - Overhead travelling crane - Temperature controller - Energy management system	- Pilot plants/scale facilities - Specialized control and automation sub-systems - Industrial test systems - CS for small scale plants
UNIQUENESS	Detects irregularity quickly and accurately	Operate in any weather conditions	Highly adaptable to changes in data processing functions.	Real-time operating system, runs in scheduled cyclic mode
EXAMPLES	- NVIDIA Jetson Nano - NVIDIA Jetson TX2 - Sipeed Maixduino Kit - Sipeed Maix BiT - Raspberry Pi 4 Computer Model B - Coral Dev Board	- Siemens 6AG4040-0AG20-0AX0 - Allen Bradley 1766-L32BXB - Advantech UNO-1372GJ - Omron NX102-1200 - Beckhoff C5002	- Lovato Electric PLC LRDKIT12RD024 - Siemens 6ED1052-1MD08-0BA1 PLC Controller - Omron CP1E-N30SDT-D - Panasonic AFP0RC16CP - Allen Bradley MICRO820	- MKS PAC 100 AS11870G-03 - Emerson RX3i CPL410 PAC - Emerson RX3i CPE330 PAC - Advantech AMAX-5000 - Parker Hannifin PAC320-CWB21-3A

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