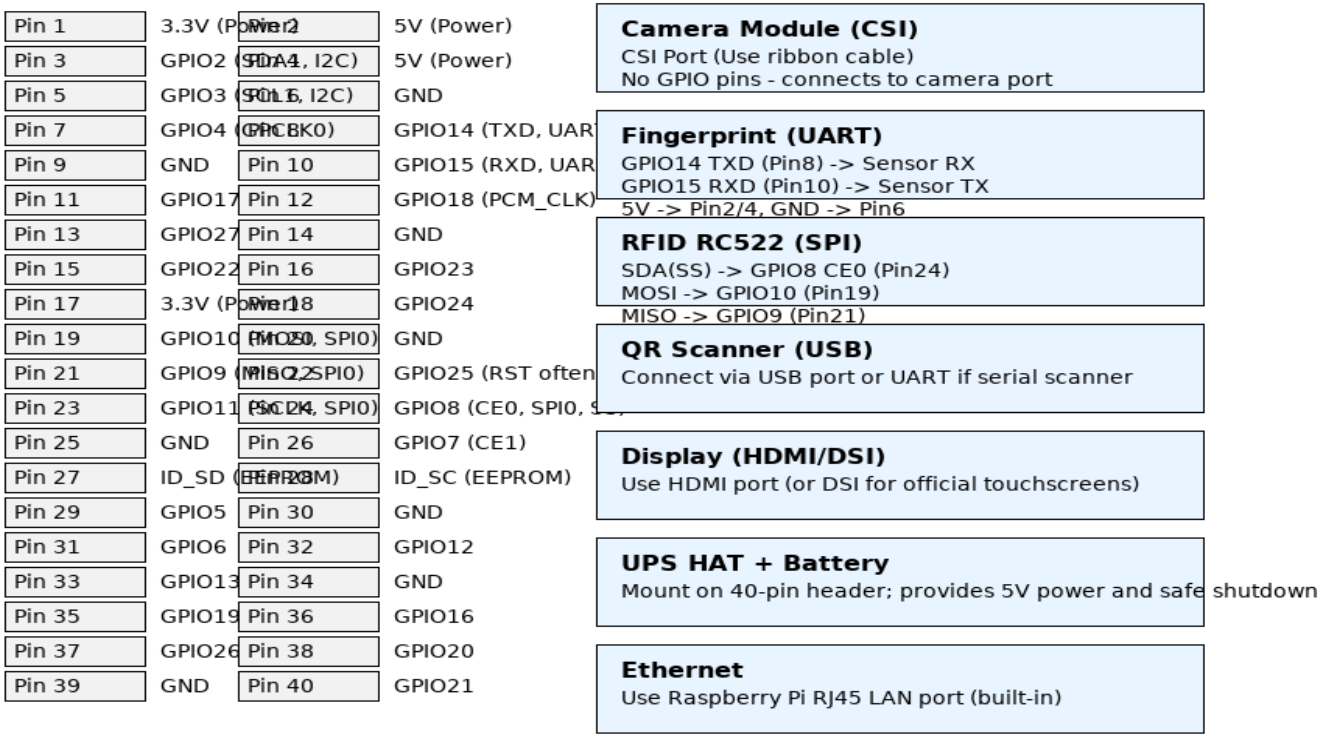
Smart Attendance System — Detailed Wiring & Pinout

This document contains the exact Raspberry Pi GPIO pin mapping and how each hardware component should be wired. Use this as the installation and handover guide for school IT teams and hackathon judges.

Raspberry Pi 40-pin Header - Pinout & Connections for Attendance Kiosk



Component	Pi Pin(s)	Connections / Notes
Camera Module (CSI)	Dedicated CSI port	Connect via 15-pin ribbon cable to CSI port. Use IR camera module for low light.
Fingerprint Sensor (UART)	Pin8(TXD), Pin10(RXD), Pin2(5V), Pin6(GND)	GPIO14->Sensor RX, GPIO15->Sensor TX, Power 5V, GND to common ground.
RFID RC522 (SPI)	Pin24(CE0), Pin19(MOSI), Pin21(MISO), Pin23(SCLK), Pin22(RST), Pin1(3.3V), Pin6(GND)	GPIO8, GPIO10, GPIO11, GPIO25, Power 3.3V, Ground for RC522.
QR Scanner (USB)	USB Port or UART	Use USB for plug-and-play or UART serial for cheap scanners.
Display (HDMI/DSI)	HDMI port / DSI ribbon	Use HDMI for HDMI displays; official Pi DSI screens use DSI ribbon.
UPS HAT / Battery	40-pin header + 5V	Mount UPS HAT on 40-pin header. Connect battery pack to HAT input.
Ethernet	RJ45 port	Connect LAN cable to school network; ensure DHCP/static IP as per IT.

1. Mount Raspberry Pi inside kiosk; attach UPS HAT on 40-pin header.
2. Attach Pi Camera ribbon to CSI port; secure camera behind front glass window.
3. Wire fingerprint sensor TX/RX to GPIO14/15 and power to 5V/GND.
4. Wire RC522 module to SPI pins as per table; connect RST to GPIO25.
5. Connect 3.5-4'' HDMI display to HDMI port; secure in front panel.
6. Connect Ethernet cable to RJ45; test network connectivity.
7. Power on and test each module; run enrollment for sample student.

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