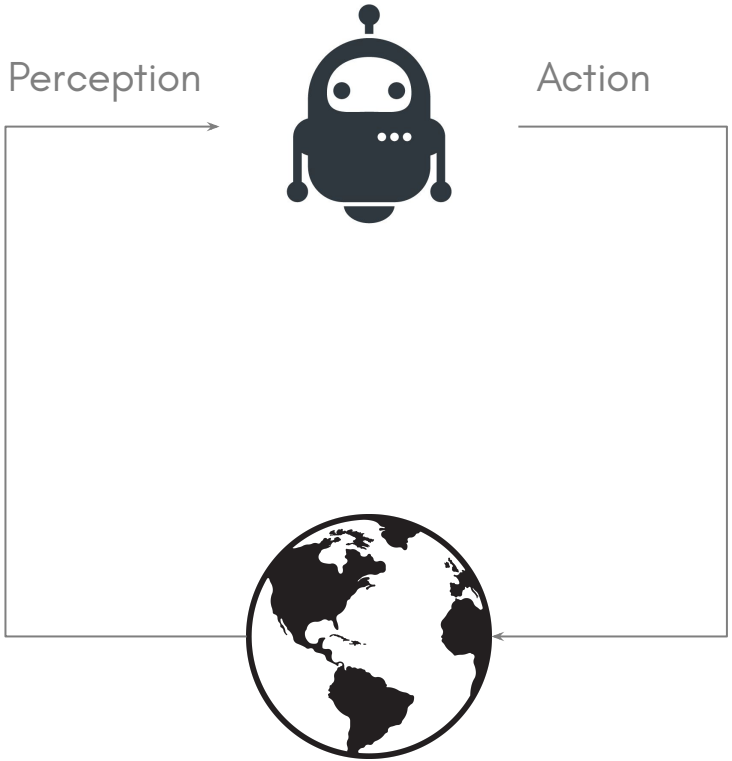
ENGR 3421: Robotics I

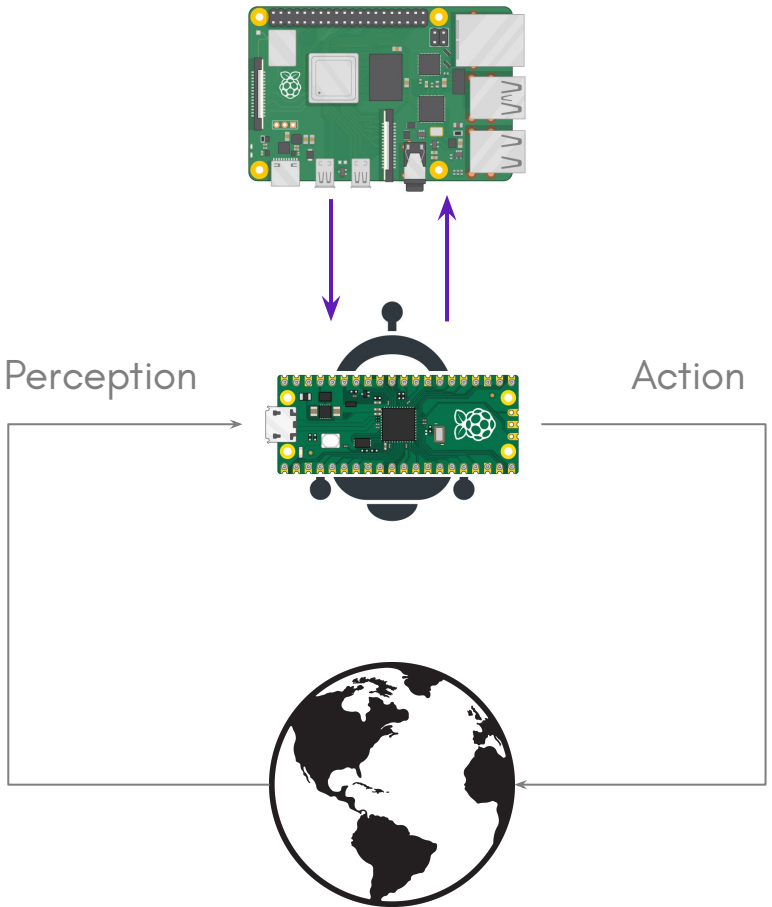
Communication

11/19/2024

A Robot Needs to Talk and Listen



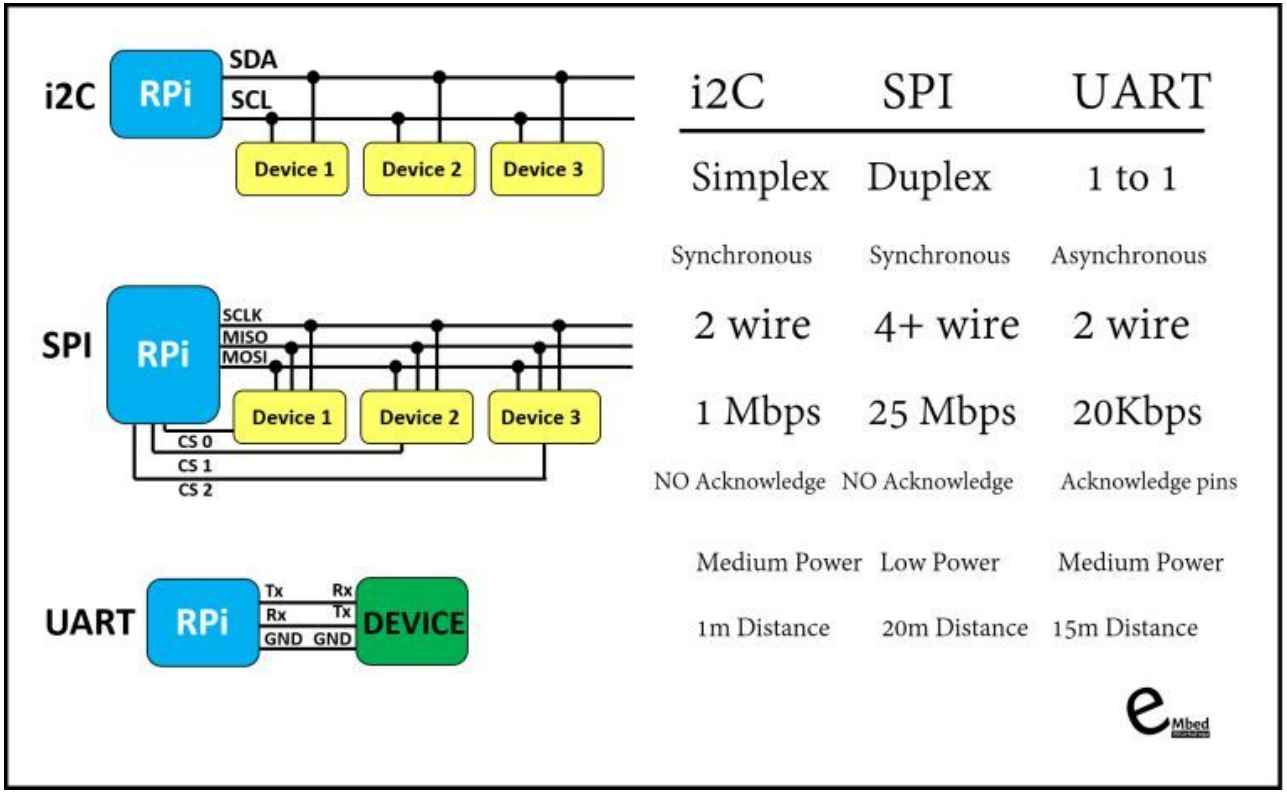
A Robot Needs to Talk and Listen



Communication Protocols

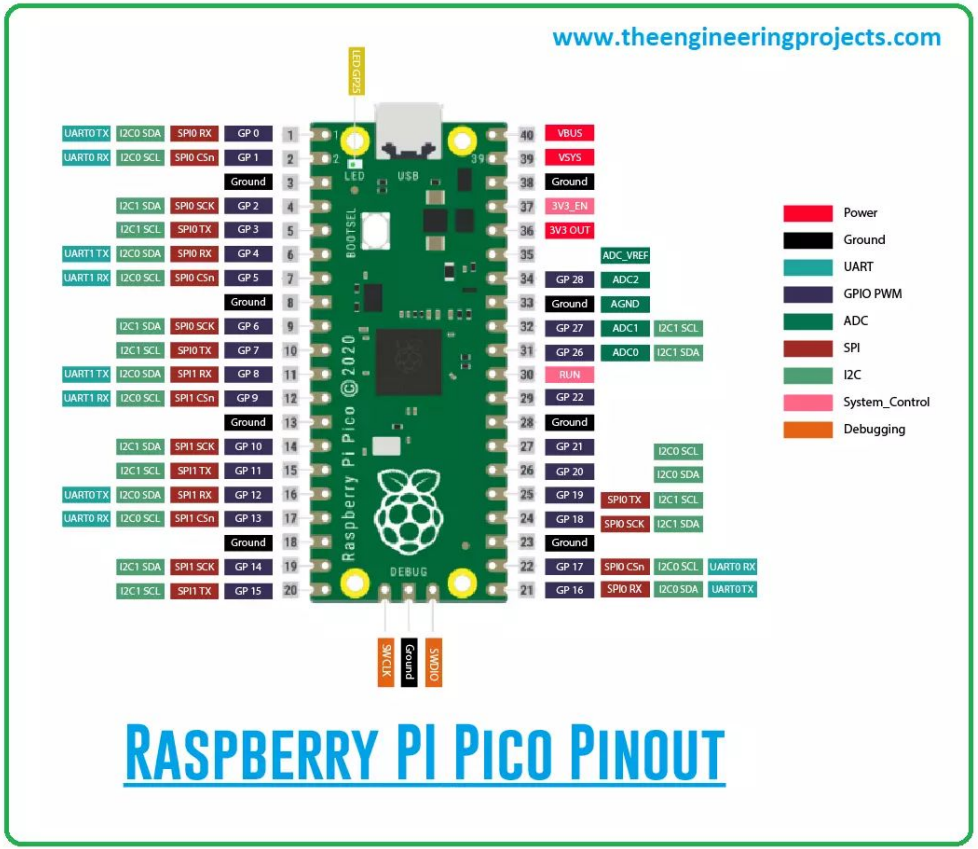
Protocol	UART	I2C	SPI
Complexity	Simple	Easy to chain multiple devices	Complex as device increases
Speed	Slowest	Faster than UART	Fastest
Number of devices	Up to 2 devices	Up to 127, but gets complex	Many, but gets complex
Number of wires	1	2	4
Duplex	Full Duplex	Half Duplex	Full Duplex
No. of masters and slaves	Single to Single	Multiple slaves and masters	1 master, multiple slaves

Communication Protocols

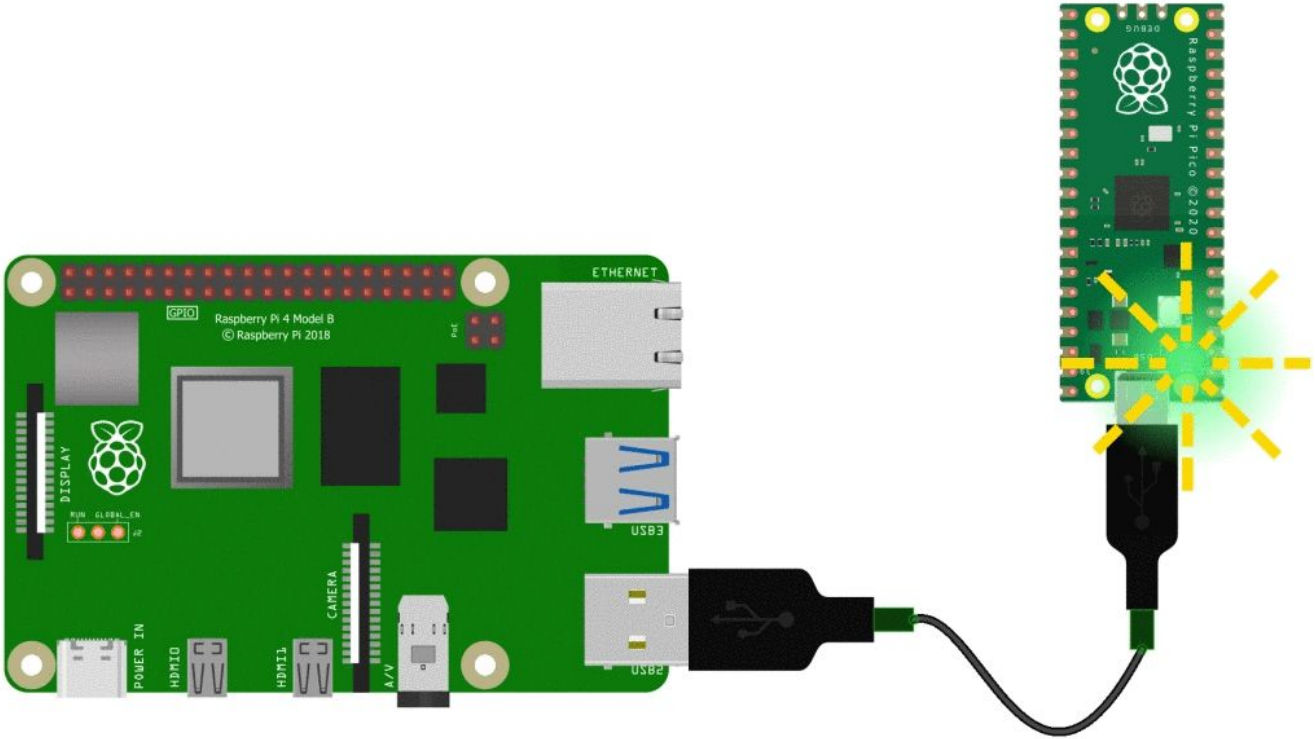


i2C	SPI	UART
Simplex	Duplex	1 to 1
Synchronous	Synchronous	Asynchronous
2 wire	4+ wire	2 wire
1 Mbps	25 Mbps	20Kbps
NO Acknowledge	NO Acknowledge	Acknowledge pins
Medium Power	Low Power	Medium Power
1m Distance	20m Distance	15m Distance

Communication Interfaces on Pico

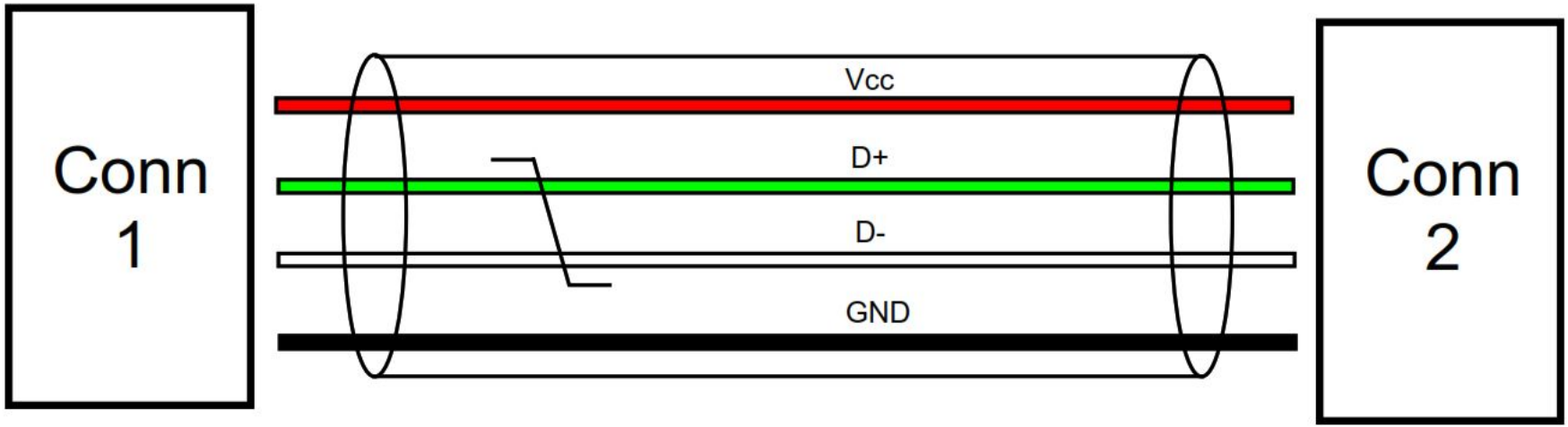


USB Serial Bus



USB Serial Bus

SINGLE USB 2.0 CABLE



Examples

https://github.com/linzhangUCA/3421example-communicate