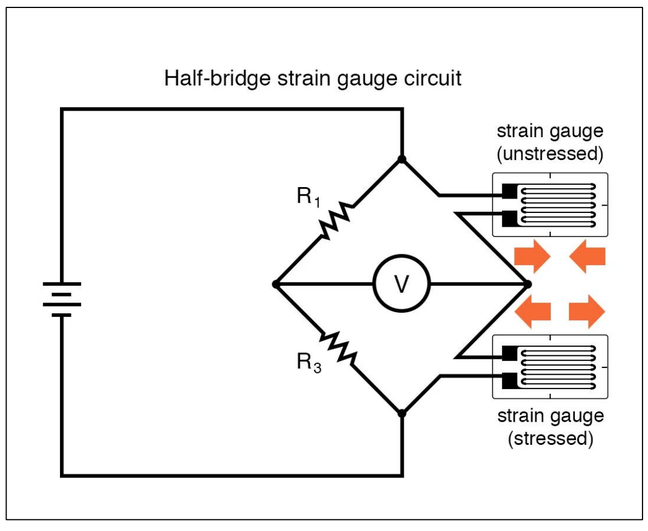
Internet of Things (IoT)

Technische Hochschule Rosenheim

Intelli Shelf
“Smart Shelves, Smarter Inventory”

Motivation

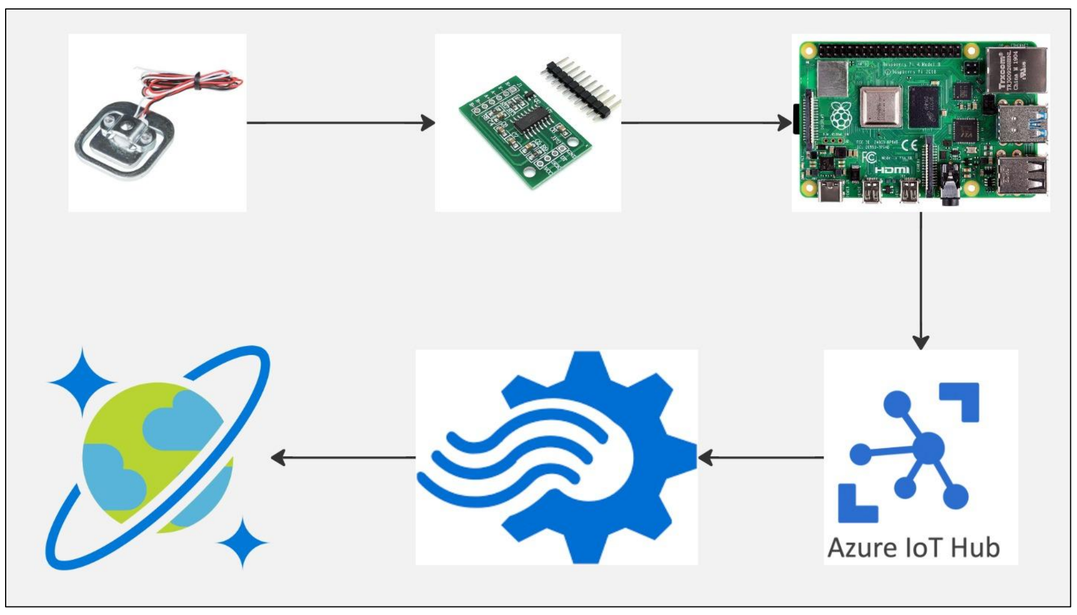
- **Retail Efficiency**: To improve inventory management in retail by providing real-time data on product availability and sales.
- **Automation**: Reduce manual labor and errors in stock management.
- **Customer Experience**: Ensure that products are always available, enhancing customer satisfaction.



Half Bridge Circuit

Technologies

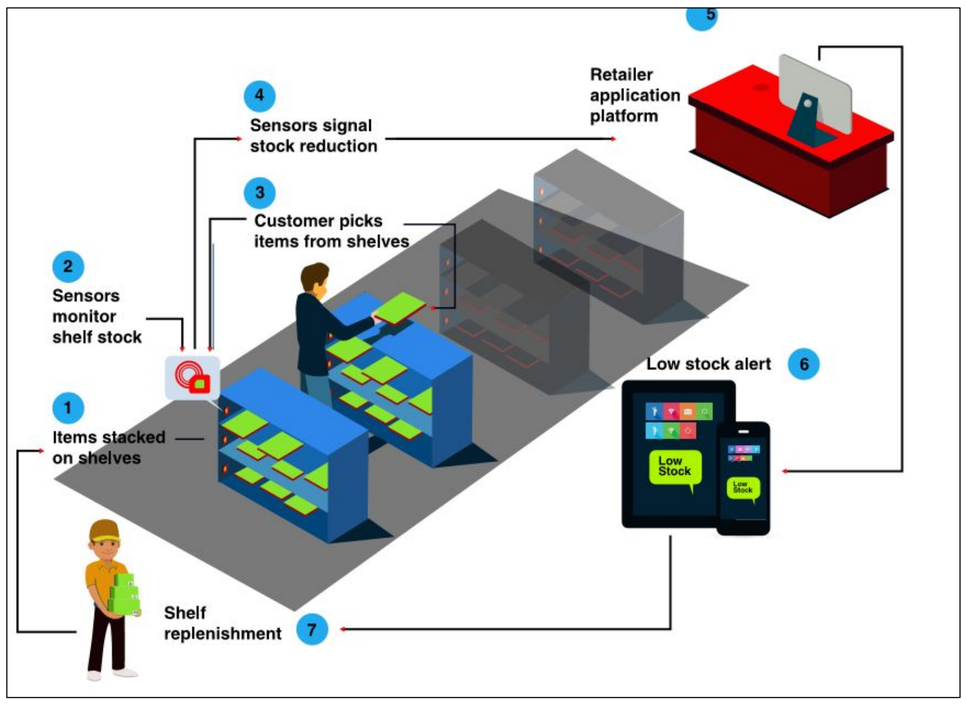
- **Raspberry Pi**: Central processing unit for data collection and communication.
- **Weight Sensors**: Load cells to measure the weight of products on the shelf.
- **Python**: Programming language used for developing the software to process and transmit data.
- **Wi-Fi/Ethernet**: Connectivity solutions for real-time data transmission.
- **IOT Hub:**IoT devices send data to Azure IoT Hub
- **Databases**: Storage of collected data for analysis and reporting.



System Architecture

Further Work

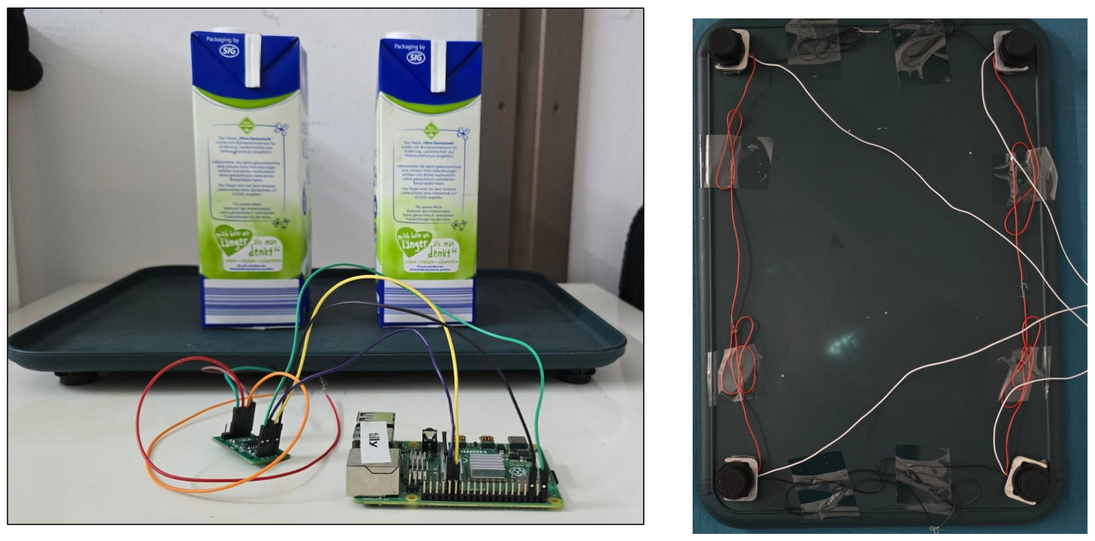
- **Enhanced Accuracy**: Improving sensor calibration and data processing algorithms to ensure precise weight measurements.
- **Scalability**: Expanding the system to handle larger inventories and multiple shelves.
- **User Interface**: Developing a user-friendly dashboard for easier monitoring and control.



Project Visualization

Challenges

- **Weight Accuracy**: Difficulty in obtaining accurate weight measurements due to sensor calibration issues and environmental factors.
- **Connectivity**: Ensuring stable and reliable connectivity of the Raspberry Pi to the network for continuous data transmission.
- **Power Management**: Managing power supply for the Raspberry Pi and sensors to ensure continuous operation.
- **Data Integration**: Integrating weight data with existing inventory systems for seamless operation.



Project Model

Analysis Possibilities

- **Real-Time Inventory Tracking**: Monitoring stock levels in real-time to prevent stockouts and overstock situations.
- **Sales Data Analysis**: Analyzing sales patterns and product popularity to optimize inventory.
- **Customer Behavior Insights**: Understanding customer preferences and shopping habits based on product interaction.
- **Loss Prevention**: Detecting potential theft or misplacement of items through weight discrepancies.

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