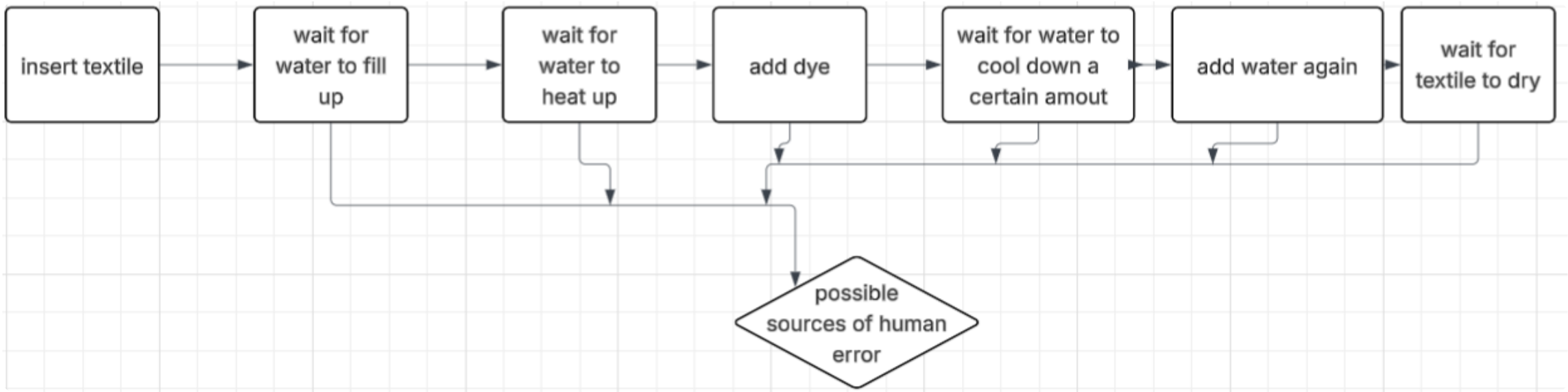
Automation Of Industrial Textile Painting Machine

By: Alyazid Idrissi

Role: Automation Consultant

For: GeoTex



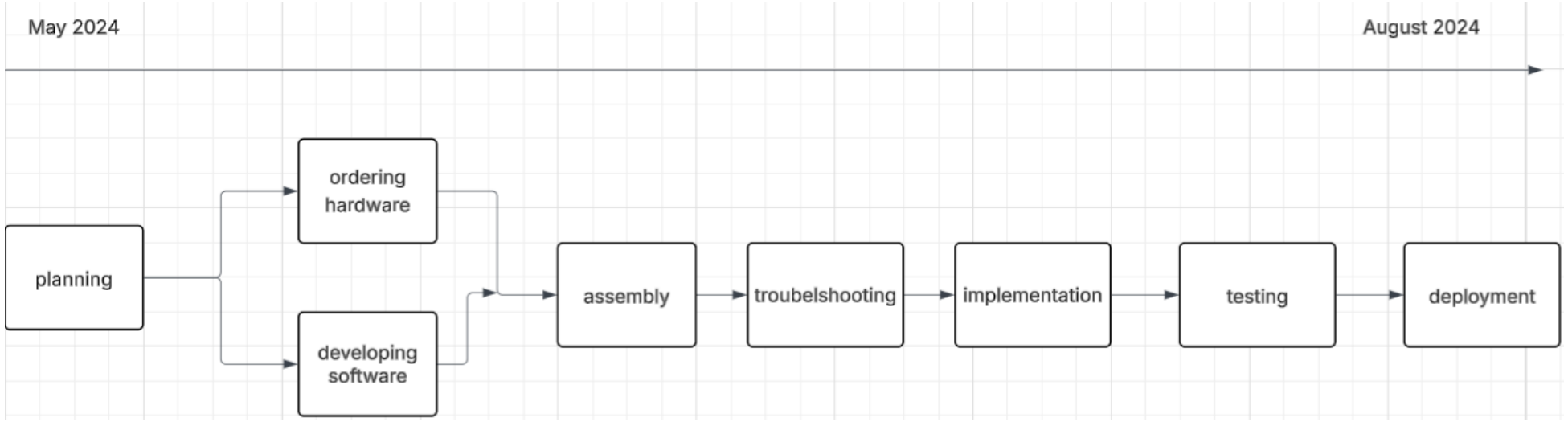
Problem statement

Challenges with old system:

- High dependency on human input
- Inconsistent quality
- Limited data tracking and analysis

These challenges led to the following issues :

- High error rate
- Reduced output
- Higher maintenance and operational cost

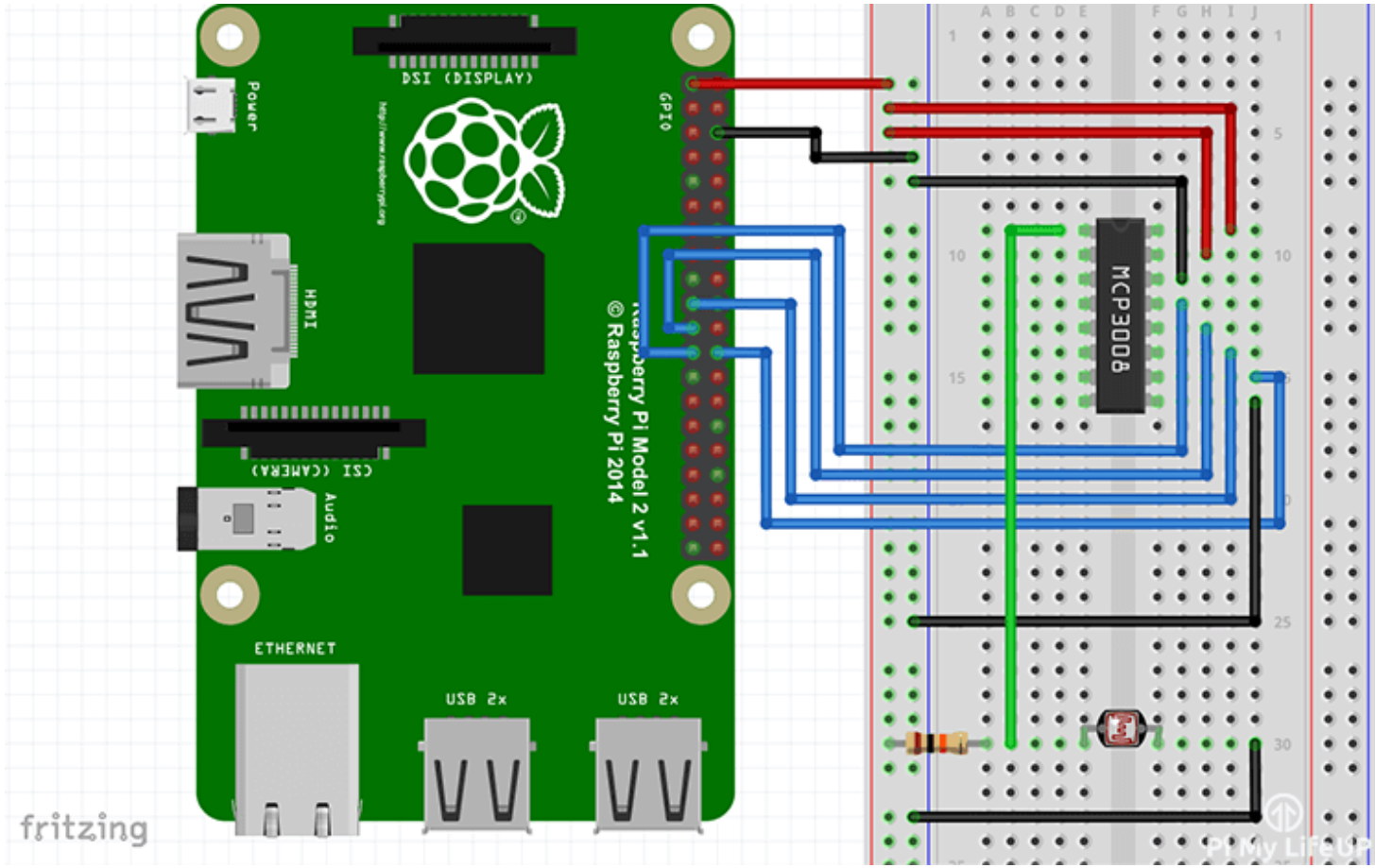


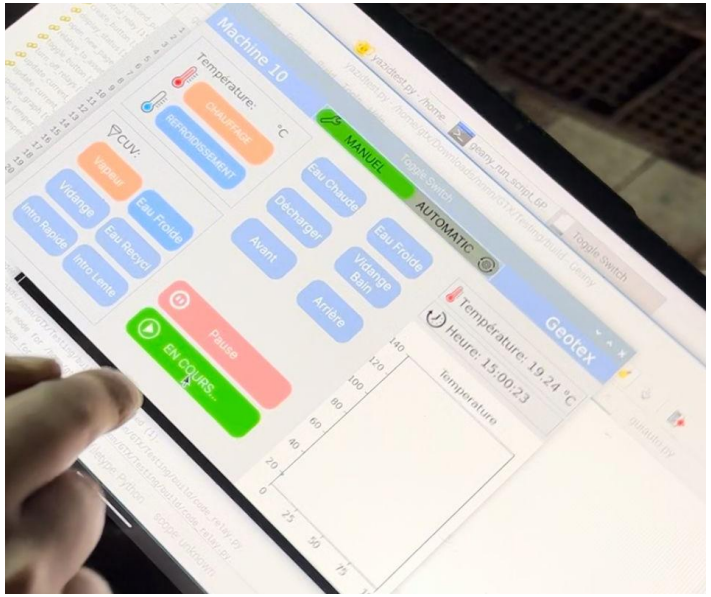
objectives

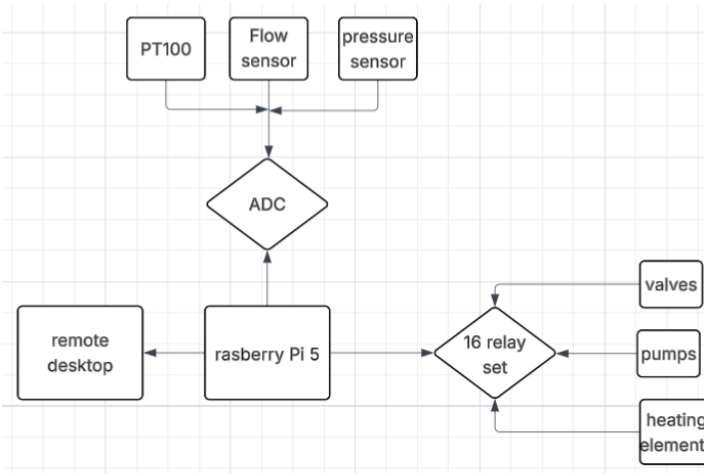
- Main goals are:
  - Introduce automation to legacy machines.
  - Enable remote monitoring, data collection and control
  - Improve reliability, reduce waste and increase output
- Constrains:
  - Keep the machines working in the day.
  - Preserve existing machine manual override and structure

Role and contribution

- Co-led the automation integration
- Was responsible for hardware selection (raspberry pi, relays, translation boards, ...)
- Designed main interface
- Coordinated testing and calibration
- Worked with operation team to ensure seamless transition







System Architecture and Implementation

Hardware integration

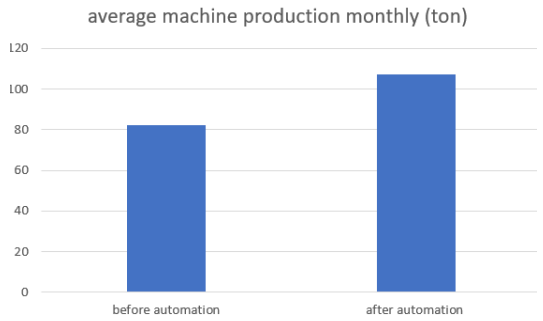
- Raspberry Pi 5 used as the central control unit
- Analog signal translation board connected to: PT100 temperature sensor and analogue flow and pressure sensors
- Relays modules controlled legacy systems such as electro-valves, pumps and heaters

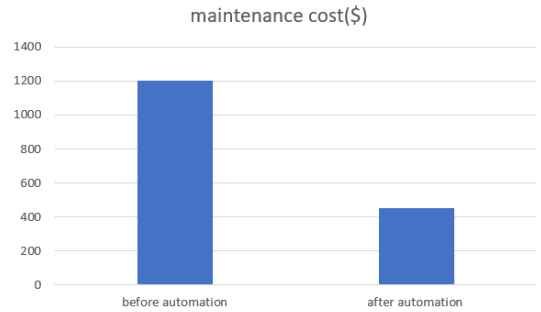
Software and control logic:

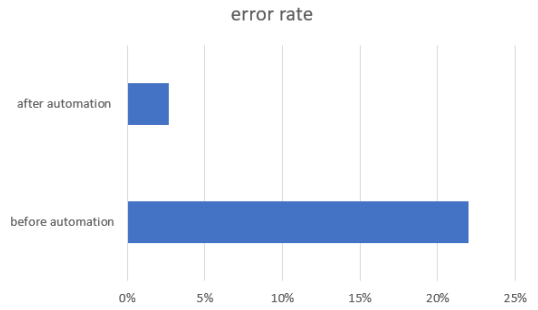
- Python script that for real-time control and data acquisition
- Python built interface that tracks data, and offers remote control

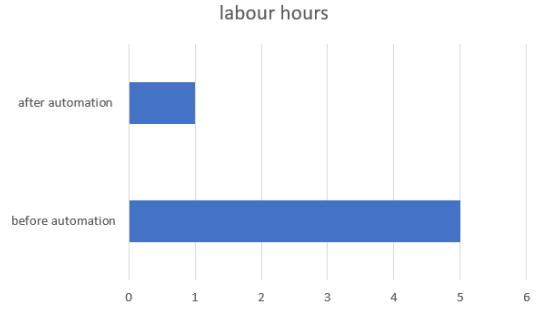
Overcame Challenges:

- Stable analogue signal conversion (noise + calibration)
- Retrofitting into existing infrastructure without disturbing it









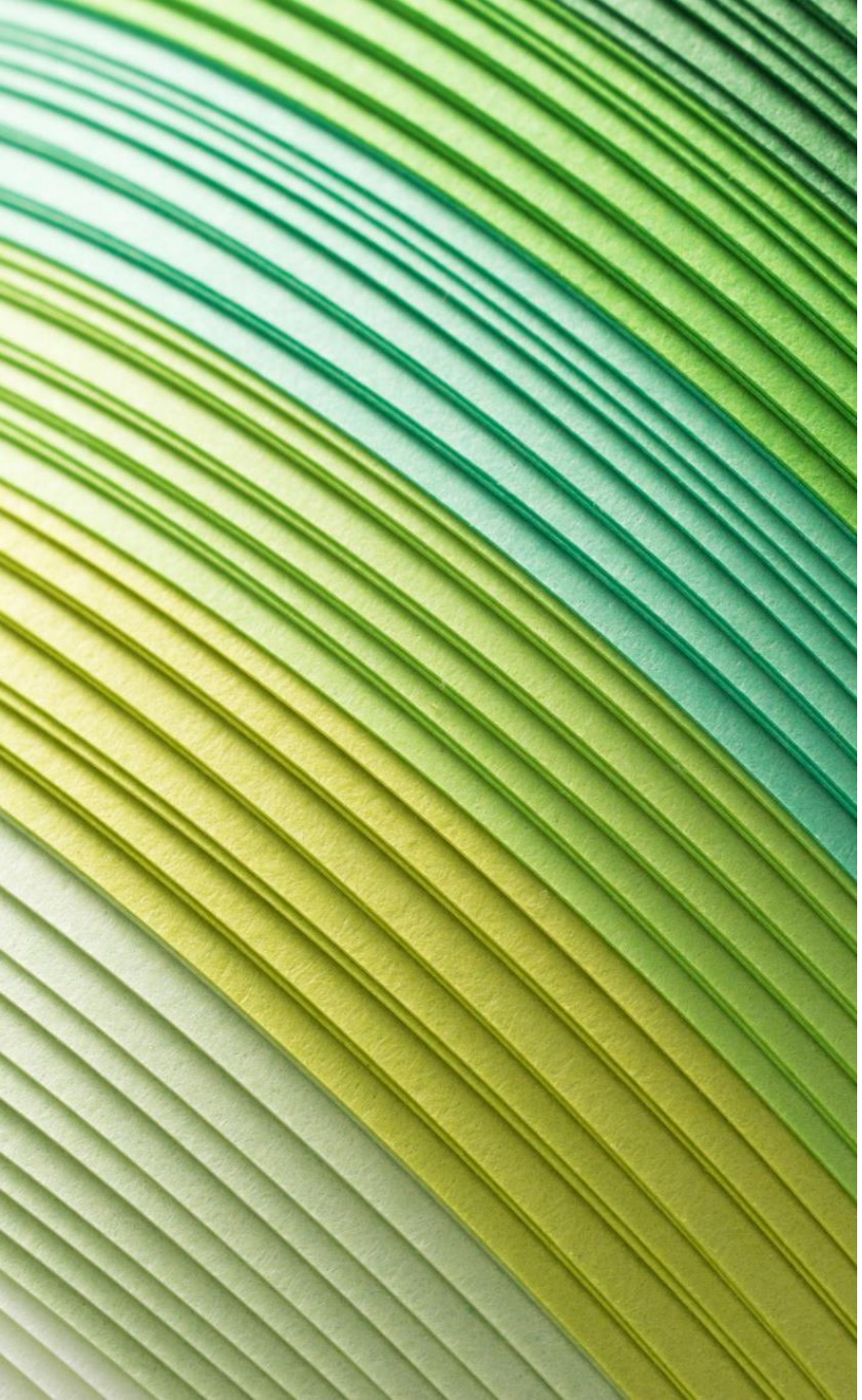
Results and impact

Key metrics after 2 months:

- Improved total machine output by 31%
- Error rate dropped by 20%
- Maintenance cost dropped by 266%
- Labour hours put into each machine dropped by 500%

long term benefits:

- Improved product quality
- Scalability for future upgrades
- Lower maintenance costs and higher reliability



reflection

VALUE OF CONTINUOUS DEVELOPMENT AND IMPROVEMENT.

IMPORTANCE OF USING PAST SYSTEM MISTAKE TO IMPROVE ON FUTURE ONE.

LEARNED A LOT ABOUT CONTROL SYSTEM INTEGRATION AND CROSS-FUNCTION COLLABORATION

Sources

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