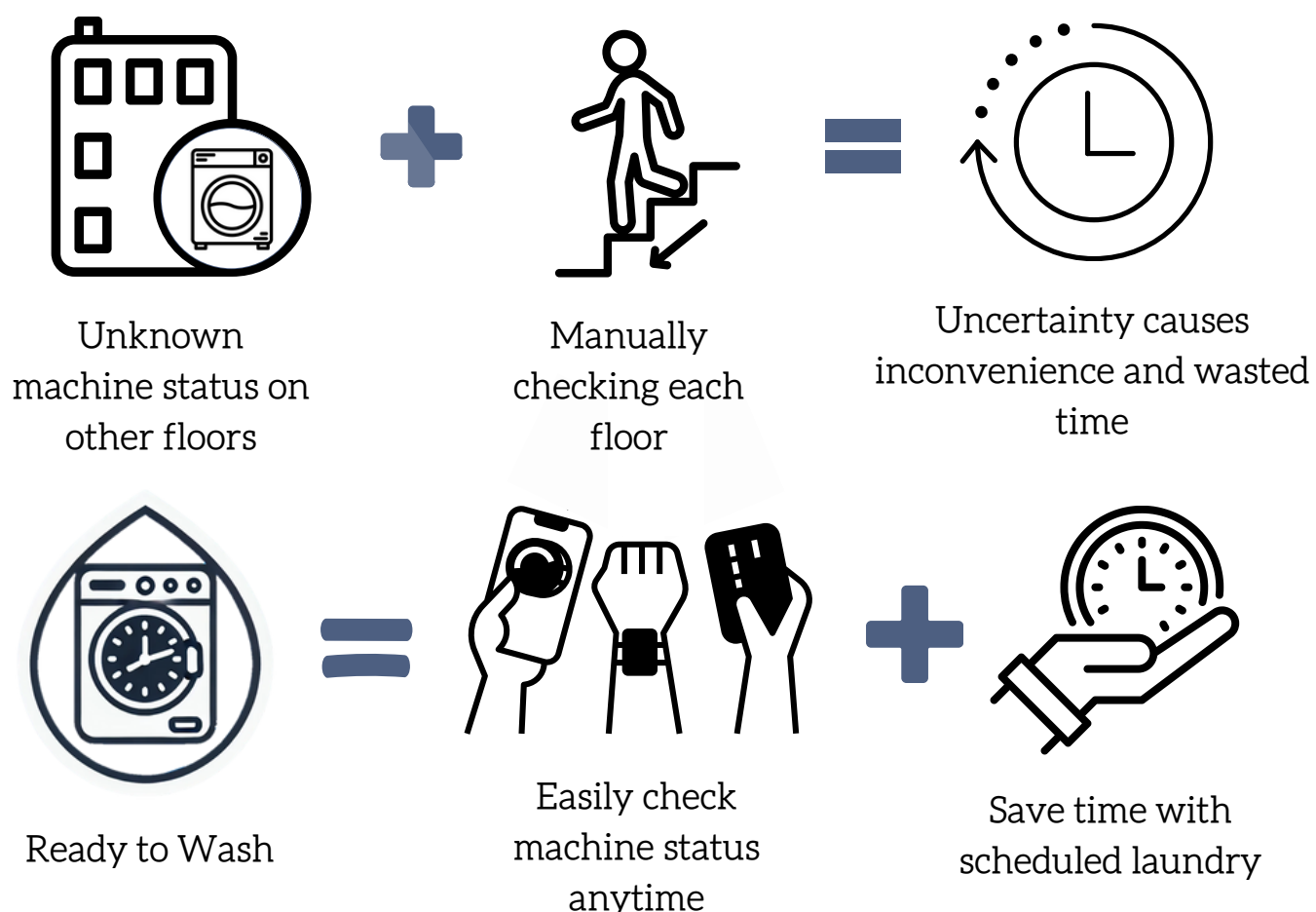
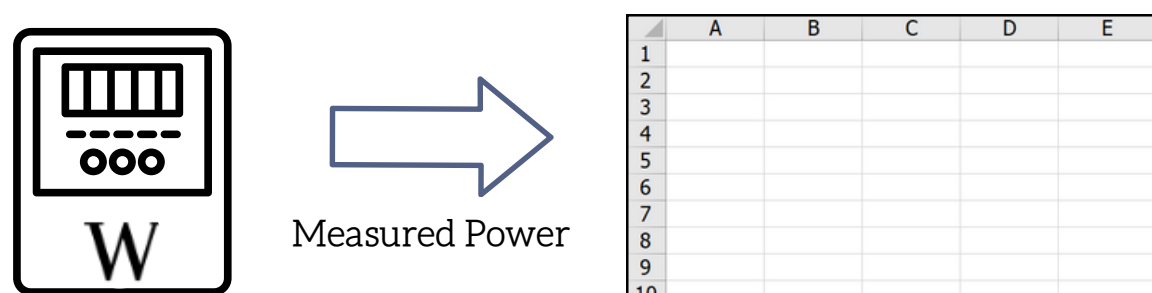


## PROBLEM/QUESTION



## FRAMEWORK/PROJECT DESIGN

### 1 Data Collection



The experiment used a SONOFF POW device to measure power consumption during each stage of the washing machine's cycle. Power data was recorded every second, and this information was later analyzed to correlate power usage with each stage: washing, rinsing, and spinning.

### 2 System Operation

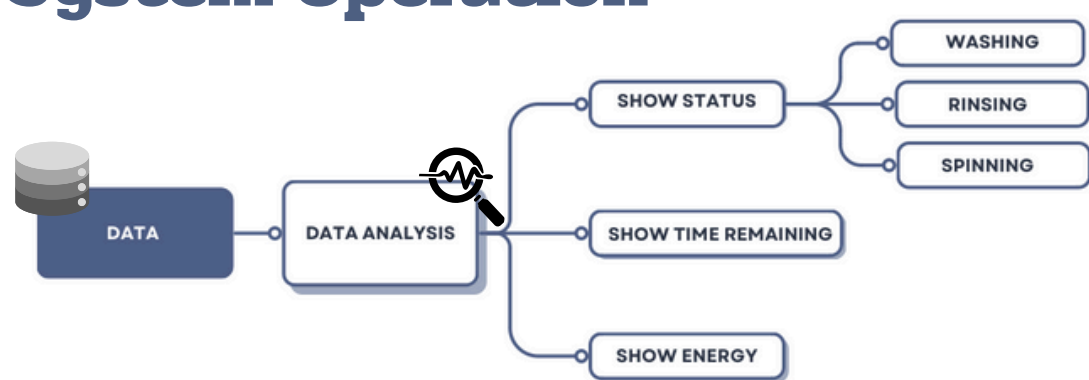


Figure 1: Block diagram for system operation

The system gathers power consumption data during the washing, rinsing, and spinning stages using a SONOFF POW smart plug. This data is processed in LabVIEW to display the machine's status, remaining time, and energy usage by comparing real-time values against predefined thresholds for accuracy. This approach allows for seamless monitoring and efficient performance analysis of the washing cycle.

### 3 Reservation System

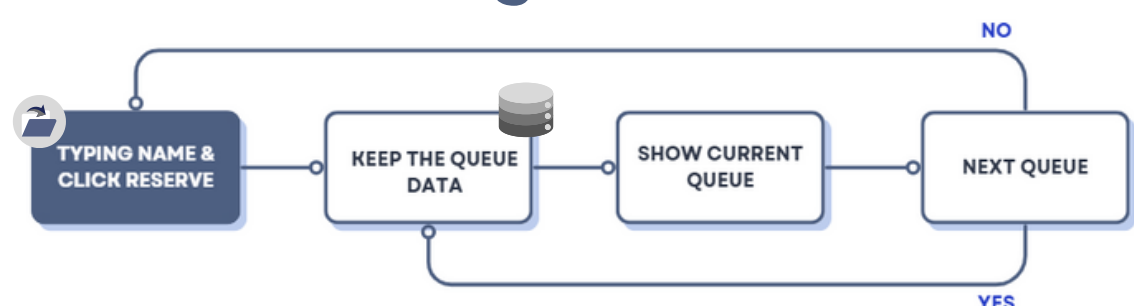


Figure 2: Reservation block diagram

The reservation system functions by allowing the user to input their name and click "Reserve". The system saves the user's queue information and displays the current queue status. If the machine is available, the user is next in line. If not, they remain in the queue until their turn comes.

## FINDINGS

### Experimental Data

The Table 1 shows power ranges for each washing phase. It highlights the minimum and maximum power used during spinning, rinsing, and washing, helping to understand typical energy usage. Washing uses the highest power, with a maximum of 350W, while rinsing and spinning consume similar amounts, both ranging from 100W to 240W.

Table 1: Power range for each washing cycle phase

Cycle Stage	Min Power(W)	Max Power(W)
Spinning	100	240
Rinsing	100	240
Washing	100	350

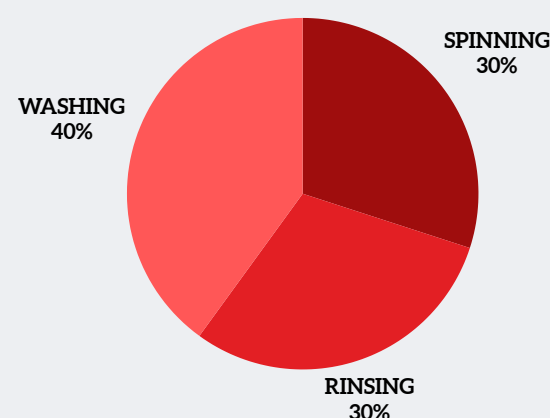


Figure 3: Energy consumption of washing cycle

According to Figure 3, the energy consumption shares for each phase of the washing cycle. Washing consumes the highest percentage, 40%, while rinsing and spinning use an equal share of 30% each. This data reflects how energy is distributed across different washing stages, with washing being the most energy-intensive.

### Ready to Wash

The GUI developed in LabVIEW in Figure 4, which provides real-time updates on the washing machine's status, power usage, and remaining time. Users can interact with this interface to monitor and manage their laundry schedules efficiently.

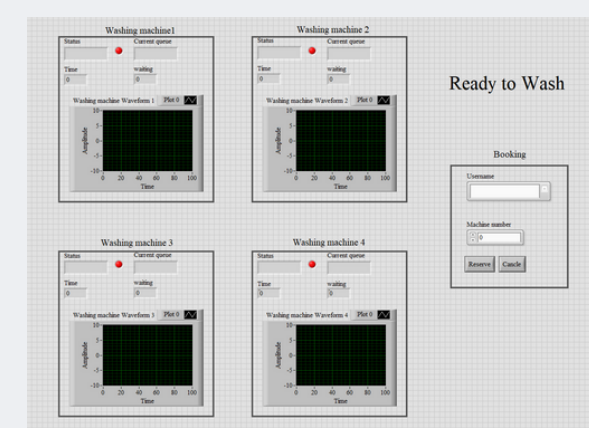


Figure 4: Graphic user interface

Figure 5 illustrates the internal system operations. This diagram demonstrates how power consumption data and machine statuses are analyzed and relayed to the GUI, enabling accurate monitoring and seamless booking functionality.

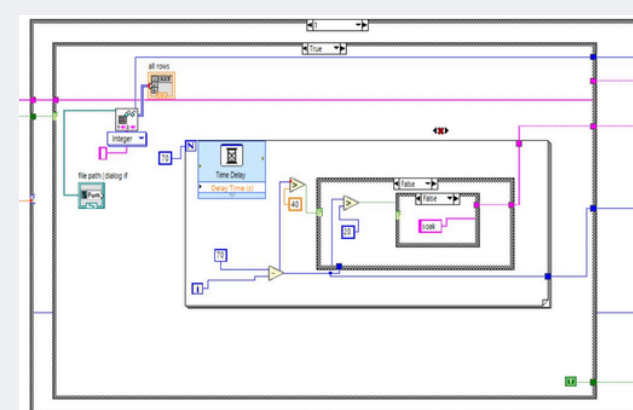


Figure 5: Internal system operation flow

## INTERPRETATION AND CONCLUSION

The system successfully addresses the challenge of monitoring and reserving washing machines in dormitories. Through real-time data collection and analysis using LabVIEW, it accurately tracks the machine's status, power consumption, and remaining time. This allows users to efficiently manage their laundry schedules, reducing unnecessary time spent checking for available machines. The reservation system simplifies the process by allowing users to book a machine in advance, reducing waiting times and providing convenience. Overall, the system enhances the laundry experience in dormitories, making it more organized and efficient for residents.