REPORT ON MECHATRONICS SYSTEM INTEGRATION

6- DAQ-MC interfacing
GROUP 7

SECTION 2, SEMESTER 1, 24/25

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ABSTRACT

The project explores the use of Arduino as the primary DAQ hardware in conjunction with microcontrollers to integrate a Data Acquisition (DAQ) system. The system collects data from an LM35 sensor which determines temperature and an LDR sensor that detects light intensity. A specialist data logging program called PLX-DAQ is used to log the obtained sensor data into Excel once it has been sent to a computer via serial connection. The project illustrates the efficiency of integrating hardware and software for real-time data gathering and analysis by building a basic sensor circuit, writing the necessary Arduino code, and displaying the outcomes in Excel. With a focus on simple visualization and useful information interpretation, the findings demonstrate the potential of such systems for use in environment monitoring and control systems.

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INTRODUCTION

The project explores the use of Arduino as the main form of DAQ hardware in conjunction with microcontrollers to construct a Data Acquisition (DAQ) system. The system collects data from an LM35 sensor which measures temperature and an LDR sensor that detects light intensity. A specialist data logging program called PLX-DAQ is used to log the obtained sensor data into Excel once it has been sent to a computer via serial connection. The project illustrates the efficiency of integrating hardware and software for real-time data gathering and analysis by building a basic sensor circuit, writing the necessary Arduino code, and displaying the outcomes in Excel. With a focus on simple visualization and informative information interpretation, the findings demonstrate the perspective of such systems for use in environment monitoring and control systems.

The goal of this project is to build a simple yet efficient system in order to give a practical grasp of DAQ systems and its components. By integrating Arduino and PLX-DAQ, this project demonstrates the simplicity of integration and the potential uses of such systems in many different kinds of industries, bridging the gap between data analysis and hardware interfacing.

MATERIALS AND EQUIPMENT

- PLX-DAQ
- Arduino Board
- LDR
- LM35
- Jumper
- Wires
- Resistor
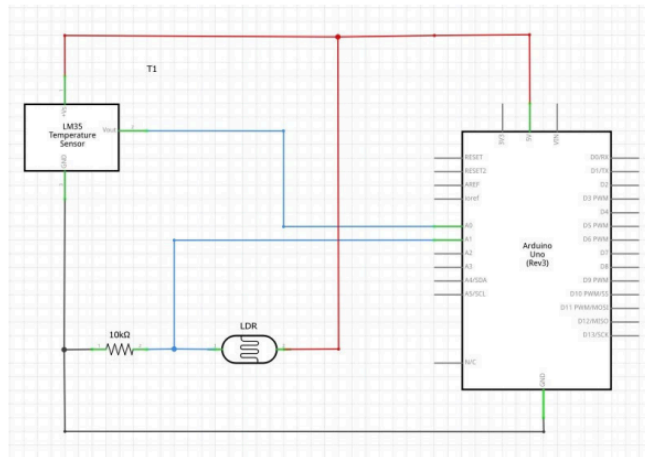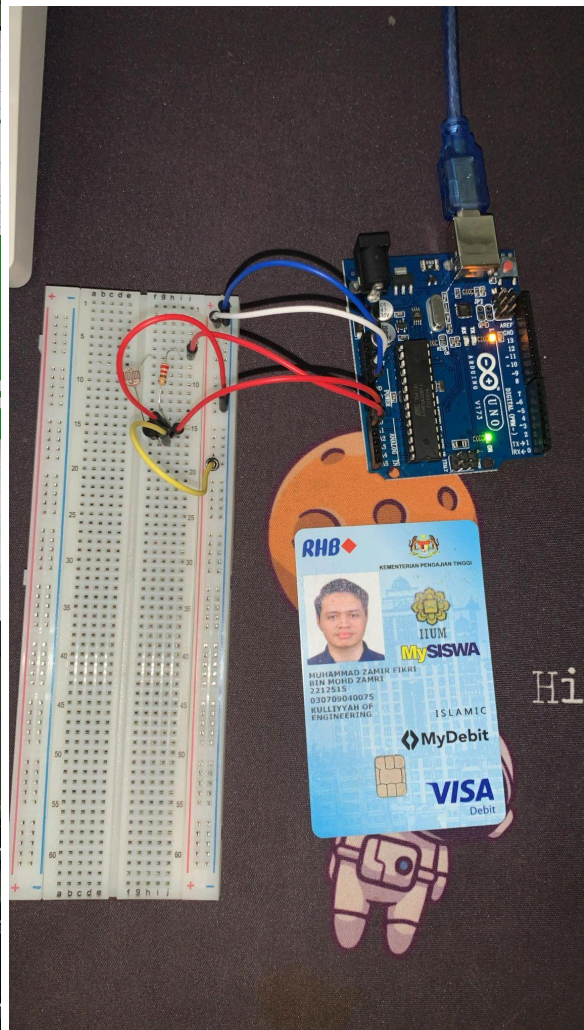- Breadboard

EXPERIMENTAL SETUP

Fig. 3

METHODOLOGY

1. After constructing the circuit, launch Arduino IDE and write code that allows Arduino to read analog signals from the LM35 and LDR and convert it to digital.
2. Complete the example code below. (Alternatively, you may write your own code from the start).
3. Verify the codes and upload it to the Arduino board.
4. Launch the PLX-DAQ spreadsheet. Ensure correct com port is selected and generate the output from the sensors in the spreadsheet.
5. In your report, write the comments to explain each line of the codes and produce meaningful excel plots from the sensors' data.

RESULT

DISCUSSION

This project demonstrates the integration of a simple Data Acquisition (DAQ) system using an Arduino microcontroller alongside LM35 and LDR sensors. The system effectively gathers temperature and light intensity data, which is then logged into Excel in real-time using the PLX-DAQ program. This setup highlights the potential of combining hardware and software for environmental monitoring and other applications requiring real-time data analysis.

The system is straightforward to implement and cost-effective, making it an excellent learning tool for beginners. The ability to log data directly into Excel allows for easy visualization and analysis. However, some limitations were noted. The accuracy of the sensors may not meet the requirements for more precise applications. Additionally, the dependence on a computer for data logging through PLX-DAQ restricts the system's portability.

The project could be enhanced by addressing these limitations. Testing the system in more dynamic environments or adding functionality through additional sensors would improve its usefulness. While the current system provides a basic understanding of DAQ, further development is required to make it suitable for practical applications.

RECOMMENDATION

1. **Improve Sensor Accuracy:**

Consider using sensors with higher precision, such as digital temperature sensors, to increase the reliability of the data collected.

2. **Automate Responses:**

Include components like relays or actuators to allow the system to perform automatic actions, such as adjusting lights or activating fans based on sensor readings.

STUDENT DECLARATION
Certificate of Originality and Authenticity

This is to certify that we are responsible for the work submitted in this report, that **the original work** is our own except as specified in the references and acknowledgement, and that the original work contained herein have not been untaken or done by unspecified sources or persons.

We hereby certify that this report has **not been done by only one individual** and **all of us have contributed to the report**. The length of contribution to the reports by each individual is noted within this certificate.

We also hereby certify that we have **read** and **understand** the content of the total report and that no further improvement on the reports is needed from any of the individual contributors to the report.

We, therefore, agreed unanimously that this report shall be submitted for **marking** and this **final printed report** has been **verified by us.**

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