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Automatic Rain Sensing Window

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A B S T R A C T

The current development of rainwater sensing windows is very helpful in protecting the interior of houses as it works automatically by sensing the water. It is a particularly very helpful device to use in the rainy season. The concept of feeling rainwater to close the window has been introduced previously. It has been developed to use in the automobile sector. But this invention can be used successfully for domestic purposes. This system can evaluate whether the water particles are contracting with the window or not; sensing this, it will close automatically to protect the house's interior. Key Words: Mechatronics, Water sensing, Window, Rainwater. Arduino is a physical programmable board. A broad array of sensors can be attached to this board, and many third-party libraries can be Linked with an Arduino sketch.

Moreover, Arduino hardware components are cheaper concerning other controller architecture, and the programming language is Easy. Therefore, Arduino has more incredible applications. In this paper, the roles and importance of Arduino among microcontroller boards are defined. First, Various types Of Arduino boards are identified. Second, various Arduino applications are determined from the literature reported in the literature and are surveyed and Analyzed. In the last, we will also conclude the work done.

Keywords: Rain, Sensor

Introduction

The previous year, we studied microcontrollers, actuators, sensors, PLCs, etc.. We are Studying and will make this project based on microcontrollers (Arduino Uno) and sensors. During the rainy season, the door and as well as the windows are closed after some time. Due to the Absence of the human being. Usually, people will try to close windows when it rains outside. But it must take time to be done. It may be stuck at the time of closing or opening the windows. And also, some Of the windows are kept open because of the Absence of the person in his Home. To avoid this problem, We made a setup called an automatic rain-sensing window opening and closing during the rainy Season. It helps people to close windows on buses and buildings automatically. In this project, we use the Raindrop sensor to detect the rain and a dc motor to close and open the Window. The Rain Detector Using Arduino and Raindrop Sensor is use to alert the surrounding when it's Raining outside. The system is controlled with Arduino UNO. If the waterfalls are on the Raindrop sensor, It detects that it's raining outside, and a led connected to it will glow and alert the surroundings. The dc motor starts moving when It rains and closes the Window so that rainwater can't-come inside the Home in this Arduino project. Arduino is a microcontroller that uses ATmega328p IC for its functioning. Many types of Arduino boards are available in the worldwide, but we apply Arduino UNO for this project. For controlling the Dc motor, we use the L293D motor driver module. Complete the connections as given below in the circuit Diagram and upload the Arduino code.

1.1 Principle

The rain sensing window is works on a lead screw mechanism with some electronic components. During the rainy season the door and as well as the windows are not closes immediately. Due to the Absence of the human being. Usually person will try to close windows when it rains outside. But it cannot be done easily.it may be stuck at the time of closing or opening the windows. And also some of the windows are kept opened because of absence of the person on his home. To avoid this problem we made a setup called as automatic rain sensing window opening and closing during the rainy Season.

It helps people to close windows on the buses and buildings automatically.

2. Literature Review

The Arduino project began in 2005 as a tool for students at the Interaction Design Institute Ivrea, Italy,aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors. The name Arduino comes from a bar in Ivrea, Italy, where some of the project's founders used to meet. The bar was named after Arduin of Ivrea, who was the margrave of the March of Ivrea and King of Italy from 1002 to 1014.

Founding :The Arduino project was started at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy. At that time, the students used a BASIC Stamp microcontroller at a cost of $50. In 2003 Hernando Barragán created the development platform Wiring as a Master's thesis project at IDII, under the supervision of Massimo Banzi and Casey Reas. Casey Reas is known for co-creating, with Ben Fry, the Processing development platform. The project goal was to create simple, low cost tools for creating digital projects by non-engineers. The Wiring platform consisted of a printed circuit board (PCB) with an ATmega128 microcontroller, an IDE based on Processing and library functions to easily program the microcontroller. In 2005, Massimo Banzi, with David Mellis, another IDII student, and David Cuartielles, extended Wiring by adding support for the cheaper ATmega8 microcontroller. The new project, forked from Wiring, was called Arduino.

The Initial Arduino core team consisted of Massimo Banzi, David Cuartielles, Tom Igoe, Gianluca Martino, and David Mellis

Post-dispute : In October 2017, Arduino announced its partnership with ARM Holdings (ARM). The announcement said, in part, "ARM recognized independence as a core value of Arduino ... without any lock-in with the ARM architecture". Arduino intends to continue to work with all technology vendors and architectures. Under Violante's guidance, the company started growing again and releasing new designs. The Genuino trademark was dismissed and all products were branded again with the Arduino name.

3. Design

3.1 Linkage mechanism

A lead screw, also known as a power screw or translation Screw, is a screw used as a linkage in a machine to convert turning motion into linear motion. Because of the large area of sliding contact Between their male and female members, screw threads have more considerable Frictional energy losses than other linkages. They are not typically applied to carry high power but more for intermittent application in low Power actuator and positioner mechanisms. Lead screws are commonly used in linear actuators, machine slides (such as in machine tools), vices, Presses, and jacks. Lead screws are a common component in electric Linear actuators. Lead screws are manufactured like other thread forms (they may be cut, rolled, or Ground). A lead screw is sometimes with a split nut (also known called half nut) which allows the nut to be disengaged from the threads and moved axially, independently of the screw's motion, whenever required (such as in single-point threading on the manual lathe). A split nut may also be used to compensate for Wear by compressing the parts of the nut. A hydrostatic lead screw overcomes many of the disadvantages of an ordinary lead screw, having high Positional accuracy, very low friction, and shallow Wear, but requires a continuous supply of high-Pressure fluid and high precision manufacture, leading to a significantly greater cost than most other Linear motion linkages.

Fig. 1 - Lead screw mechanism

3.2 List of components used

1.Window frame

2.Lead screw

3.Dc Motor

4.Plywood foundation

5.Battery

6.Arduino Uno

7.Rain Sensor

8.Relay module

10.Jumper wires

11.Reversible switch

3.3 Final project model

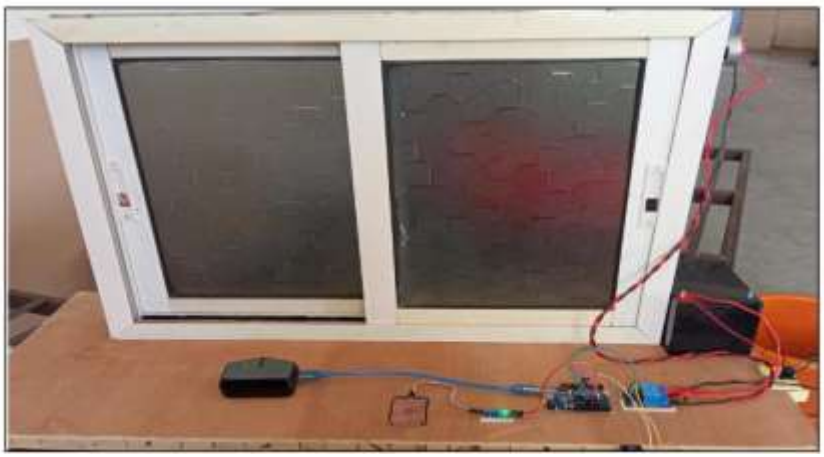

Fig.03 Final project model

It is final working model i.e. works on a 12 volt dc supply. And arduino microcontroller has operated at 5 volt power supply. Which is connected to power bank.

4. CONCLUSION

We learnt that designing a new product is a challenging task. It requires a lot of rigorous research and calculation. Several factors have to be considered, and approximations have to be made. This has to be a team effort since an individual only has limited knowledge and experience. A lot more experience has to be gained before we become professional designers. We are aware that the project has its weaknesses. However, we also feel it is a healthy design that can be brought into the market after eliminating the limitations. The limitation here is the design of the cap and the stroke of the screw.

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