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Lab Automation using Embedded System

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Abstract: ***This project involves design and construction of automated lab system using arduino mega, GSM technology, RFID technology, Bluetooth technology. In today's age of automation, the focus of making our educational institutions smart and automatic is necessary. For that in this project, we would be implementing the automated lab. We are firstly concerned with the security of the lab where, the entry of the lab is only allowed for the authorized person by using radio frequency technology. To save energy we have implemented automation of electrical appliances using centralized control system based on the Bluetooth technology, In this we will use Bluetooth app to control electrical appliances. We have also included fire detector to detect fire related hazards. If temperature becomes very high so that there is chances of fire then call through the GSM module will make to the lab assistant and buzzer will buzz. In case, suppose lab catches fire then water sprinkling will start which will help to control fire.***

I. INTRODUCTION

In today's age of automation, the focus of making our educational institutions smart and automatic is necessary. Lab is one of the important part of educational institutions. In existing system, there is a issues related to security, power consumption and fire. The existing system has following drawback:

A. Excessive power consumption
B. Heating up of the systems
C. huge loss in data due to less security
D. Fire problems are not detected immediately

To overcome these issues, we would be implementing the lab automatio using embedded system

II. PROPOSED SYSTEM

In proposed system we have included three module.

A. Security with RFID
B. Controlling light fan using Bluetooth module
C. Give immediate solution to fire problem

1) Working: In this we have to show RFID card to the reader which is fitted on the door. If the data inside the RFID card matches with the data in reader then the servo attach to the door will rotate and door will open,to come out of the lab there is a IR sensor, when IR sensor will sense the radiation inside the body the door will open and we can go out. If data inside RFID card doesn't match it will considered as unauthorized entry and to detect it there is a buzzer and message to lab assistant. As nowadays there is more power consumption to avoid these we are implementing, automation of electrical appliances

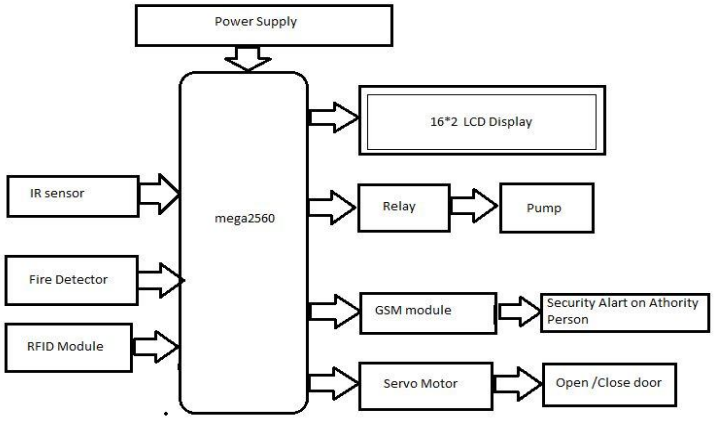

Fig. 1: semantic block diagram of the proposed lab automation system

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III. REQUIREMENT ANALYSIS

A. Hardware Component

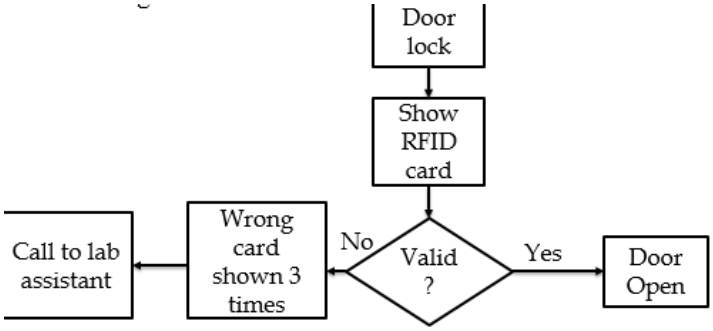
1) Arduino mega
2) Relay
3) RFID cards
4) RFID Reader
5) Servo Motor
6) Bluetooth HC05 Module
7) GSM Module
8) Water Pump
9) Fire Detector

B.Software Components

1) Arduino Software

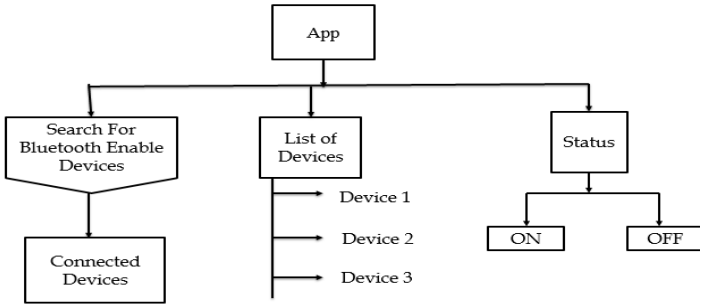
IV. IMPLEMENTATION DETAILS

A. Working of RFID



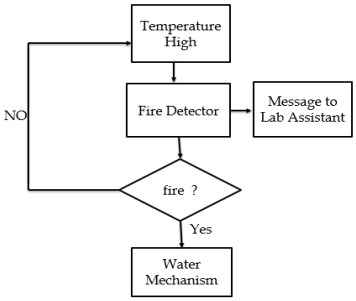
The Basic necessity of security can be attained by designing various door locks such as mechanical locks or electrical locks. These kind of door locks are designed with one or more keys, but for locking a large area various locks are needed. Electronic are better over mechanical locks.

B. Working Of Bluetooth App



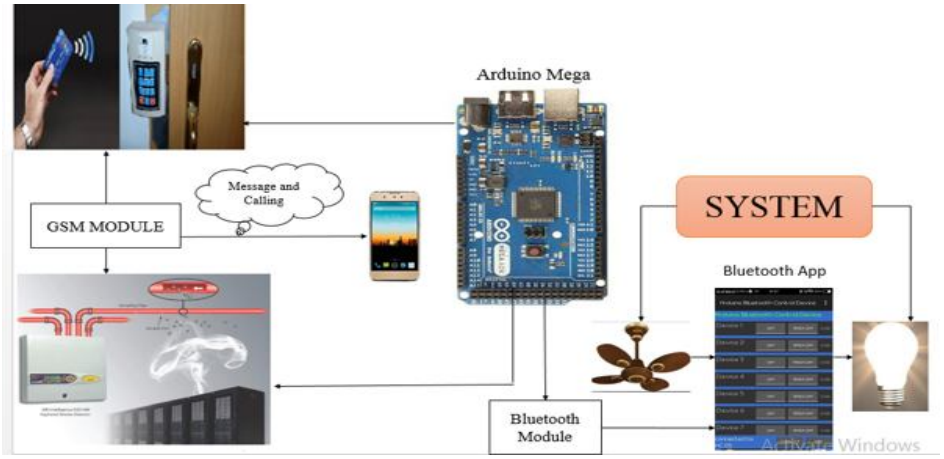
In this project we are going to make a lab automation system using Bluetooth Arduino Uno. Using this we will be able to control lights, electric fan and other home appliances through a web browser using your PC or mobile.

C. Working of Water Mechanism



A submersible pump, also called an electric submersible pump, is a pump that can be fully submerged in water. The motor is hermetically sealed and close-coupled to the body of the pump.

V. RESULT



VI. ADVANTAGES

The main goal of our proposed system is to provide the security and make Lab user friendly. Lab Automation has following advantages

A. Secure, compact & Easy to handle.
B. System is User friendly.
C. Energy Efficiency.
D. Convenience.
E. Gives precautions to avoid the hazards.

VII. CONCLUSIONS AND FUTURE SCOPE

The proposed system is real time. Only authorize person can enter in the system .System enable to consume low power. It can immediately notify the fire hazards and take immediate action. Our proposed system has the following future scopes:

A. It can be used for high security in college and other organizations.
B. Connecting more devices.
C. Using real time clock, the appliances which need response in real time can also be controlled through wireless link
D. This system can be used in Industries, Offices, Home and so on.

VIII. ACKNOWLEDGMENT

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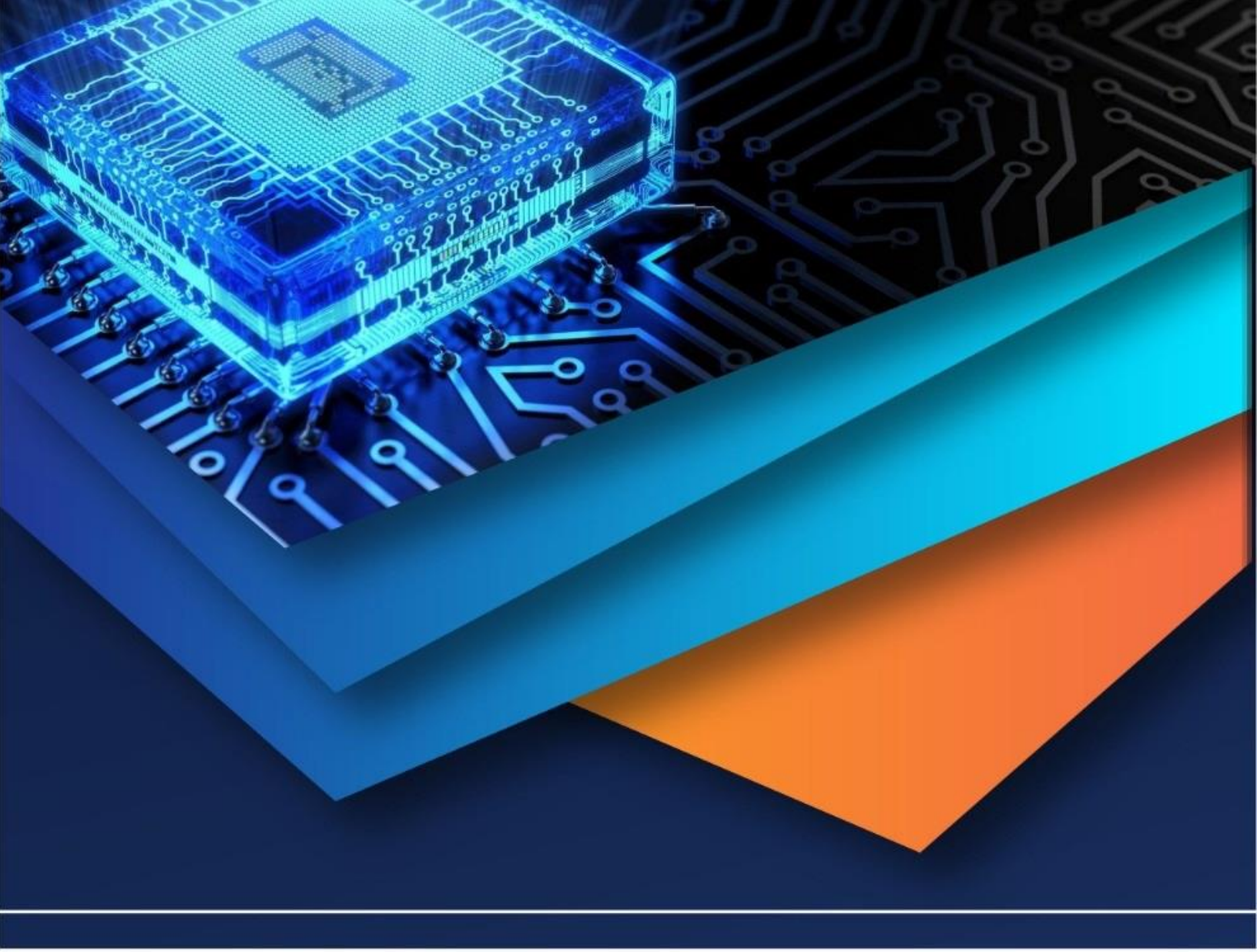

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