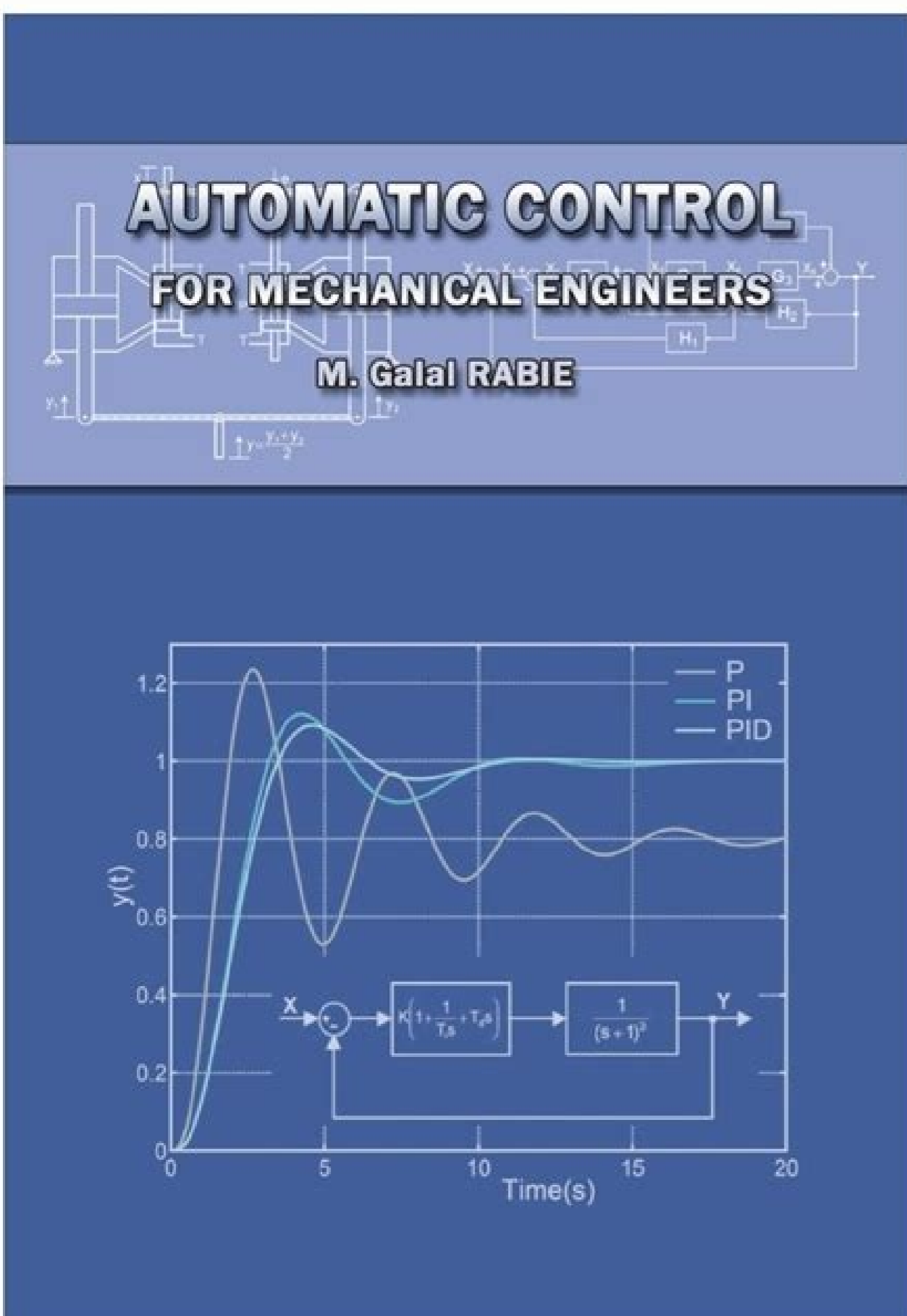


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Automatic Access Control System using Arduino and RFID

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Abstract Wireless security based applications have rapidly increased due to the dramatic improvement of modern technologies. Many access control systems were designed and/or implemented based on different types of wireless communication technologies by different people. Radio Frequency Identification (RFID) is a contactless technology that is widely used in several industries for tasks like access control system, book tracking in libraries, tollgate system, supply chain management, and so on. In this paper, automatic RFID-based access control system using Arduino was designed. The system combines RFID technology and Arduino to accomplish the required task. When the RFID reader installed at the entrance detects an RFID tag, the system captures the user unique identifier (UID) and compares it with the stored UID for a match. If the user UID captured match with any of the stored UID, access is granted; otherwise access is denied. The results clearly show that the system is cheap, effective, and a reliable means of granting or denying access in a secured environment.

Keywords Arduino, RFID, Access Control, Arduino IDE, UID, Sensors

1. Introduction

Security systems play an important role to prevent unauthorized personnel entry into a secured environment, which may include physical and intellectual property. Various door locks such as mechanical locks or electrical locks were designed to attain basic security requirements. Basically, these locks can be easily hacked by unwanted people thereby allowing unauthorized personnel into secured premises. Automatic access control system has become necessary to overcome the security threats faced by many organizations in Nigeria. By installing the system at the entrance will only allow the authorized personnel to enter the organization. The system is not restricted to main entrance installation, but can be installed at various entrances within the organization to track personnel movement thereby restricting their access to areas where they are not authorized.



Figure 1: RFID Based Door Lock System [1]

Design and Implementation of Remote Controlling and Monitoring System for Automatic PLC Based Packaging Industry

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Abstract— This paper presents an implementation of a human machine interface (HMI) for a programmable logic controller (PLC) based automated packaging process that can be remotely controlled and monitored using mobile application. A conveyor belt does the moving of products to a destined place for packaging, is controlled by Siemens LOGO! 230 RCE PLC. Microcontroller (arduino uno) operates the relays according to the output of IR sensors, which are used to sense the products. States of relays are taken as the input of the PLC. An HMI is designed with an android application and the microcontroller (as the processor) that establish a communication path between the operators and PLC based plant. The interface provides remote controlling and monitoring feature. The proposed design minimized the overall cost by replacing the widely used supervisory control and data acquisition (SCADA) system with normal sensors and mobile application based control. The performance of the implemented prototype is evaluated through several real-time operations, which shows satisfactory results.

Keywords— PLC, Arduino Uno, Android-based application, SCADA, Conveyor belt, Packaging process.

1. INTRODUCTION

Industrial automation is one of the most global trends that enhances the quality of production, safety and proper utilization of plant and resources. From the economic view, mass production is the main goal of any industry to stay ahead in the recent competitive market [1]. The mass production can be eased through the process automation. In any kind of industry, packaging is a widely used process. Packaging is done for providing protection and safety of products from dust, moistures and other objects that are harmful to the products. The packaging also provides better handling, transporting and, stable storage capability, company branding and many more [2]. The manual packaging process is toilsome work and costly, as a large number of workers is required for it. Therefore, many companies switching to industrial automation for cost-effective and uninterrupted production. Automation of the packaging process with remote control and monitoring

system will provide more reliable and developed packaging with less error and less probability of hazards [3]. In industry, an essential equipment of product processing is the conveyor belt. Conveyor belt performs the functions include rotation, accumulation, flipping, stacking, and diversion of products depending upon the application. There are several conveyor belt systems are used in industries. In Table I, numerous conveyor belt systems are enlisted with their working domain [4].

TABLE I
CONVEYOR BELTS AND WORKING DOMAIN

Types	Working Domain
Roller	Belt, rings or chains powered rollers
Sortation	Diverts product one region to another or one belt to another. Mainly used for sorting.
Accumulation	Holds products for a fixed time or for a fixed quantity gathering.
Screw	Consist of helix pushes loose products forward such as powdered or mixed products.
Cannusel Indexing	Conveyed products to upward.

In the area of industrial automation, programmable logic controller (PLC) found greater interest for its robustness and low-cost implementation. PLC is a kind of small computer specially designed for industrial purpose, performs several functions including logical operations, counting and arithmetic functions to control various process or machinery through digital or analog modules [5]. Various automation of packaging using PLC and supervisory control has been proposed and implemented by numerous researchers around the world. Each automation has its own pros and cons. A brief discussion has been made on the various automation of packaging processes in Section II. It is found that most of the automation is applicable for large industries, complex in nature, expensive and not affordable for small industries. To overcome the aforementioned limitations, an affordable, less-costly and simple packaging process is proposed. The main contributions of this paper are:

- For lower capital industries, SCADA and other supervisory devices are used for feedback and

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