

**FACULTY OF ENGINEERING**

**DEPARTMENT OF COMPUTER AND ENGINEERING**

**TITLE:**

**IMPROVED PASSIVE INFRA RED MOTION SENSOR SWITCH**

**BY**

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**Project report submitted to the faculty of engineering, department of computer and electrical engineering in partial fulfillment of the requirement for the award of a diploma in industrial electronics and electrical engineering.**

### SATISFICATION

This is to satisfy that this project was our own handwork (written and constructed by the students listed above and has been prepared in accordance with regulation governing the writing and presentation of projects at BUSITEMA UNIVERSITY, FACULTY OF ENGINEERING, DEPARTMENT OF COMPUTER ENGINEERING.

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## DECLARATION

We do hereby declare that this project report compiled is our original work and to the best of our knowledge, it has never been published or submitted for the award of any academic qualification in any higher institution of learning.

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## ABSTRACT

This report represents automatic lighting and security system design using PIR motion sensor. Using this sensor, we can certainly minimize the consumption of electrical power. Power crisis is one of the most common problems in Uganda. With the help of the sensors we can eliminate this shortage by minimizing the wastage of electrical power or saving our generated power. PIR is the type of sensor that gives us signal when anything crosses its rays. It is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. It is a low-cost device used to detect a change in motion in its surroundings within different range of radius. A PIR-based motion detector is used to sense movement of people, animals, or other objects. It can also be helpful in the security systems. In many offices there are pavements where lights kept switched on for the whole night and day. But if we use the sensor then only when it gets motion it will give signal and the lights will be switched on. The whole process can be controlled by using microcontroller. Using the received motion from any movements, the PIR sensor gives high signal to the microcontroller. So we can easily create a program for the microcontroller for setting up an alarm. So this project is very lower costing and also power saving. It also minimizes the electric bills of any office. Moreover, it creates an opportunity for minimizing the load shedding in the cities and villages.

## DEDICATION

We dedicate all our efforts and struggles of the educational life to our dear parents. without them we are meaningless. we also dedicate this report to entire Busitema University for providing the better and convenient platform for our studies and other co-circular activities which we acquired from the university. we humbly thank for their support during our studies may the Almighty our Lord bless you all abundantly.

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We also give a special appreciation to our families for mainly financial support towards the accomplishment of our project.

Lastly, great appreciation to our friends Thomas and Abubakar for the great advices and guidance they rendered to us.

## LIST OF ABBREVIATIONS

PIR: Passive Infra-Red

IR: Infrared

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# 1Chapter one Introduction

## 1.1 Background

The first motion detector was invented in the early 1950s by Samuel Bango, and which was a burglar alarm. He applied the fundamentals of a radar to ultrasonic waves – a frequency to detect fire or thief and that which human beings cannot hear. Samuel motion detector is based on the principle of Doppler Effect. Nowadays, most of the motion detectors work on the principle of Samuel Bango's detector. IR sensors and microwave sensors can detect motion by the alterations in the frequencies they emit.

Motion detectors are used as security systems in banks, offices and shopping malls, and also as intruder alarm in home. The prevailing motion detectors can stop serious accidents by sensing the persons who are in close proximity to the detector. We can observe motion detectors in shopping malls or stores with automatic doors. The main element in the motion detector circuit is the dual infrared reflective sensor or any other detecting sensor.

An electronic motion detector contains an optical, microwave, or acoustic sensor, and in many cases a transmitter for illumination. However, a passive sensor only senses a signal emitted by the moving object itself. Changes in the optical, microwave, or acoustic field in the device's proximity are interpreted by the electronics based on one of the technologies listed below. Most inexpensive motion detectors can detect up to distances of at least 15 feet (5 meters). Specialized systems are more expensive but have much longer ranges. Tomographic motion detection systems can cover much larger areas because the radio waves are at frequencies which penetrate most walls and obstructions, and are detected in multiple locations, not just at the location of the transmitter.

Motion detectors have found wide use in domestic and commercial applications. One common application is activation of automatic door openers in businesses and public buildings. Motion sensors are also widely used in lieu of a true occupancy sensor in activating street lights or indoor lights in walk ways (such as lobbies and staircases). In such "Smart Lighting" systems, energy is conserved by only powering the lights for the duration of a timer, after which the person has presumably left the area. A motion detector may be among the sensors of a burglar alarm that is used to alert the home owner or security service when it detects the motion of a

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