Third Eye-Office Automation using Image Processing

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Abstract-With the continuous growth of technological devices in its popularity and functionality, the demand for advanced applications in people's daily lives is continuously increasing. People are becoming more dependent on technology to carry out basic activities. With the increased awareness of conservation of electricity and various other energy sources,many industrial firms are willing to take steps to conserve it. An attractive market can be developed for office automation which is represented by busy individuals and those with physical limitations. This project introduces the intelligent office automation system which is developed using Intel Galileo (development board) with MATLAB. The office automation system is used to control lights and electrical appliances in an office using gestures and human recognition.

Keywords- *intelligent office automation, image processing, gesture recognition, intruder detection.*

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I. INTRODUCTION

In todays world energy generation and conservation is a necessity to meet the ever growing demand. Modern engineering constrains are trying hard to produce eco-friendly and cheaper source of energy but this energy is wasted due to human negligence and laziness leading to wastage of energy. Hence conservation of energy plays an important role.

II. LITERATURE SURVEY

At present, motion sensing technology is used to detect the presence of a person. Even though this technology has proved to be handy, it is still not economically viable. CCTV cameras are being used for the purpose of surveillance, alongside the use of motion sensors.

The explicit use of these two devices distinctively is costly which is why we have formulated the use of CCTV camera for surveillance and for human detection. The incorporation of the above two features by the CCTV camera for surveillance are formulated in our project as gesture recognition and intrusion detection.

We have understood the use of camera attached to the robot; the robot uses image processing after capturing pictures of the gestures and mimics thecorresponding gesture [1]. Through the automation of lights and other electrical appliances we are able to conserve electricity.

III. EXISTING SYSTEM

Currently we have motion sensors for the automation of electrical appliances. Now, these motion sensors require a good amount of movement of something/someone to trigger itself and then switch on the electrical equipment(Lights). It is not always possible for someone to move just for the motion sensors to trigger even if they are in the room already.

For detection of human in a room various motion sensors are used. But these motion sensors requires the person to move at times so as to trigger the sensor. [3] Various aspects such as sensing noise, environmental variations, similarity to background signal, appearance variability and unpredictability, active deception etc. are considered for detecting the presence of human such as which makes it quite difficult.

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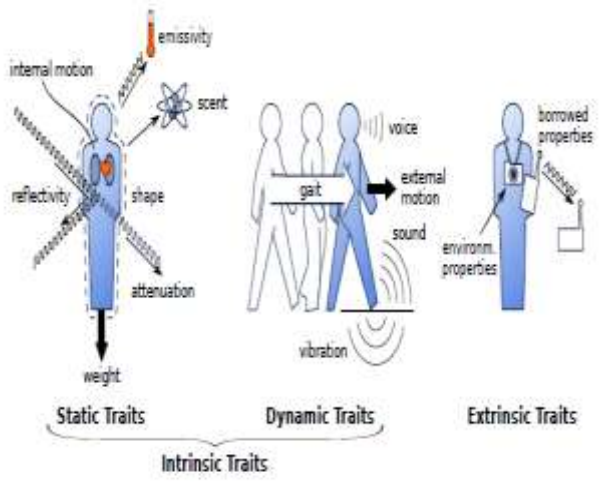

Fig. 1.Physical traits used by motion sensors.

IV. PROPOSED SYSTEM

Third eye is a concept that we are introducing for commercial infrastructure. This is a purpose to add new features to the existing concept. It has various features such as customizing electrical units, gesture recognition and intrusion detection.There are three modules in it which are as follows :

1. Contol functioning of electrical units to reduce wastage of electricity automatically.
2. Gesture recognition facilitates the control of electrical appliances through gestures.
3. Intrusion detection takes pictures of intruders and sends to the authorized personnel and sounds an alarm at night (Night Mode).

❖ Intel GalileoBoard :Galileo is a microcontroller board based on the Intel® Quark SoC X1000 Application Processor, a 32-bit Intel Pentium-class system on a chip. It's the first board based on Intel® architecture designed to be hardware and software pin-compatible with Arduino shields designed for the Uno R3. Digital pins 0 to 13 (and the adjacent AREF and GND pins), Analog inputs 0 to 5, the power header, ICSP header, and the UART port pins (0 and 1), are all in the same locations as on the Arduino Uno R3. This is also known as the Arduino 1.0 pinout.

❖ Viola-Jones algorithm: The Viola–Jones object detection framework is the first object detection framework to provide competitive object detection rates in real-time proposed in 2001 by Paul Viola and Michael Jones. Although it can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection. The main characteristics of Viola–Jones algorithm which makes it a good detection algorithm are:

- Robust – very high detection rate (true-positive rate) & very low false-positive rate always.
- Real time – For practical applications at least 2 frames per second must be processed.
- Face detection and not recognition - The goal is to distinguish faces from non-faces /

The working of the modules will be as follows :

- Images will be captured by the web camera installed in the room and sent to Intel Galileo board. Processing will be done and the electrical appliances such as light and fans will switch on and off accordingly. Images of the room will be already stored on the Intel Galieleos memory space. The algorithm which will be used is Viola-Jones algorithm.
- As of now are using thumb as a gesture for gesture recognition which will be capured by web cam and processed by Intel Galileo.The electrical appliance such as AC will switch on and off accordingly.

GESTURE	EFFECT
1.Thumbs Up	AC ON
2. Thumbs down	AC OFF

- Intrusion detection takes pictures of intruders and sendsthem to the authorized personnel and sounds an alarm at night(Night Mode). The images of the people working in the office will be stored in the memory

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space of Intel Galielo. It will detect whether the face image is same as in the stored data.

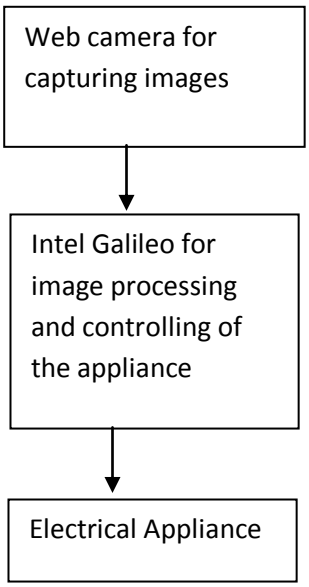

Fig. 2. Proposed System

V. FUTURE SCOPE

The system for the "Office and Home Automation Network" has a vast scope & almost limitless application in today's technology driven market. The system can be made efficient by modularising each and every component of thesystem hence ensuringthat it can be integrated with a varied range of devices. The basic vision of the system is to provide a convenient & secure system to the user, which would aid the high degree of mobility & control we aim to achieve nowadays.

VI. CONCLUSION

It is an innovation that would help to conserve electricity and would enable ease at workplace and strengthen security of the system.

VII. REFERENCES

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