

IOT BASED REAL TIME MONITORING OF SECURITY SYSTEM USING LEAP MOTION SENSOR

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Abstract : The main objective of this project is to maintain the proper security in the in-house by developing the robotic arm that would sense the actual motion of the human hand and finger by incorporation of a control strategy through leap motion sensor, based on gesture recognition. Articulated Robotic Arm is connected to the servo motor, the motion of robotic arm is depends on the servo motors action, servo motor and leap motion sensor(LMS) are connected each other by raspberry pi model, the other important point of this project is placing of this robotic arm model to the conveyor which is fixed in the sealing, trolley is used for the movement action. And also camera is fixed near the robotic arm for controlling and monitoring the actions, we are placing the gun to the robotic arm part initially it will be in hidden state, whenever action is necessary gun will draw out and action will come into picture. This system has capability to operate in three dimensions(3D), the complete action will monitored by the user, he will going to recognize the intruder first then the shooting action will takes place. It has enhanced the relationship with the user-robotic arm interference. It also allows greater control ability and it facilitates its use. Thus, it has been developed a robotic arm prototype, which has the capability to operate in three dimensions(3D) simulating the degrees of freedom of the human forearm, by using above system This project can be used in banks, VIP chambers wherever continuous monitoring is required.

Index Terms- Leap motion sensor (LMS), Security System, Gesture recognition, Robotic arm, Three Dimension(3D).

I. INTRODUCTION

The most basic definition of any security system is found in its name. It is literally a means or method by which something is secured through a system of interworking components and devices. In this instance this paper gives a information about in-house security system, which are networks of integrated electronic devices working together with a central control panel (user control) to protect against intruders. This paper tells more about security system in unique way how the security is improved and how it is going to monitored by the user, by the use of surveillance camera and user control security device protection is provided where 24*7 security is needed like VIP chambers, Bank Locker rooms, VIP Conference halls etc., whole monitoring action is done by using Leap motion sensor (LMS), it works on the basis of gesture formed by human fore arm. Hence, action of gun placed in the model is controlled by user (human) also the gun should be in hidden state, it will come out only when the emergency action is necessary.

II. METHODOLOGY

2.1 System Depiction

The block diagram of the proposed model is shown in Fig.1.

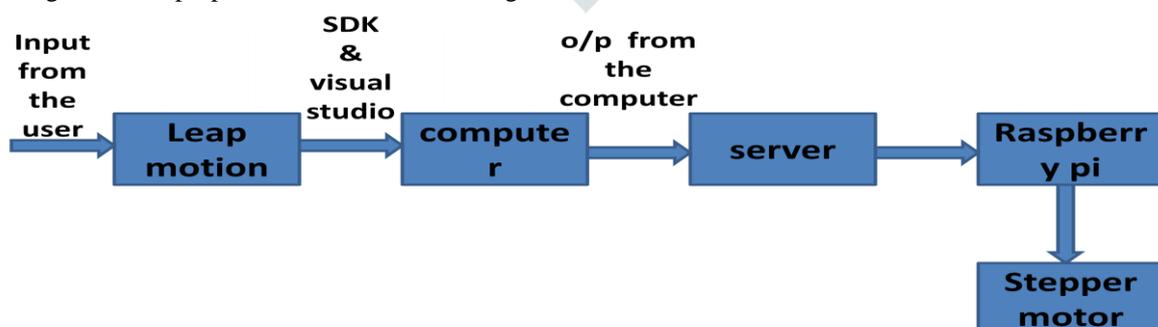


Fig.1. Block Diagram Of the Proposed Model

2.2 Gesture recognition by LMS

Gesture recognition is a type of perceptual computing user interface that allows computers to capture and interpret human gestures as commands. A gesture is defined as any physical movement(hand or fore arm movement) that can be interpreted by a motion sensor, it may include anything from the pointing of a finger or wave of the hand. In some case “gesture” may also includes voice or verbal but according to this paper gesture command is through movement of forearm of human(user), this gesture formation will be the first user input to the computer with the help of Leap motion sensor.

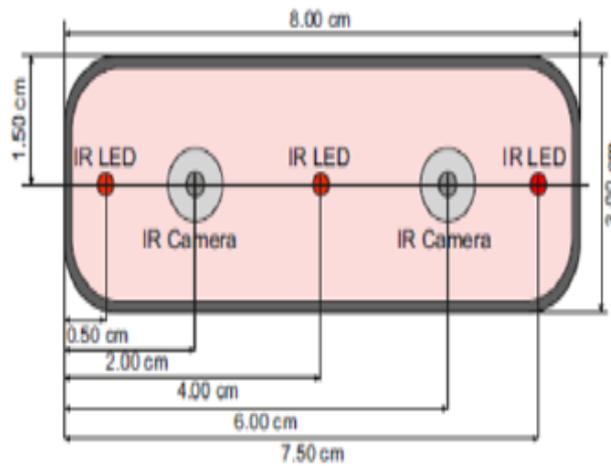


Fig 2. Schematic representation of Leap motion sensor

It is a small USB device consists of three infrared LEDs and two camera sensors. It scans an area of roughly 8 cubic feet above the device. It tracks both hands and all 10 fingers. The LEDs and Cameras present in the controller generate pattern-less IR light and 200 frames per second of reflected data respectively, this is then sent through a USB cable to the host computer,



Fig 3. Image of Leap motion sensor

Fig 3. Represents the image of Leap motion sensor having USB cable for connection to the computer and it also indicates the on state of three infrared LEDs.

2.3 SDK and VS

Software development kit (SDK) is a software development tool that allows the creation of applications for a certain software package, hardware platform, video game console. SDK is used as a supporting software device.

Visual Studio (VS) is used to develop computer programs, as well as websites, web apps, web services, and mobile apps. VS uses Microsoft software development platforms such as Windows API, Windows Forms. VS is used for coding the Leap motion sensor. Visual Studio supports 36 different programming languages and allows the code editor and debugger to support nearly any programming language. Here, in this paper, C# language is used to program for the Leap motion sensor to create a table of LMS output in terms of values, flow chart to form the table of output produced by LMS is shown in Fig 4.

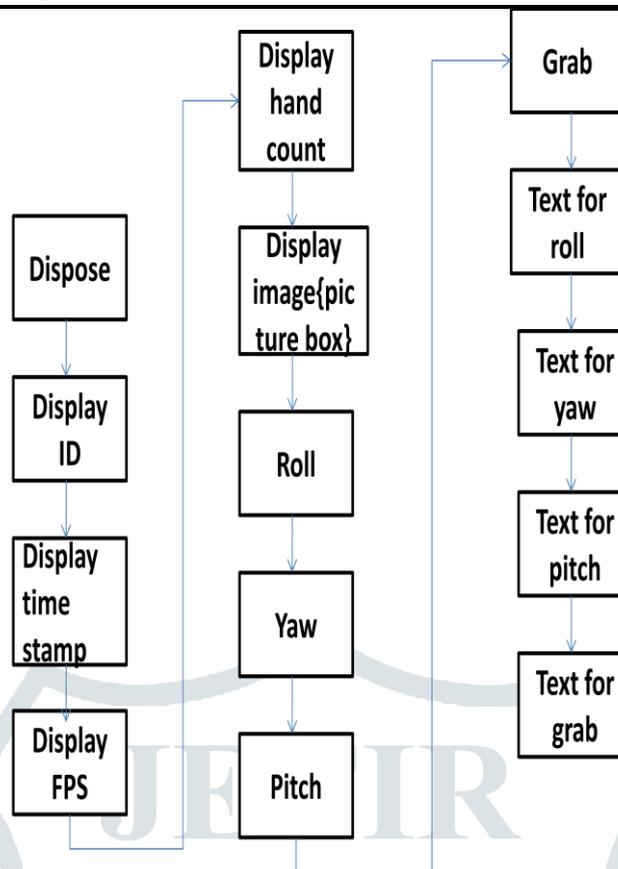


Fig 4. Flow chart to form the table of LMS output in terms of values

Mainly the value of Frames per second, hand count, Pitch, Roll, Yaw and Grab strength is displayed on the table. Also, hand image is going to display in the table itself, so that user will observe the live movement and action of his own gesture.

For the controlling of security system any one of the Pitch Roll and Yaw value is considered

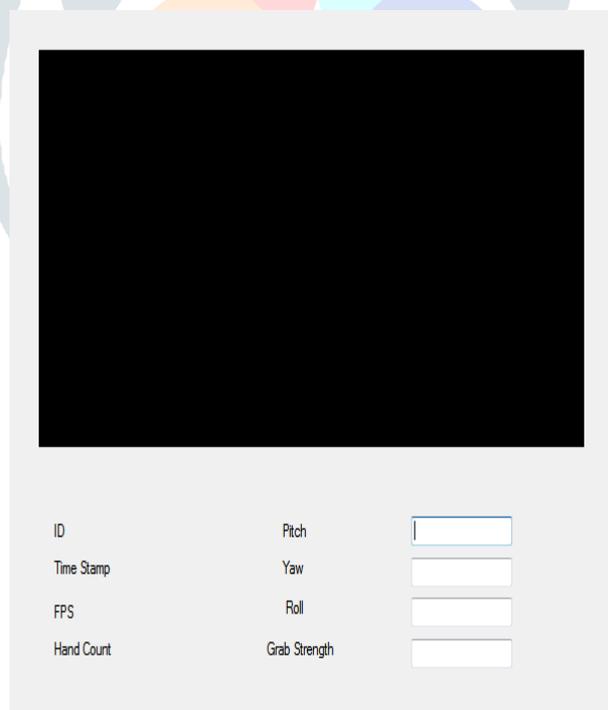


Fig 5. Output table of Leap motion sensor

2.4 Hardware interfacing

From Fig 5. pitch, roll and yaw values are formed, consider any one of these value, based on these value rotation of stepper motor is done.

With the help of Raspberry pi model output value from leap motion table acts as input for the rotation of stepper motor. Gun and one more camera for observation is fixed to the stepper motor. By the movement of stepper motor gun and camera also going to rotate simultaneously.

2.5 Design of the model

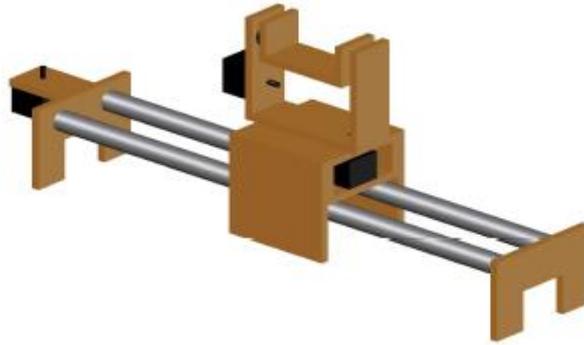


Fig 6. Model design of security system

Fig 6 model shows the design of the security system, total three stepper motors are used for rotation in all directions, this model is fixed in ceiling.

III. CONCLUSION

In the proposed model is intended to develop a safety monitoring system that integrates the technologies of IoT and other monitoring device, this system is unique in its ability to monitor the situation when the protection is needed, transmit the data through wireless communication to the management staff in real time for prompt reactions this system can enable 24x7 safety management as well as prompt and appropriate responses to emergency incident which is done by the user. The functionality of the entire proposed model has been demonstrated by simulation and the results obtained are found to be satisfactory.

IV. ACKNOWLEDGMENT

Completing a task successfully after months of perseverance and hard work, inevitably brings about a sense of satisfaction and happiness. However, this feeling would be incomplete without expressing our gratitude to all people without whom this task would have remained incomplete.

First and foremost we pay our regards to our institute NIE-IT, which provided us a platform and gave an opportunity to display our skills through the medium of research project. We express our heartfelt thanks to beloved principal **Dr. Archana N V**, NIE Institute of Technology, Mysuru for her encouragement

We express our thanks to our guide **Dr. Mohan N**, Associate professor and Head, Department of EEE, NIEIT, Mysuru, for his valuable guidance and his immense help in our project work.

We express our thanks to GSSSIETW, Mysuru for providing a wonderful opportunity to present our project paper in the National Conference on Intelligent Energy System(NCIES-2019)

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