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PSOC BASED ADVANCED BANKING SECURITY SYSTEM

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Abstract: The current security systems have various drawbacks in banking security systems. Programmable System on Chip (PSoC) is a new technology developed. This technology is used here. Infrared radiation based motion detection sensor is used. This comes in second phase detection. IR sensor is used for first phase detection. If human is detected in restricted area then it will send message to the authorized security person via GSM module attached to PSoC module. This system works on radiations spread in atmosphere. In case of night or darkness also human detection will occur. It doesn't need camera. After human detection all doors will get lock and if require poisonous gas will release in restricted area. This project is based on PSoC 4 Pioneer kit which consists of ARM Cortex M0 processor in it. For programming and debugging PSoC Creator IDE is used. GSM module is interfaced with kit to send message.

Keywords: PSoC, GSM module, IR proximity

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INTRODUCTION

We need the automation in every field. Security is one of the field where automation is necessary. Need is the mother of research. Let see some examples of week security system and its affects.

On Monday, August 21, 1911 the worlds most famous work of art Leonardo da Vincis Mona Lisa was stolen from the Louvre museum in Paris. That painting was stolen by Italian man named Vincenzo Perugia. He spend whole Sunday night in museum. This happened due to the low security system.

Vincent Van Gogh's "Poppy Flowers" also known as "Vase With Flowers" was stolen in October 2010 from Khalil museum Cairo, Egypt. After investigation it found that the security cameras and alarms were not working. Non of the alarms at Khalil museum and only seven out of 43 security cameras was working [1].

Same condition is there in banking security systems. By 2001, 98 percent of robbed branches had both cameras and alarm system. As we can see hollywood films that how they crack banks and other security systems. This various systems have some drawbacks.

Robbery	Reason	Year
Louvre Museum. Paris.	Low security.	August 1911.
Khalil Museum, Cairo.	Security[7] cameras were not working.	October 2010.
9S% of bank robberies	Faulty alarm system	In 2001

Fig. 1. Robbery reasons [1].

II. LITERATURE SURVEY OF EXISTING METHODS

Current security systems that implemented in banks or museums have various drawbacks. This security systems consists of cameras and alarms. In some of advanced security systems they implemented biomedical authentication system. Such as they are depends on fingerprint recognition, face or voice recognition and iris recognition etc. Still thieves' were able to crack this kind of security system. Because this system is based on external parameter [1]-[3]. In this

system we need to monitor camera continuously. Or after detecting thieves' we need to switch on alarm immediately. This won't take place in some of the extreme conditions. For that we need advanced system that will work automatically. The current security systems have following limitations;

1) Can't be activated automatically

2) Can't respond immediately

3) It has significant features such as camera to be seen or light to be detected

4) It interfere daily business activity

Therefore there is need to develop undetectable system that cannot be cracked. Because developing such a secure system involves time investment, money investment and hard work [4]. After cracking such a system all this become zero. So there is need to developed extremely secure system. Banks have implemented modern security measures, like motion-sensing and high resolution color security cameras, time-locked heavy vault doors, silent alarms, exploding dye packs, bait money and locator devices. Some banks supplement this protection with armed or unarmed security guards. Today's biometric technology makes non-violent methods of gaining access, even by the most experienced safe hackers and code crackers, nearly impossible. Modern vaults and safes are also reinforced to the point that the amount of explosives needed to blow them open would likely create unwanted attention and run the risk of harming the building to the point of collapse. By their very nature, even the most impregnable vault or safe eventually needs to be able to be opened and closed by someone. To circumvent vault and safe security features, robbers often kidnap the bank manager, but that is not always a successful workaround as banks have often removed the manager's ability to open the vault.

III. PROPOSED SYSTEM

This proposed security system consists of two phase detection. Both the sensors are connected to PSoC (Pro¬grammable System on Chip). This PSoC-4 kit having ARM Cortex M0 processor in it. So if high pulse is detected in first phase it will activate the system. Then PSoC kit will send message to local security system via GSM module. If in case something detected by IR sensor i.e. second phase detection then PSoC kit will send message to higher security authority. At this time all doors will get locked automatically. We can implement other systems also and activate it after second phase detection. We can send message to local LCD. Directly we will send message to higher security authority. So that thefts will not try to escape from restricted area.

And we can catch them easily. After second phase detection in system message will send to higher security authority, all doors will get locked and other systems will get activated. This other system consists of poisonous gas release mechanism. Consider thefts are there with highly loaded weapons. If we try to catch them they may start firing on security guards. So to avoid this risky situation we will release poisonous gas in restricted area. Then all thefts will feel unconscious faint and they will lie down. We can attach relay at the output and add any mechanism further. It depends totally on our application requirements.

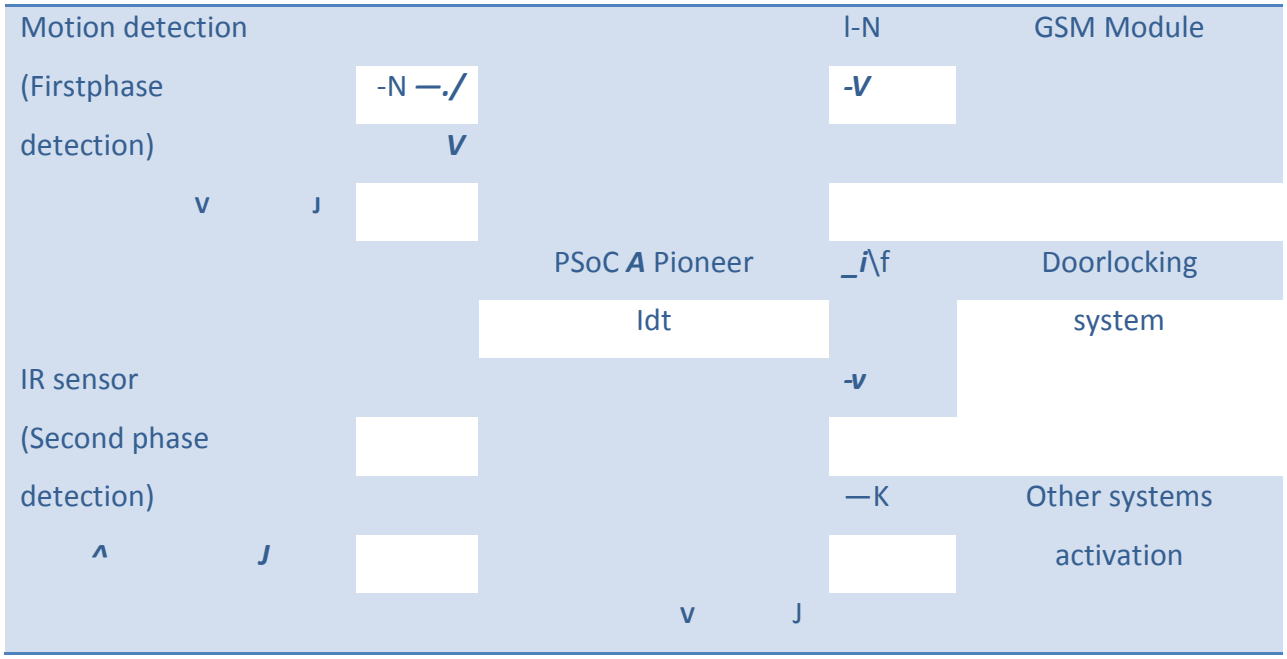

Fig. 2. Block diagram of proposed system. A. IR Detection

Every human being body emits infrared radiations.

Human body emits radiations of 108 Hz frequency. This frequency will be emitted in surrounding atmosphere. IR sensor of our system will detect this IR radiations. This detected radiations will compared with threshold. If it is from human body then system will get activated. We have to distinguish radiations of other live beings and human beings. According to that we have to set our system [6]. Human detection is important part of our project. We differentiate the normal motion and human motion in atmosphere. This will help us to detect human motions in restricted area.

B. Improving Power Analysis

PSoC Have different power modes. Any other processor do not support this power modes. This will lead to less power consumption. Alternatively system power consumption will get reduced. In this case the power parameter will get im¬proved. PSoC have five power modes. They are active, sleep, deep sleep, hibernate and stop. Every mode have its own speciality while application is running. With the help of this power modes we can configure our application for low power consumption.

	Active	Sleep	Deep-Sleep	Hibernate	Stop
CPU	On	Retention*	Retention	Off	Off
SRAM	On	Retention	Retention	Retention	Off
High Speed Peripherals	On	On	Retention	Off	Off
Universal Digital Blocks (UDBs)	On	On	Retention	Retention	Off
Low Speed Peripherals	On	On	On	Off	Off
High Speed Clock	On	On	Off	Off	Off
Low Speed Clock (32kHz)	On	On	On	Off	Off
Asynchronous peripherals	On	On	On	Off	Off
Power On Reset, Brown-Out Detection	On	On	On	On	Off
ADC and CTBms	On	On	Off	Off	Off
Low Power Comparators	On	On	On	On	Off
GPIO Output State	On	On	On	On	Frozen**

Fig. 3. PSoC Power modes [17].

IV. RESULT ANALYSIS

We come to result now. In this case IR sensor will detect human motions also. All motions will get detected by motion detection sensor. In to that particular human motions will get detected by IR sensor. Two phase detection takes place here.

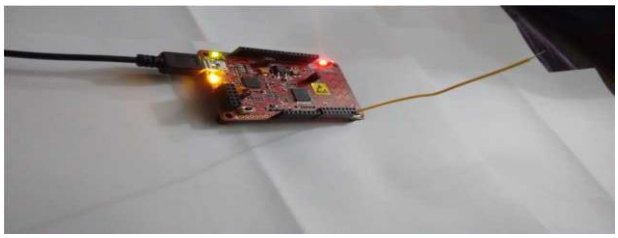

Fig. 4. LED Initial stage.

In above iimages we can see the actual result. IR sensor will detect human motions only. Motion sensor will detect all motions.

V. CONCLUSION

Fig. 5. LED changes when human detected.

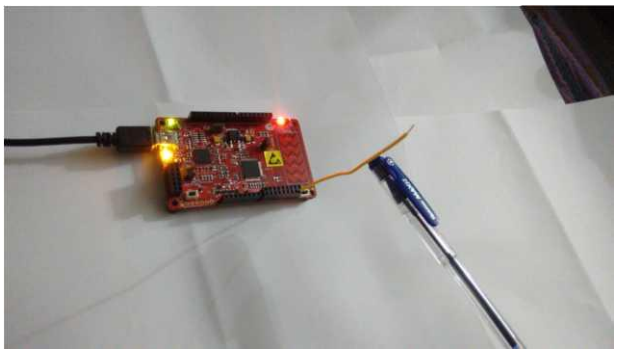

Fig. 6. LED remains same when other motion takes place.

We have to remove this drawback. The system should be fully automated and must give immediate response. This system works automatically and also gives immediate response. The main part of the system is that it detects the human radiations in atmosphere and sends input to the PSoC 4 IC. There is no any password in this system. So no one can crack it. The locker room or restricted area is configured with this IR Proximity antenna. If any intruder comes in this restricted area then it detect via human body radiations and sends message to authorized person or police. So there is no need to monitor any screen or any other security object continuously to detect an intruder. Another advantage is that low power consumption. PSoC 4 IC requires 5V power supply. And if there is no any input then this IC will goes in to sleep mode. Which leads to power saving mechanism again. It means that we can run our complete system on external power supply. If robbers cut the main power line then also this system will work.

The IR proximity antenna is the base of this system. Due to this antenna the system will become highly secure and undetectable.

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