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# Ladies Compartment Intruder Alert

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**Abstract -** *This paper focuses on ensuring the safety of female passengers in the ladies compartment of a train. The basic principle is the geometrical analysis of the facial image. The result of this analysis decides if the person entering the compartment is an intruder or not. This technique has become an empirical aspect in the present world. For this purpose, Weber's Local Descriptor (WLD) is used for the pre-processing of the image. When an intruder enters the ladies compartment, the system transmits a warning signal to the receiver kept near to the officials in the train. Once warning signal is received it sounds an alarm for alert. Also the mode of communication used is ZigBee for a better and faster response.*

**Keywords: Intruder, Geometric Analysis, Weber's, Local Descriptor, ZigBee.**

## 1. INTRODUCTION

Presently, a lot of complaints are being reported on women harassment in sub-urban trains. According to surveys, with an increase in women workforce, the chance of women being harassed is likely to go up numerously in coming years. Most of the women commuters are also ignorant of the railway helpline numbers which results in the incidents being unreported. This paper gives a solution to this problem up to an extent in order to inculcate fear in law-breakers. The system proposed in this paper is limited for the passengers in the ladies compartment of the train and not for all the female passengers in the train.

Weber's Local Descriptor algorithm can be effectively used for image processing [1] & [4]. It was found to be satisfactory than any other descriptive algorithms.

PIC16F877A micro-controller is used in the transmitter and receiver section [2] & [5]. It has a variable frequency of 0-20MHz and each pin of the ports can be individually configured. Serial Peripheral Interface can be used to connect the micro-controller to external devices. Another benefit of using this micro-controller is that it has flash memory. On comparing with GSM and Wi-Fi, ZigBee was found to be better. It is because of its smaller size, low power consumption and longer battery life [3].

## 2. BASIC CONCEPT

The proposed system is composed of mainly two parts: transmitter and receiver section. The transmitter part is placed in the female compartment and the receiver part near to the officials in the train. If an intruder enters the female compartment, the camera processes the video and takes the image of the intruder. The image is then processed using the principle Weber's Local Descriptor (WLD). WLD helps to analyze the image geometrically. On finding it to be an intruder the transmitter section transmits a signal via ZigBee transmitter and receives it at the ZigBee receiver. On receiving this signal the alarm gets switched ON and "WARNING" is displayed on the LCD screen in order to alert the officials. There is an emergency switch kept in the female compartment in case of emergency situations. On pressing this switch the passenger can manually sound the alarm and alert the officials for help.


**Fig – 1:** Block Diagram of the working model

## 3. HARDWARE SECTION

The hardware section mainly composes of mainly 2 parts, i.e., the transmission part and receiver part.

### 3.1 Transmitter Section

#### 3.1.1 Circuit diagram of transmitter section

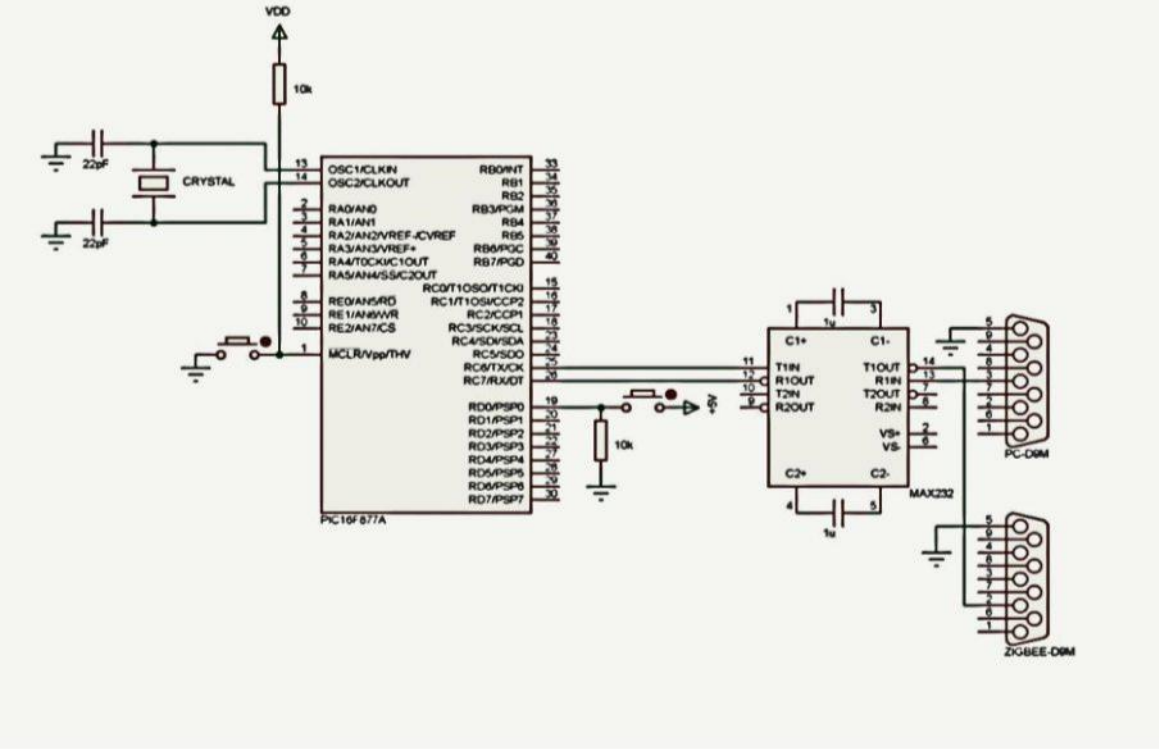


**Fig – 2:** Circuit Diagram of Transmitter Section.

#### 3.1.2 Schematic diagram of transmitter section

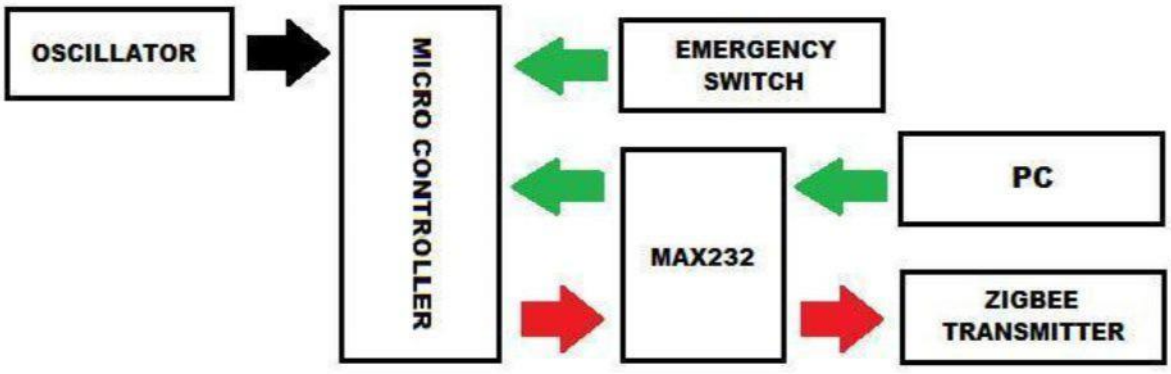


**Fig – 3:** Schematic Diagram of Transmitter Section

### 3.2 Receiver Section

#### 3.2.1 Circuit diagram of the receiver section

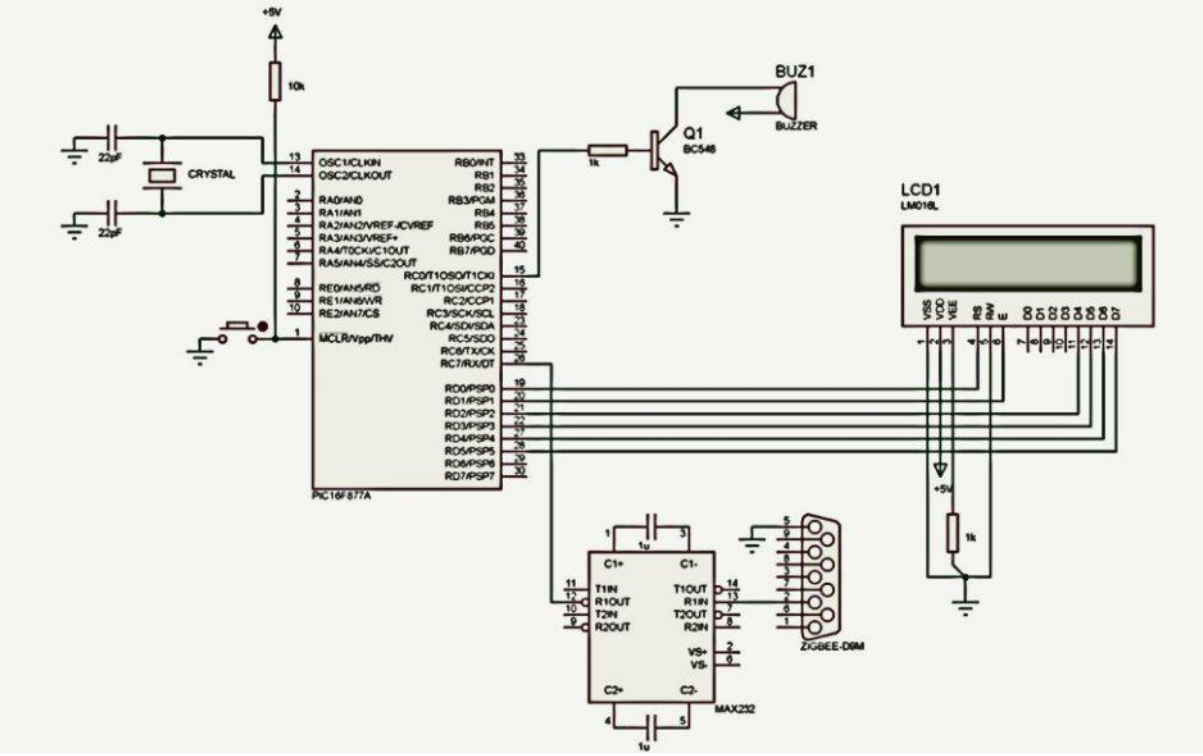


**Fig - 4:** Circuit Diagram of Receiver Section.

#### 3.2.2 Schematic diagram of receiver section

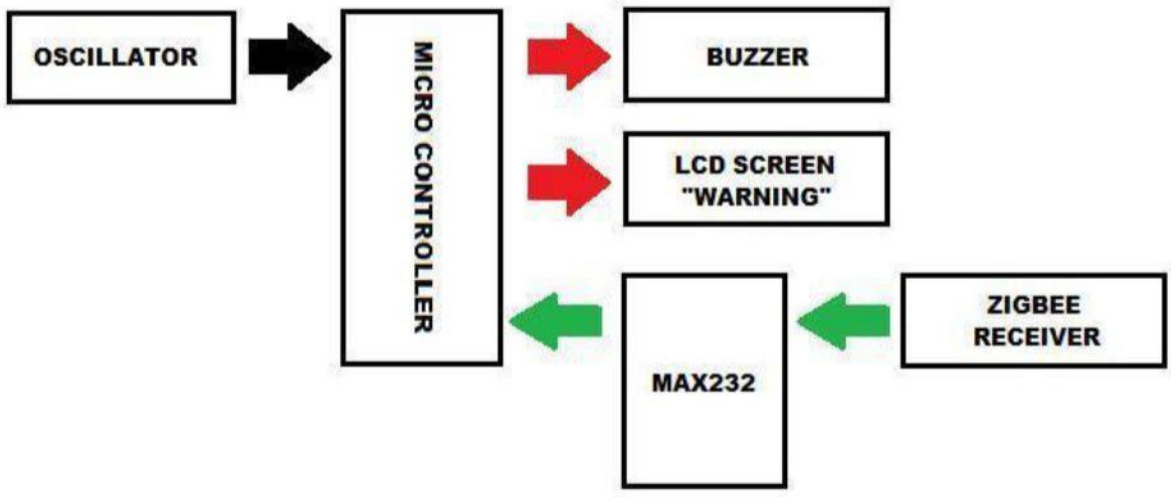


**Fig – 5:** Schematic Diagram of Receiver Section.

**Fig – 6:** Circuit of Transmitter and Receiver.


**Fig – 7:** LCD Display during Normal Condition


**Fig - 8:** LCD Display during Emergency Condition.

### 3.3 Working

Camera captures the image of the intruder and is given to the PC for image processing. MATLAB is the software used for image processing. After processing the image, the prediction is sent to the micro-controller through a logical level shifter. The micro-controller used here is PIC16F877A which is a 40 pin IC with 5 ports A, B, C, D and E. The particularity of PIC16F877A is that each pin of its ports can be individually configured. MAX232 used here is a logical level shifter. The prediction is then sent to the micro-controller. And the micro-controller sends this signal to the ZigBee transmitter through MAX232. ZigBee communication is the best choice for short range communication as it gives a very fast response. It has a frequency of 2.5GHz which lessens the chances of noises to interfere with the original signal transmitted. This signal is then received by the ZigBee receiver and is sent to the micro-controller through MAX232. The micro-controller at the receiver section examines whether the prediction is a male or female. If it is a male then warning is displayed on LCD screen and the alarm is sounded. During normal condition, the LCD display keeps displaying "checking". If an intruder enters the compartment, the image processing section of the system spots it to be an intruder and this information is sent via transmitter to the receiver section. This alerts the receiver, the LCD display shows "Warning Alert" and the buzzer sounds.

## 4. SOFTWARE SECTION

### 4.1 MATLAB

The image captured by the camera is processed here. The image is passed through 4 stages; Re-sizing, Differential excitation, Gradient Orientation & WLD. The WLD extracts the features of the image in values and these values are then compared with Trained Data Set (TDS). At first, the image is re-sized to required resolution and cropped. In differential excitation, the intensity of a pixel of the image is compared with the intensity of the neighboring pixel and textures are computed. In gradient orientation, the orientation of the current pixel is computed. These values are used to construct a histogram.

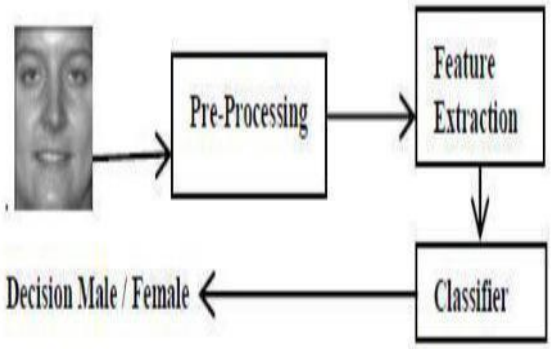


**Fig – 9:** Block diagram of Image processing

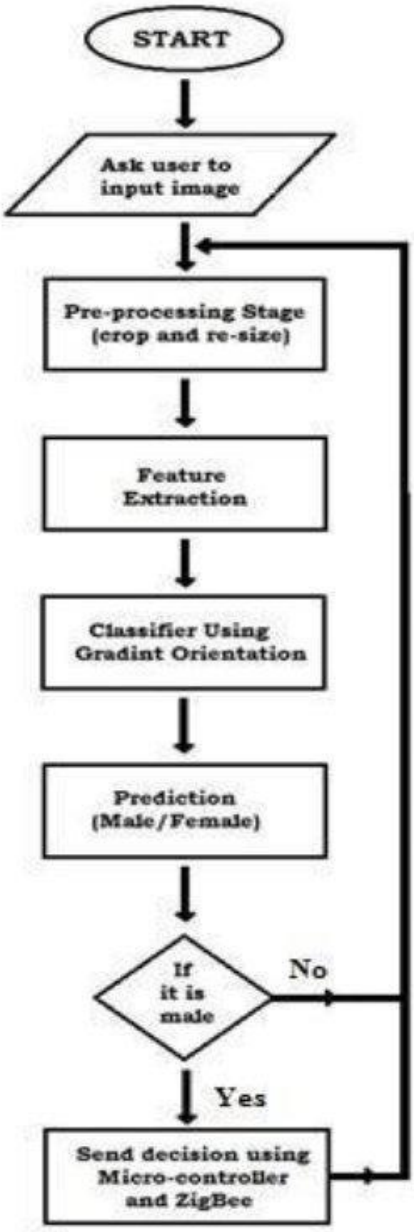


**Fig – 10:** Logical Explanation of MATLAB

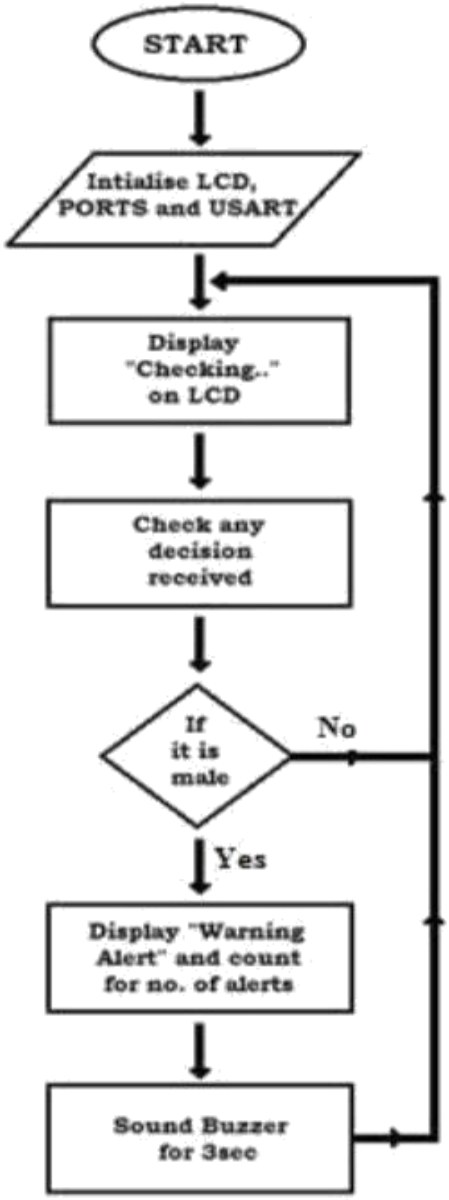


**Fig – 11:** Logical explanation of Basic working

## 5. CONCLUSION

This paper delved into a system put forth for a socially relevant issue. The concept and method of implementation of the system were explained. The results showed proper functioning of the system, i.e. the LCD display showed "Warning Alert" and the buzzer sounded. This system can be built at low cost and the chances of errors are less.

## 6. REFERENCE

[1] Ihsan Ullah, Muhammad Hussain,a, Ghulam Muhammad , Hatim Aboalsamh, George Bebis and Anwar M Mirza "Gender Recognition from Face Images with Local WLD Descriptor" IWSSIP 2012, Vienna, Austria.

[2] X. Celin Kethzia, M. Valarmathi, "Novel Surveillance to Detect Abnormal Activities in ATM Centers" International Journal of Engineering Research-Online, Vol.5, Issue 2, 2017.

[3] Baronti P. Pillai P,. W. C. Chook et al. "Wireless sensor networks: A survey on the state of the art and the 802.15.4 and ZigBee standards[J]" Computer Communications, vol. 30 no. 7 pp. 1655-1695, 2007.

[4] Jie Chen, Shiguang Shan, Chu He, Guoying Zhao, Matti Pietikainen, Xilin Chen, and Wen Gao, "WLD: A Robust Local Image Descriptor", IEEE Transactions On Pattern Analysis And Machine Intelligence, Vol. 32, No. 9, 2010.

[5] W. U. Jin, Q. Y. Pan, Y H. Wang, "Research and implementation of physical layer protocol based on single-chip ZigBee platform using MCI3213, Micro- computer & Its Applications , vol.3,2010