Emergency Alert System for Women's Safety

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Abstract: Women's safety is an extremely important issue on the modern day due to the rise in the number of crimes against women. This paper proposes a GPS-based women's safety system operable through fingerprint. A woman can turn on this system in case she even thinks she would be in trouble by just placing her finger on the scanner and the system now sends her location to the authorized personnel number saved previously in the system through SMS message. The proposed system is microcontroller-based, additionally using GPS sensor with a GSM modem for determination and forwarding the location of the woman in danger.

Keywords: Women's Safety, Fingerprint, Microcontroller, GPS, GSM, Location

I.   INTRODUCTION

Crimes against women have been increasing continuously during the past few years. Consequently, many researchers have tried to propose different solutions to the safety issues faced by women around the world on a daily basis. To this end, some researchers have carried out reviews of the currently available technology for the safety of women [1]. The current paper formulates a scheme for setting up a system for women's safety using a microcontroller, fingerprint sensor and GSM module. The paper is organized in the following manner. Section II surveys the recent literature on safety systems. Section III describes the proposed system model and its mode of operation. Section IV concludes the paper with a discussion on the scope for future research in this domain.

II.   LITERATURE SURVEY

Researchers have been looking into internet-based schemes for generating safety alerts due to some of their obvious advantages [2]. Some researchers have also investigated the feasibility of android-based systems [3]. Wearable and portable devices have emerged as popular as well as economic solutions in this context [4]. Others researchers have also proposed IoT (Internet of Things) and wireless network-based system architectures [5][6][7]. Small and uncomplicated systems such as push-button alarm generation systems have also been proposed by certain researchers [8]. These systems have also been implemented in an IoT based paradigm by certain researchers [9].

In areas of low internet speed or without internet connectivity, SMS based systems are much more robust than their internet-based counterparts. Hence the authors have proposed an SMS based alert system in this paper.

III.   PROPOSED SYSTEM

In order to make the system cheap, portable and robust (within cellular coverage area), the proposed system uses only basic component along with the Arduino Uno board with ATMega328 microcontroller, fingerprint sensor, LCD display (for testing purposes) and the GPS and GSM modules. A complete list of components is given in table 1 below.

Table 1: List of System Components

Sl.	Component
1.	Arduino Uno with Battery Power Source
2.	SIM 800 GSM Module
3.	GPS Module
4.	Fingerprint Sensor
5.	LCD Display
6.	Cables, Connectors and Switches
7.	IC and IC Socket

The system mainly comprises of a cheap and lightweight microcontroller board unit interfaced with fingerprint sensor, LCD module and GPS and GSM modules. The microcontroller board is powered by a battery. The block diagram of the proposed system is shown in figure 1 below.
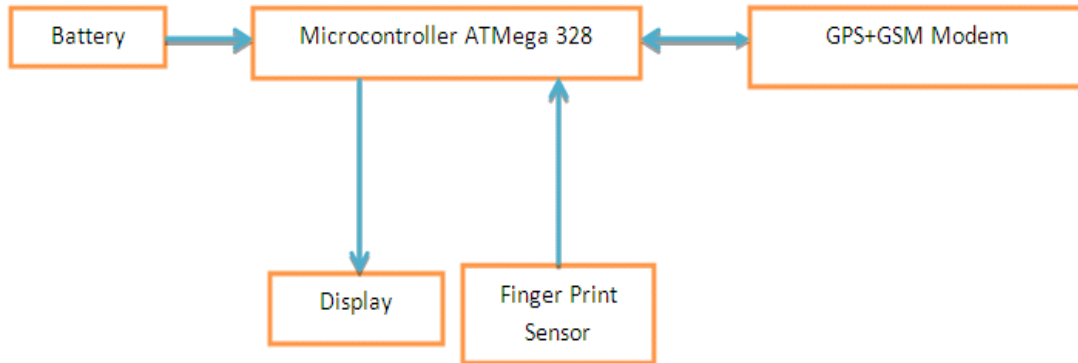

Fig. 1 Simplified Block Diagram of Emergency Alert System

The system is started and the GPS and GSM modules are initialized. The fingerprint scanner is polled continuously and if a fingerprint is detected, SMS alert with GPS location is sent via the GSM module. The flowchart for operation of the system is shown in figure 2 below.
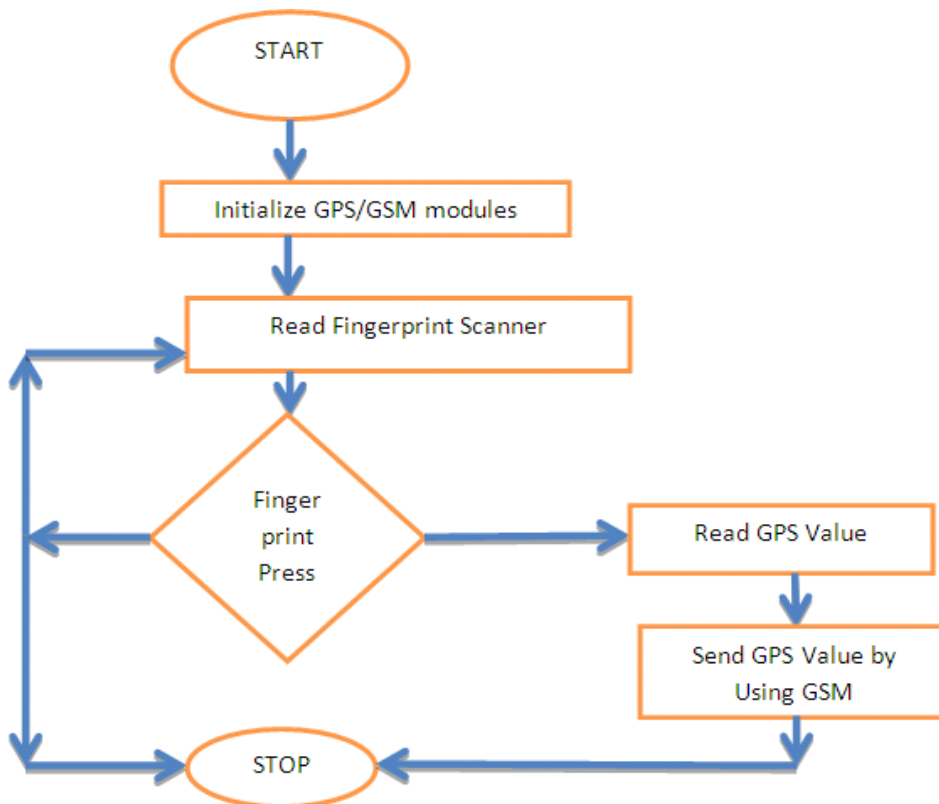

Fig. 2 Flowchart of Emergency Alert System

IV. CONCLUSION

The current work accomplished in this paper comprised the proposal of a fingerprint and SMS based emergency alert system for women. Further improvements on the proposed model may include adding a WiFi module to the system for areas with no cellular coverage but with the presence of WiFi network. For such a scheme, internet-based messaging capability may also yield the desired results.

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