

# Smart Gadget for Women Safety using IoT (Internet of Things)

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**Abstract:-** As we know the present era is with equal rights, where in both men and women are taking equal responsibility in their respective works. Hence women are giving equal competition next to men in all fields, they are assigned works in both the even and odd shift. Every single day women and young girls from all walks of life are being assaulted, molested, and raped. The streets, public transport, public spaces in particular have become the territory of the hunters'. Because of these reasons women can't step out of their house. The only thought haunting in every women's mind is when they will be able to move freely on the streets even in odd hours without worrying about their security. In critical situations the women will not feel insecure or helpless if they have some kind of safety device with them.

We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart gadget" which continuously communicates with Smart phone that has access to the internet. The complete gadget also ensures to provide self-defence application which helps her to escape critical situations. This system can be used at places like bus stops, railway stations, offices, footpaths, shopping malls, markets, etc.

The implementation of the smart gadget is basically split into two sections the first part ensures to capture the image of the Culprit the device get automatically triggered when there is a suspected motion in front of the camera, the device captures the image of the culprit and send it as an attachment to the concerned E-mail Id along with the location of the Victim. The captured image serves as the valid proof against the one who has committed the crime.

The second section deals with defence application as we tend concentrate more on providing self-defence for the women in danger. By making self-defence as the first priority we make sure that occurrence of the critical situations are eliminated. The self-defence feature is capable of working in any of the circumstances either it may be with Internet as a Smart Pendant with LED flash that makes an alert call to the family, relatives via the cloud and also glows the led flash on the eyes of the culprit to make the vision blur when the attacker is at the shorter distance. Whereas Self-defence without Internet consists of Electric shock gloves, that is used to provide the electric shocks that diverts the mind of the culprit and reduce his excited state to commit the crime on women. These two factors form the combined self-defence application and helps the victim to escape from the danger

**Key words:** Self-defence, Email, Electric shock, Smart pendant, women safety

## I. INTRODUCTION

Women are the backbone of any economy primarily shaping future of the country. She who earlier stayed at home to attend her domestic duties is now maintaining work and home simultaneously, participating in the process of economic development on an equal footing with men.

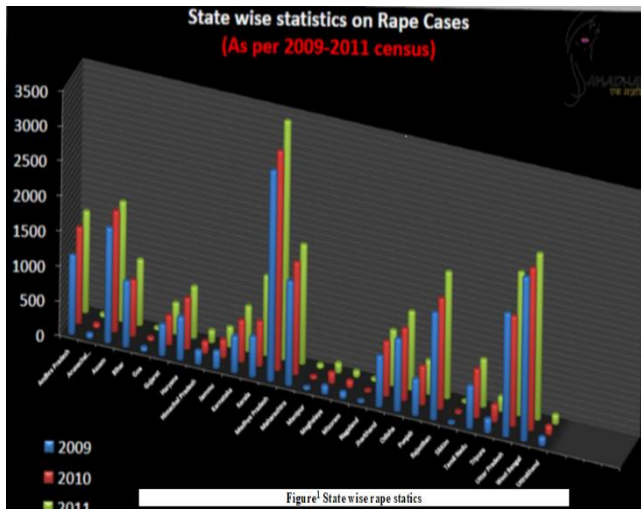
The Government of India, meeting a longstanding demand for gender parity in the workforce, has approved an amendment in The Factories Act 1948 to allow women employees to work in nightshifts. The amendment suggests that nightshift for women shall be allowed only if the employer ensures safety, adequate safeguards in the factory as regards occupational safety and health, equal opportunity for women workers, adequate protection of their dignity, honour and transportation from the factory premises to the nearest point of their residence are met.

Nightshifts have been in existence for a long time, however for India it was only recently through an amendment to the Factories Act 1948 that it was allowed under the law for women to work nightshifts. Women are participating in almost all the spheres of economic activity. From village to city, we can see number of women workers and entrepreneurs contributing towards the national income of the country. Garment units already employ 60% of women workforce; and with growth in this industry the number this will go up tremendously. So far, the IT sector were employing women for late-night work hours but had no legal obligation to provide the above safety measures.

There is no denying the fact that women in India have made a considerable progress in almost seven decades of Independence, but they still have to struggle against many handicaps and social evils in the male-dominated society. Many evil and masculine forces still prevail in the modern Indian society that resists the forward march of its women folk.

With the onset of IT&BT industry, women work in night shifts. It is the responsibility of the firm to provide office transportation to such employees. Now a days even though the companies provide the facilities for transportation, but the security of the women is not fully ensured as one of the incident occurred in the year 2007 at Pune where a girl working in the call centre was brutally raped by two of her cab drivers assigned by the company, not only this we have

come across many of the same incidents in the recent times where the safety of the women cannot be fully ensured with the cab facilities provided by the companies. The figure<sup>1</sup> shows the statistics on rape cases (as per 2009-2011 census) on women.



The only solution to the problem can be taken in such a way that, women should be assigned with a safety gadget that is portable and ensures her safety. Our paper focuses on providing a Smart gadget based on IoT solutions that not only helps to woman escape the critical situations but also ensures to provide justice to the women by capturing the image of the culprit if in case any harassment occurs .

II. EXISTING TECHNOLOGIES

**A. SHE (Society Harnessing Equipment):** It is a garment embedded with an electronic device. This garment has an electric circuit that can generate 3800kV which can help the victim to escape. In case of multiple attacks it can send around 80 electric shocks [1].

**B. ILA security:** The co-founders of this system, have designed three personal alarms that can shock and disorient potential attackers and hence safeguard the victim from perilous situations.

**C. AESHS (Advanced Electronics System for Human Safety)** It is a device that helps track the location of the victim when attacked using GPS facility.

**D. VithU app:** This is an emergency app initiated by a popular Indian crime television series “Gumrah” aired on Channel [V]. When the power button of the Smartphone is pressed twice consecutively, it begins sending alert messages with a link of the location of the user every two minutes to the contacts.

**E. Smart Belt:** This system is designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help [2].

Drawbacks of the existing systems:

1. The systems are bulky and are not portable where in these cannot be carried easily anywhere, any time

2. Requires more hardware, which in turn increases the implementation cost.
3. The systems doesn't provide a complete kit solution to the existing problem

F. Smart Security Solution for Women based on Internet of Things (IOT):

An advanced system that can detect the location and health condition of person that which will enable us to take action accordingly based on electronic gadgets like GPS receiver, body temperature sensor [3], GSM, Pulse rate sensor.

The major reference of our paper is taken from “Smart Security Solution for Women based on Internet of Things (IOT)” [4] this system has the major drawbacks as follows:

1. Not providing the defence application for the women to escape the critical situation
2. And also the proposed system lacks the feature capturing image of the culprit
3. System uses GSM and Bluetooth technologies that are interfaced to a smart band, with the use of Bluetooth technology the coverage area for communicating with android smart phone is limited, if the distance between Smart phone and Smart band is more this might cut-off communication with smart band and smart phone and cannot ensure the safety of women completely.

III. PROPOSED SYSTEM

Our proposed system gives first priority on self-defence by providing the tolerable electric shock to culprit that reduces the exited state and help women to escape the critical situation, we also tend to implement the device that is triggered without any manual aide that provides safety for women in public places transport vehicles such as cabs, taxi, bus, auto rickshaw and working places.

The implementation is divided into the 3 Sections

A. Device:

Raspberry pi board with the image capturing and location tracking as shown in figure<sup>2</sup>

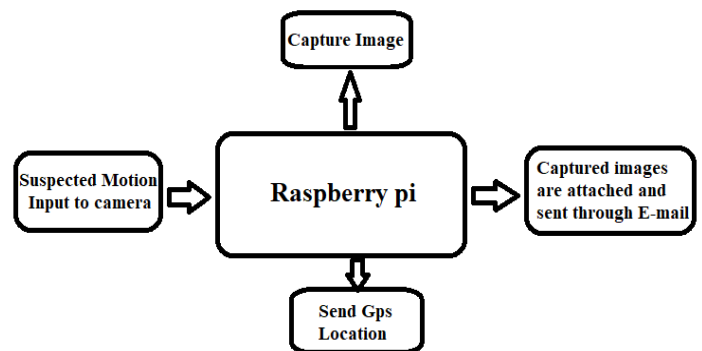
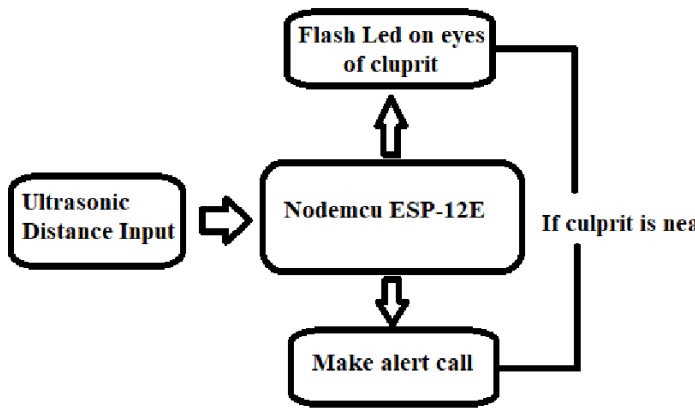


Figure2: Raspberry pi Device

B. Defence:

a. Smart pendant with internet for Emergency alert and Led flash as shown in Figure<sup>3</sup>



Figure<sup>3</sup> Smart pendant with Emergency alert and led flash

b. Electric shock gloves for self-defence without internet

**Electric shock gloves  
providing shocks upto 3000  
volts for few milli seconds to  
culprit**

The paper aims to provide low cost IoT based solutions for women safety which includes:

- Image capturing of culprit, this helps to find the culprit and also serves as valid proof to make culprit guilty in the Indian Judicial courts
- Making alert call via cloud ( Twilio ) to family, police station alerting woman is in danger
- Locating the position of women under danger
- Electric shock gadget for defence to help women escape in critical situation

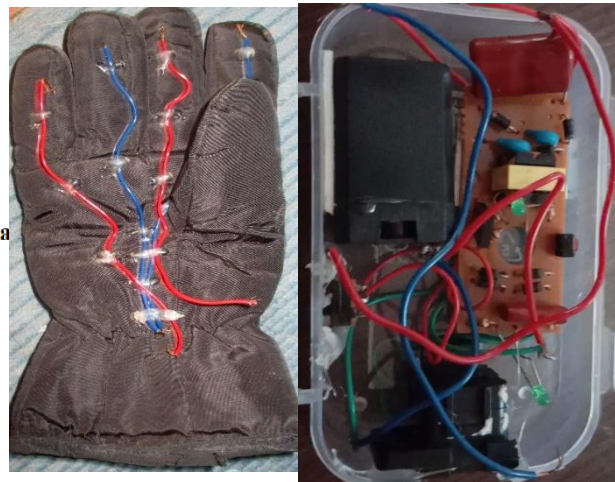
IV. EXPERIMENTAL RESULTS

A. Electric Gloves (self-defence without internet)

As said above, the paper has first priority to the self-defence as we tend give more importance for the preventive measures of not causing any harm to women and help women to escape from the activities like molestation, rape or kidnapping. As seen from the existing technologies of the previously implemented systems on women safety the feature of self-defence was nowhere in the picture and also the tools available for women safety did not provide assurity for the women to escape the critical situation. The implementation speaks of a Self-defence gadget which intends to provide instant security for women even without the internet facility.

The gadget is basically a shock providing glove, which is capable of giving a tolerable voltage shock in terms of milli seconds this reduces the excited state of the culprit.

The Circuit figure<sup>4</sup> produces an output voltage is of the order 3000volt for few fraction of seconds that does not cause any severe harm to the culprit. The gadget also ensures that the victim gets an opportunity to escape the critical situation



B. Emergency alerting smart pendant with led flash (Self-defence with Internet of Things)

Nowadays, we can find a lot of Alarm Systems in the market, the Smart pendant of our project is made with the similar concepts, but things that make our pendant different from the existing technology is that we ensure to implement a smart pendant which not only sends an alerting message to the family or police but also provide a combined self-defence with led flash circuit that creates a sense of blurriness to the eyes of culprit, when the culprit tries to attack the victim at the shorter distance.

Our Gadget is capable of working without the aid of any manual Input, gadget works on a full automatic bases by measuring the distance between the culprit and victim, if measured distance is less than the accepted value then device triggers itself, making to LED glow which in turn makes the light to flash on to the eyes of culprit and also tends to make an alter call to the family or police station via TWILO API (Cloud). This complete process is controlled by the aid of hardware components like Nodemcu ESp-12E (Wi-Fi Module) and Ultrasonic sensor. The detailed circuit connection is shown in figure<sup>5</sup>

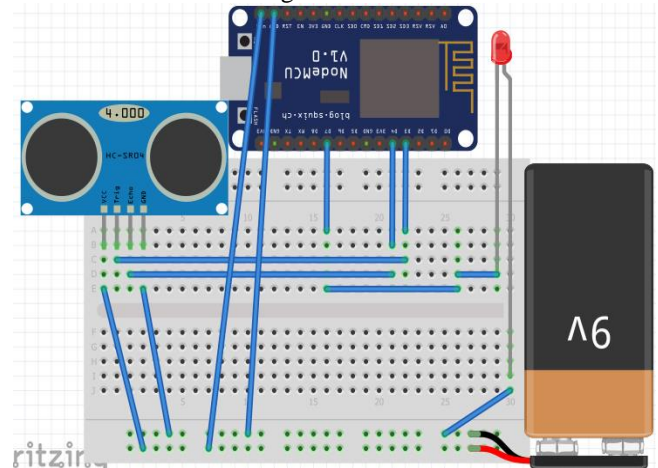


Figure5: Smart pendant

1. D3 of Nodemcu - Trig pin of Ultrasonic sensor
2. D4 of Nodemcu - Echo pin of Ultrasonic sensor
3. D7 of Nodemcu - Anode of LED
4. Vin of Nodemcu - +ve of Battery
5. Gnd Of Nodemcu - -ve of Battery
6. Vcc of Ultrasonic Sensor - +ve of Battery
7. Gnd Of Ultrasonic Sensor - -ve of Battery

*C. Gadget for Image capturing of culprit and Location tracking of victim*

Facts at a glance in rape cases in India [5]:

- Nearly 1 in 5 (18.3%) women reported experiencing rape at some time in their lives.
- Approximately 1 in 20 women and men (5.6% and 5.3%, respectively) experienced sexual violence other than rape.
- Among female rape victims, perpetrators were reported to be intimate partners (51.1%), family members (12.5%), acquaintances (40.8%) and strangers (13.8%).
- 13% of women reported they experienced sexual coercion at some time in their lives.
- In a study of undergraduate women, 19% experienced attempted or completed sexual assault since entering college.
- Among female victims of partner violence who filed a protective order, 68% reported they were raped by their intimate partner and
- 20% reported a rape-related pregnancy

From the above facts we can clearly see women, girls and now a days even the minor kids are getting affected mentally as well as physically with the so called societal issue of rape, not only the victim is affected by this crime but also the entire family has to undergo critical circumstance after the occurrence of this nasty crime.

Even though the victim has undergone the situation of physical violence, sexual molestation, rape etc. our Indian judicial system still requires a valid proof against the culprit to prove him guilty, There number of rape case residing unsolved in our judicial courts and still many of victims are behind the expectation that either one of the day there will be justice prevailed in the entire country regarding the sexual violence.

Some of the statistics on rape cases [6] are as follows:

- In 2016, India recorded 106 rapes a day
- A large number of those raped (2,116) were girls in the age-group of 0 to 12 years and in 36,859 (94.6%) of cases
- The national capital Delhi witnessed the most rape cases at 1,996
- followed by 712 in Mumbai, 354 in Pune and 330 in Jaipur

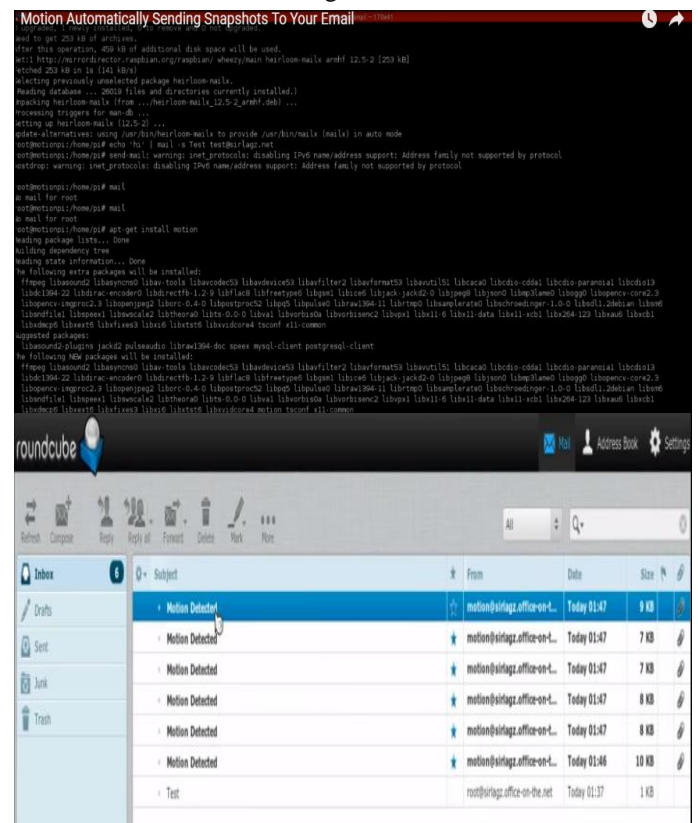
The solution for providing justice for the women who has undergone the violence is by building a smart surveillance system that is fully autonomous and works without aid of any

manual input to the device. The proposed system design is as shown in the above figure<sup>2</sup>.

The gadget captures the image when there a suspected motion in front of the camera, a copy of the captured image is stored on the both device memory and the registered Email Id, even if the culprit destroys the gadget the copy of culprit image can be recovered from the registered Email id. The device also sends out the location of the victim under the critical situation.

The captured image of the culprit can be hence forth used to show in the judicial courts and prove the culprit guilty thus our proposed gadget assures that women gets complete justice for the critical situation she has underwent.

The results are as shown in figure<sup>6</sup>



**V. CONCLUSION**

The paper mainly focuses on the low cost implementation of the device which can save the life of the women in the critical condition the proposed system provides end to end security solutions for women safety using the advance technologies of IoT along with combined hardware technology like Raspberry pi, Nodemcu. The proposed system not only defends the women in the critical situation of rape, molestation but also the captured image of the culprit is used as a valid proof that can be presented in the Indian Judicial Courts for making the culprit guilty for his committed crime.

The overall system is first of its kind that provides a complete kit solution to the existing women safety problem, with the

complete system the women can now travel freely without any hesitations of getting harmed by the societal issues. The further research can be made to make the prototype version of our system into a consumer portable product.

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