

An E-Ornament for Women to Escape the Effects of Date Rape Drugs

S. Tamil Selvi, K. Helen Prabha, G. Preethi, M. Pooja

Abstract: India is a developing country which had shown several successful faces in various fields. Though there is a good rate of social, economic and political development in our country on one hand, the amount of violence, crimes and illegal activities are increasing on the other hand. With regard to this, a survey of National Crime Records Bureau had stated that the fourth most common crime in our country is Sexual Assault. To ensnare the victims of sexual assault, women trafficking, robbery and other crimes related to women, criminals most probably uses date rape drugs. In this paper, we had put forth an idea of developing an Electronic Band which would be help for automatic indication and earlier rescue of the victim. This E-ORNAMENT is fitted with system interfaced with sensors which keeps an eye on the body conditions of women wearing the band. When there is a sudden change in usual pulse rate, body temperature and activity state of the victim, an automatic message of changes noticed in the body conditions along with the location of the victim is generated from the e-band and sent to her family or friends such that they can ensure with the victim about her safety (or) In case of no response received from her, they can rescue the victim as soon as possible. We hereby use tools such as Microcontroller, Pulse Rate Monitoring Sensor, Temperature Sensor and Panic safety button.

Keywords: Date Rape Drugs, Women trafficking, Sexual Assault, Pulse Rate Monitoring Sensor, Temperature Sensor

I. INTRODUCTION

India is a globalized country with women having opportunities to stand equally in all sectors from cab drivers to CEO's. But still, their safety is a question mark. Each year in India, more than 7,200 minors – 1.6 in 100,000 minors – are sexually assaulted as per the small sample survey of Human Rights Watch projects. One of the most common way of women trafficking and sexual assault is through date rape drugs. The drugs are usually mixed into the victim's drink or else these predator drugs are sprayed or injected to the victim unknowingly to incapacitate them to facilitate a crime called as "Drug Facilitated Sexual Assaults" (DFSA) at an outside place, party, raves, clubs & concerts. In such situations the victims feel fuzzy & intoxicated and loses consciousness. While the victims are out of their own control, it's really difficult and sometimes impossible to use smart phones to intimate their risks to their friends, family or to a helpline. Under this circumstance, the E-Band would be really helpful in automatically intimating the victim's relatives with location details.

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II. EXISTING SYSTEM

The Existing systems consists of a wearable smart bands, shoes and other devices which continuously communicates with the smart phone having internet access to send alerts based on the reactions of the victim [8]. There also exists a large number of proposed ideas regarding women safety, but most of the ideas are dealt with manual operations and alert generations of a victim themselves [3]. Basically, when a woman is under fear or stress, it increases her heart rate, blood pressure as well the cardiac output. Under such critical situation's humans cannot respond aptly[7] and it's also not possible to safe guard the smart phones for alert generation & internet access rather than safeguarding themselves. Moreover, if she is sedated and unconscious, manual operations of raising requests for help is impossible. So, it would be quite helpful for them if something automatically happens to protect and rescue them.

III. PANIC STATE OF A WOMAN

Practically, when a woman is under danger, if she is frightened or pressured, a hormone called adrenaline is being secreted by the adrenal medulla upon stimulation by the central nervous system. This increases her heart rate, blood pressure as well the cardiac output. At this time, the human body would be preparing to make an idea of flight or fly. When she is not sedated but in danger, we categorize her under the panic state.

IV. ANALYSIS ON DATE RAPE DRUGS

Sedatives, hallucinogenic drugs and tranquillizers are commonly the date rape drugs which are used in India for crimes. These drugs are mostly undetectable since it has no smell, color or odor when mixed with drinks or eatables of the victims. They are sometimes injected, sprayed or used as drug-soaked rag. This makes the crime unsusceptible most of the times. The date rape drugs known internationally includes Rohypnol, GHB, Ketamine and other drugs in the markets include Halothane, Stilnox, Ecstasy, Scopolamine, Midazolam, and Chloroform. Table1. shows different characteristics, effects and properties of each drugs.

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Table 1. Analysis of Drugs, its properties and effects.

| Most commonly used Predator Drug and its Effects | Properties and Appearance | How it is abused. |
|---|---|---|
| Ketamine (K, Kat, Special K) Conscious Sedation, Loses consciousness, Dizziness, Dissociation, Hallucination, Impaired Motor Skills. | Liquid or powder. (colourless, Odourless, Tasteless) | Slipped into beverages to sedate people. |
| Gamma-Hydroxy Butyrate (GHB, Liquid X, Liquid E, Scoop, Easy Lay G, Vita-G, G-Juice) Depressant on the central nervous system, dizziness intense drowsiness. | Clear liquid or powder (Colourless, Odourless, Tastes salty) | Since its salty, its masked by mixing it in sweet liquor or fruit drinks. |
| Rohypnol (Rib, Mind Erasers, Roofies, Rochies, Roaches) Drowsiness, nausea, impaired motor skills, disorientation, poor balance and coordination, memory loss and reduced levels of consciousness. | Pill form (either small round white pills or oval shaped greenish-blue pills) & sometimes in liquid form. | Usually dropped whole or crushed into carbonated beverages. |
| Midazolam Unconsciousness | Injection form | Injected |
| Scopolamine | Powder form | Blown on victim's face. |
| Halothane | Liquid form. | Soaked in rag & forced to inhale. |

These drugs have adverse effects on pulse rate, active modes of human body and sometimes rarely the body temperature.

V. BODY TEMPERATURE OF HUMANBODY

Temperature of human body varies by person, age, activity, place and time of the day. Average Normal Temperature of human body lies between 97°F(36.1°C) to 99°F(37.2°C). Most of the times, date rape drugs do not have adverse effects on temperature. But sometimes it can cause notable changes in the normal human body temperature. It either lowers the temperature below 95°F or higher's the temperature suddenly above 100.4°F(38°C). This effect of temperature is also accounted in our design.

VI. OVERVIEW OF PULSE RATE/HEART RATE OF HUMAN BODY

Pulse rate is the measure of heart beats per minute. The heart rate varies over a range from person to person. Normally, Children of 7 to 9 years has the heart rate of 70 to 110 beats/minute and Adults of 18years and above has the

heart rate of 60-100 beats/minute. Other than this, Athletes have a slight varying range. To have a better understanding, the pulse rate of female's is tabularized below.

Table 2. Pulse Rate of women according to age categorization.

| Resting heart rate chart for women | | | | | | | |
|------------------------------------|-----------------------|-----------|-------|---------------|---------|---------------|------|
| By Age | Heartbeats Per Minute | | | | | | |
| | Athlete | Excellent | Good | Above Average | Average | Below Average | Poor |
| 18-25 | 49-55 | 56-61 | 62-65 | 66-69 | 70-73 | 74-81 | 82+ |
| 26-35 | 54-59 | 60-64 | 65-68 | 69-72 | 73-76 | 77-82 | 83+ |
| 36-45 | 54-59 | 60-64 | 65-69 | 70-73 | 74-78 | 79-84 | 85+ |
| 46-55 | 54-60 | 61-65 | 66-69 | 70-73 | 74-77 | 78-83 | 84+ |
| 56-65 | 54-59 | 60-64 | 65-68 | 69-73 | 74-77 | 78-83 | 84+ |
| 65+ | 54-59 | 60-64 | 65-68 | 69-72 | 73-76 | 77-84 | 84+ |

From the above classifications in Table2. and other analysis it's clear that the average normal pulse rate lies within the range of 49-100bpm. When the person is influenced by drugs the heart rate increases or decreases from the usual level based on the characteristics of the drug. And if they are in frightened or given conscious sedations, it will trigger the pulse rate automatically.

VII. PROPOSED SYSTEM

The proposed system is an E-Ornament which inculcates a Pulse rate monitoring Sensor, Temperatures Sensor, Panic safety Button, GPS and GSM interfaced in a microcontroller board. Based on the study it is clear that the date rape drugs such as Chloroform, Rohypnol, GHB, Ketamine, Halothane, Stilnox, Ecstasy influences unconsciousness and raises or lowers the pulse from the normal level and Another impact of abusive drugs is the body temperature variations. On the other hand, When the victim is conscious and pushed into a trouble, she will fall under panic state. On considering both these situations, this device is designed. Normally, this ornament can be fabricated as watch, wrist band or pendant and can be worn by women, visually impaired girls and all others who go for works to the outside world & whose safety is not assured. This ornament keeps track of pulse rate, temperature and active rate of the person wearing it.

Case1. If the **victim is drugged** and her consciousness slips, the pulse rate definitely increase or decreases(Pulse rate<45 bpm or >100bpm) and sometimes deviates the body temperature(Temperature < 95°F or >100.4°F) based on the effects of drug and her activity mode suddenly slips to sleeping mode which can be detected with the help of the sensor fitted with the device. When anyone of these parameters falls below the limit, an automatic alert SMS is sent about the victim and her location to the prefixed numbers.

Case 2. If the **victim is under a trouble panic state** and if she wants to safeguard herself, she can use the panic safety button fixed in the E-ornament which initiates the microcontroller and sends the help alert with location to her friend or family with the help of GPS location tracking and GSM setup.



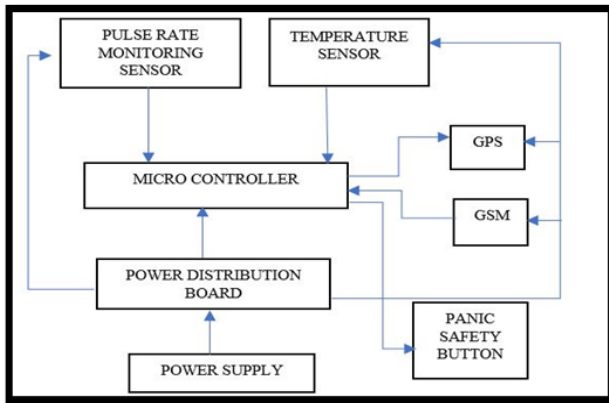


Fig. 1. Block Diagram of Proposed System.

In Figure1. the block diagram of the proposed system is shown. Based on the operations of the sensors and the panic safety button, the microcontroller unit turns on GPS and GSM to send alerts [7].

VIII. FLOW OF OPERATION

The people wearing this ornamental band will be under continuous tracking of pulse rate and body temperature. From Figure2. It's clear that, When the levels of these parameters vary from the usual threshold level as per the comparison made by the microcontroller unit, it switches on the GPS and GSM module to send the report of the parameter's deviations along with the GPS location to a prefixed number. Now, the person receiving the alert text can make a call & assure the need of help, if she picks up the call. Further, based on the response they can call helplines and other forces if needed. But, If the victim's number is switched off or unanswered, they can immediately proceed with rescue operations by contacting the government forces. This procedural flow usually avoids spread of unwanted false information's to the rescue team.

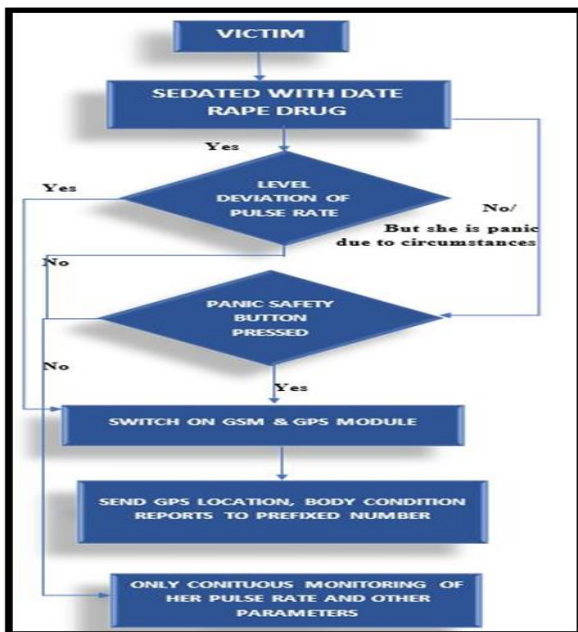


Fig. 2. Flow of the Proposed System.

In Figure2. The operational flow of the E-Ornament is shown. Based upon the sensor input the microcontroller decides the operation to be performed.

IX. RESULT

Based on the variations in the parameters of the human body the alert generation operation is performed. The defined limit of the body temperature, pulse rate and panic state of a women is set and variations of any defined range is monitored continuously. As far the limit is within the range defined, the ornament seems to be one like other wearables. Table3. Shows the parameters, its limits and variations

Table3. Alert on Level Deviations of Body Parameters

| S. No | Parameter | Variation | Alert |
|-------|---------------------|----------------------|-------|
| 1 | Pulse Rate | <45 Bpm (or) >100bpm | Yes |
| 2 | Temperature | < 95°F (or) >100.4°F | Yes |
| 3 | Panic Safety Button | On | Yes |
| 4 | Normal Routines | No variations. | No |

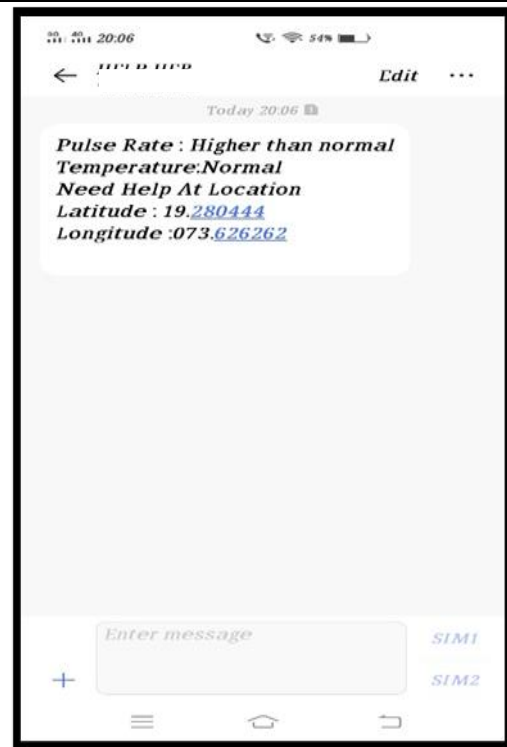


Fig. 3. Auto-sent Text SMS in needy situation.

Based upon the analysis of parametric changes (or) Panic alert input made by the device design, a text SMS is auto-sent to the prefixed number about the victim as shown in Figure3.

X. CONCLUSION

Targeting the teenage girls, working woman's, visually impaired woman's and all others with safety related issues while floating in the outside world, this E-Ornament is designed and implemented with smart features.

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The prime objective of the system is to help the female victim's influenced by date rape drugs with good safety and immediate rescue when struck with any critical circumstances. As per the National Crime Records Bureau (NCRB), the rate of crimes and abuses using date rape drugs which affects woman are drastically increasing. Nearly, female holds 48% of the total population of the country.

Though the society had paved way for her positive foot holds in various fields, the wall of safety and gender suppressions still remains as an issue. To face this issue of safety, the proposed design is really helpful. Women and Visually impaired people in day today world can wear this e-ornament and can travel to the outside world and can definitely enjoy the safety assistance provided by the device.

XI. FUTURE SCOPE

Human body and its parameters such as temperature, pressure, accelerations vary from person to person and as well based on the time, place and other factors. So, all these parametric measures of human body are indicated in ranges since specified value can't be indicated. Other than the effect of date rape drugs on these parameters, any other changes in the human body can be studied and techniques to detect those changes can be developed further. Any automatic help alert indication system for woman safety can also be developed.

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