

Internet of Safety: Applying IoT in Developing Anti Rape Mechanism for Women Empowerment

S.Balamurugan, S.Dharanikumar#, D.Gokul Prasanth#, Krithika#, Madhumitha#, V.M.Prabhakaran# and Dr.R.Gokul Kruba Shanker*

#Department of Computer Science and Engineering, KIT-Kalaignarkaranidhi Institute of Technology, Coimbatore, Tamilnadu, India

**Consultant Surgical Gastroenterologist, Advanced Laparoscopic and Bariatric Surgeon, VGM Hospital-Institute of Gastroenterology, Coimbatore, Tamilnadu, India*

Abstract— This paper investigates the cause and effect in women who faced physical abuse for the past 20 years. Physically abused women face a lot of psychological, physical and societal problems. Women, who are actually stronger sex, tend to feel very difficult to defend against rape. Also, mental health professionals term that post-rape stress disorders are increasing extravagantly in the recent years. With this thought of serving the society, we have made a detailed investigation on physical and psychological effects of rape over the past 20 years. We have developed an IoT based prototype framework aimed at protecting women against physical abuse. This paper would promote a lot of research in the area of application of IoT in developing anti-rape mechanisms.

Keywords- Internet of Things (IoT), Cloud Computing, Physical Abuse, Mental Stress, Anti-rape mechanisms.

I. INTRODUCTION

"She is free in her wildness, she is a wanderness, a drop of free water. She knows nothing of borders and cares nothing for rules. "Time" for her is 'nt something to fight against. Her life flows clean, with passion like fresh water"-Roman Payne, Famous American Novelist

Internet of Things (IoT) has major advantages, but it also has disadvantages too. Women, who are actually stronger sex, tend to feel very difficult to defend against rape. Also, mental health professionals term that post-rape stress disorders are increasing extravagantly in the recent years. With this thought of serving to the society, we have made a detailed investigation on physical and psychological effects of rape also proposed prototype framework which defines the effects of rape over the past 20 years. We have developed an IoT based prototype aimed at protecting women against physical abuse. The rest of the paper is organized as follows: Section 2 describes a literary overview of cause and effects of rape and problems faced by the women for the past 20 years. Section 3 gives a broad overview of existing anti-rape software technologies and proposed prototype architecture. Section 4 concludes the paper giving the future research direction towards women safety measures.

II. A LITERARY REVIEW

Mary P.Koss, Aurelio Joss Figuerdo, Iris Bell, Melinda Tharan and Shannon Tromp (1996) studied about the change in memory pattern of physically abused women. Study was conducted on women working in medical centres and universities etc. Results proved that post rape affect the memory factor- "Clarity" and "alertness". Authors portrayed that post rape physical symptoms and mental pressure is high. Gillian C.Mezey(1997) published a paper on treating mechanism for rape victim. Psychological post rape effect includes depression, anxiety, and sexual dysfunction. Hence the author aimed to recover the victims to achieve a normalised respond to rape, to response rape, to restore sense of power, dignity and self-confidence and to encourage getting back psychology social functionality. Authors conclude say that mental health professional can aware of history of part physical abuse and chattering. Lori K.Sudderth (1998) study is based on qualitative analysis of interview with 30 rape survivors, who had been raped by men. The core of this survey is, the victim people are more feel negative while discussing their bitter moments which they faced in rape. They feel hesitant to share their experience with others. Lots of survey says that a victim person especially younger victims don't go and complaint in police station. Even they don't feel good when share their experience till considerable time. The ultimate purpose of this

research is “recovery process”. Victim survivors avoid exposing inducing emotion connected with rape. Victim people hesitate to share their experience because of stigma is attached to being a rape victim.

The objective of the research made by Jillian C. Shipherd, J. Gayle Beck (1999) is to overcome posttraumatic stress disorder because of rape. Survey report says that the people become more anxious, depressed and distressed throughout. They are not able to get rid of rape related thoughts.

This study by Jwlith B Brad Ford (2000) say that people who had experienced child abuse are more depressed, alcohol abuse and dating stress. Rebecca Campbell, Courtney E. Ahrens, Tracy Sefi, Sharon M. Wasco, Holly E. Barner (2001), in their survey, 102 rape survivors were interviewed about social reaction, family and friends support post rape. The support from, social and friends are negligible. Instead of giving care and help regarding physically and mentally, they (society and friends) lead them into misery by giving negative complaints and blaming. Survey concludes that the support from social as well as the friend & family did not adequate. The main purpose of Paul A. Schewe (2002) study is, developing co-curricular from Middleware School to high school. Sharo M. Wasco (2003) highlighted the limitation of trauma response and applications of posttraumatic stress people who are raped. The study by Ingrid Sochting (2004) enforced to provide rape prevention programs to girls. Most of the North American Universities give priority to change women attitude, by educating them about rape prevention techniques.

There are two types of rape prevention programs

1. Attitude Changing Programmes

It is a seminar or workshops for 1-2 hours. It defines about the impact of rape on girl victim and her family and society also. Both men and women get participated. By asking their idea to suppress the rape in society Dr. Lonsway conducted these kinds of programmes.

2. Self Defence Programmes

Anti-rape resistance strategies include Yelling, Biting, Wrestling, Punching, Scratching, Kicking, Using a weapon, Fleeing and Screaming.

Tami P. Sullivan, Katharine J. Meese, Suzanne .C, Swan, Carolyn M. Mazuse and David L. Snow (2005) observed that if a criminal once committed rape and is not noticed by police or media, there are more chances that he commits the same mistake subsequently. Study by Terri L. Messman (2006) examined 262 college girls who have given ideas to prevent and avoid rape. Female victims and child abuse increase during adulthood. Sarah E. Ullman (2007) said that what happened for the last 10 years. He has reviewed sexual assaults since 1997 and reported that Self-defence, rapist types, victim offender relationship were reviewed by him. Those days in 1970s, women to restrict their behaviour like (refrain from going out, wearing fully covered cloths), is advised by police officers and certain self-help techniques were also instilled. Many women try to restrict the rape physically or verbally. The effective strategy to prevent rape is self-defence physically like biting, resisting, scratching, hitting and sing weapon because victims are not aware of that situation. Survey said that 20-25% of women use these techniques like yelling and screaming in case of danger. When Jocelyh A. Hollander (2009) researched on self defence system for women, he got handful of articles and books [Cummings 1992; kidder, boell & Moyer 1983; McDaniel 1993; ozer & bandura 1990]. In college survey lots of workshops & seminars have been conducted even though it highlights in “sufficient” [Anderson & whiston 2005; Gidycz at 2002]. The 75% of rapes are escaped, if women in counter attack [Gordon & riger 1989]. “National crime victimization survey found that 81% reduction if women who used physical attack. Every research the bench of root author Ullman (1997) that physical prevention like fight, yelling are the thinly hopes to avoid rape. The women, who learned self-defence may use these skills without purpose. Author concluded that, most of the self-defence mechanisms may sometimes make her weak, physically & psychological helpless [Hollander 2001, 2004, Mc Carighey 1997]

Steven lawyer, PhD; heicliresnick, PhD; von backanic, PhD; Tracy Burkett ph D; dean Kilpatrick ph D (2010) studied about how alcohol and drug lead to do rape or abuses. Survey have taken place with 314 colleges females, they had drug & alcohol, result is 93 (29.6%) responds that drug consumption. 5.4% [n=17] reported forcible rape. Study concludes that colleges’ campuses sexual assault are more frequent than forcible assaults are frequently proceeds by voluntary alcohol consumption.

Jocelyn A. Hollander (2010), study highlighted the need of self-defence for women. According longitudinal study of university women, self-defence from abuses is essential. Study says about barrier is lack of proper educational awareness and money. Author argues that women should be equipped with self confidence as mentioned by other authors in

literature [Cohn, kidder, & Harvey, 1978; Hollander 2004;McCaughey1997; McDaniel 1993; ozer& bandura 1990; weitlaf, smith &cervone2000]. Self defence program like 3 hours per week, 1.5 hours for physical and rest of time for psychological equip womenhood. National coalition against sexual assault [NCASA] and other feministself-defence classes offered throughout [Cummings1992;rentscler1999] Survey have taken 292 participants only 18 (6.2 %) said they said that there are lot of barriers in attending these type of classes where the remaining participants got credited.

William F.Mckibbin& Todd k.Shockelford(2011) author made several researches and found that rape is a problem faced by all the species in our evolutionary history. In humans rape of women by men has occurred throughout the history and across cultures and therefore the author provides an overview of theoretical and empirical research to avoid being raped. Therefore the author concludes by saying evolutionary physiology is a powerful heuristic tool that avoids rape he also motivates the researchers to continue to investigate the physiological mechanism associated with rape avoidance behavior that may improve the lives of women around the world. CorinPerillouer ,JoshuaD.Duntley,DavidM.Buss (2011) made a survey and examined the cost of rape experienced by the victims of completed rape and attempted several assault by using quantitative analyses on various domains such as health, self-perceived value,familyrelationships,worklife,sociallife,socialreputation,sexualreputation,desire to have sex ,frequency of sex, enjoyment of sex and long term committed relationships .The author found that completed rape victims are mostly affected in 11 out of 13 domains than the attempted sexual assaulted victims .Although victims of attempted sexual assault, both groups of victims reported negative effects in all domains.

Lorelei Simpson Rove ,ErnestN.Jouriles ,Renee Mc Donald,CoraG,platt,GabriellaS.Gomez (2012) conducted a survey by providing a DATE (Dating Assertiveness Training Experience) Despite of providing extensive effort to develop sexual assault prevention programs for college women nearly one hundred and thirty nine female college students from private university in the southwest US participated in it .Participants were randomly assigned to DATE ,sexual victimization and response to acts of sexual aggression were assessed after three months the women who completed DATE were less likely to be victimized than other women. Jeffery K.Snyder ,DanielM.T.Fessler(2012) re-examined the work of Mc Kibbin et al(2011).Mc Kibbin et al presented the documents supporting their predictions such as behaviours would vary according to the individual's physical attractiveness ,relationship status and proximity to kin but he failed to find evidence that age would experience a similar influence .The author put a couple of argument in front of Mc Kibbin et al that as follows

- 1) Two of their predictions do not prove out alternative explanations
 - 2) Their measurement instrument RAI does not support substantive predictions
- Therefore the author concludes that there may be limits to the utility of RAI beyond its specification.

R.SeanBannon ,MathewW.Brosi,JohnD.Foubert (2013) says Sorority women and fraternity men are more likely than other students to survivors and perpetrators of sexual assault ,respectively. This study examined the above mentioned characters of men & women rape myth such as acceptance, bystander efficiency and bystander willingness to help in potential sexual assault situations .Sorority women were more rejecting of rape myths and more willing to intervene than the fraternity men therefore there is no difference in bystander efficiency was found implications of this contrast are discussed. Jocelyn A.Hollander (2014) made a study on does self defense training prevent sexual violence against women or not? By undergoing self defense training over a period of year and he used those collected data from a mixed methods of university -based feminist self-defense class and come to a conclusion that the women who participated in self defense training are less likely to experience sexual assault when compared to the women's who have not taken such classes he also states that self defense training improves the confident in their ability to effectively resist over such sexual assaults .

Mary Ellsbery, DianaJ.Arrango, MathewMorton, HorizaGennari, Sveinungkiplesund, ManuelContreros, Chorlotte Watts (2014) made a survey over the statistical report of various countries and found that the violence against women and girl are of many forms such as intimate partner violence ,non -partner sexual assault ,female genital mutilation and child marriage are prevented in high -income countries the interventions have shown greater success in improvements in physical and mental health outcomes though it gave a greater success there is no effect on re-victimization and thereby in law income and middle income countries there is increase in emphasis on prevention of different forms of violence against women therefore the author concludes that it is possible to prevent violence with some interventions achieving large effects in programmatic time frames .

Claudia Garcia ,Cathyzimmerman ,Alison Morris-Gehring ,Lori Heise ,Auni Amin, NaeemahAbrahams, OswaldoMontoya, PadmaBhate-DeosthaliNdukuKilanzo, Charlotte Watts (2014) argues that violence against women is a worldwide issue violence over intimate partner physical violence ,sexual violence both are affecting one in three women the author states that political leadership and government investment are essential to reduce violence against girls and women's the author concludes by saying there is a crucial parts to play for health sector other sector and civil society and also investment is required in research to collect data on violence against women and take remedial measures for prevention.

Rachel K .Jeukes,MichaelG.Hood ,James Lang (2015) made a research on the role of violence against women are done by them instead of punishing them all engaging all men and boys in action against violence against women and girls is essential the author states that violence against women are due to gender inequality by motivating boys and men there is a change in attitude towards girls and women he also states that all men and boys have a positive role to play in helping and to stop violence against women.

RoeAnnE.Andreson ,AmandaM.Brouwer ,Angela R.Wendrof,ShawnP.Cahill (2015) say that one in four college women experiences sexual assault on campus ,yet the campus are not providing in depth self defense programs needed to reduce sexual assault risk. The author made a study to explore the quantitative themes in women such as assertion ,compliance / acceptance ,conditional decision making ,avoidance ,expressions of discomfort and allusion to future contact over 139 women were selected randomly who were in different levels of sexual assault threat the author made measures of the above mentioned themes and represented it for future interventions.

Paul A.Schewe (2016) focused on the young Rapists who were in middle school, high school and college students most of them have no idea about adolescence. Adolescence is the developmental period marked by the onset of puberty here the author surveys the experience of some measures taken for teaching sex avoidance and self - defense skills(parrot ,1990) to women but a very little was known about adolescent dating as the adolescent sexual assault has advanced , prevention efforts have expanded and more programs have begun to target younger audiences the author explained the outcome evaluations in the effort of rape prevention for adolescents and young adults.

This paper is based in the importance of protecting college students from victimization during their post secondary education here ContneyA.Franklin,Hae Rim Jin ,Lindsay M.Ashworth& Jane H.Viada (2016) analyzed the role of higher educational institutions in Texas for prevention ,resources , response and aftercare for victims after sexual assault he as analyzed that existing resources of universities and various education campus and sampled the collection data and he gave some suggestions to improve the existing strategies.

III. EXISTING ANTI-RAPE AND PROPOSED PROTOTYPE ARCHITECTURE

Every mobile phone applications have lots of threats. In fact it leads us technical problems as well as disappointment. Such as "Circle 6" is a mobile application specially designed for women's safety. When women is in the threatening situation, then she should press the button twice, meanwhile the alert goes as a pre-determined text to concern the persons whom she trusts. "Hollaback" is a mobile application used to share the criminal photo and information to ihollaback.org. It will act as pre-intimation to others to be safe . "bSafe" is a mobile application designed for kids. It is pay for use. The alert messages go to the concerns persons as a text message. "Guardly" is also a mobile application used to share the danger situation as a call to the concerns persons. It is also a payable one. "Cab4meis" is another mobile application. When the person is in danger situation and press the alert button, then the location will be traced and the cab will go and save them. Rmithra is mobile application, specially designed for train. If women have some problem related abuses then the alert goes to concern railway cabin.

Disadvantages of Existing Technologies:

1. Most of mobile application depends on smart phones.
2. Illiterate people can't use it.
3. Every safety depends on mobile phones.
4. Very expensive
5. Continue monitoring is difficult.
6. Traceability problem may occur.

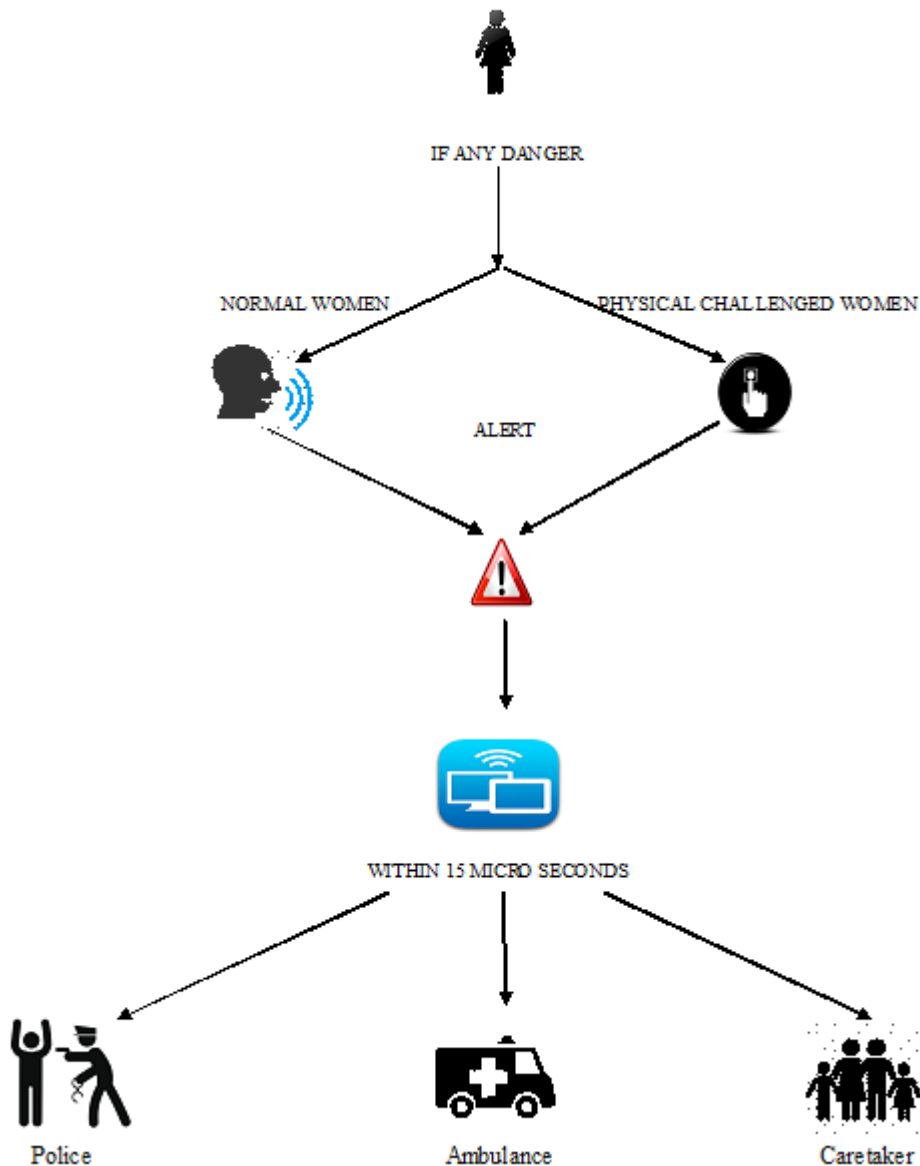


Fig.1 Proposed IoT Architecture to safeguarding women against rape

IV. CONCLUSION AND FUTURE WORK

This paper investigates the cause and effect in women who faced physical abuse for the past 20 years. Physically abused women face a lot of psychological, physical and societal problems. Women, who are actually stronger sex, tend to feel very difficult to defend against rape. Also, mental health professionals term that post-rape stress disorders are increasing extravagantly in the recent years. With this thought of serving the society, we have made a detailed investigation on physical and psychological effects of rape over the past 20 years. We have developed an IoT based prototype framework aimed at protecting women against physical abuse. This paper would promote a lot of research in the area of application of IoT in developing anti-rape mechanisms and women safety measures.

ACKNOWLEDGMENTS

S.Balamurugan, V.M.Prabhakaran, S.Dharanikumar and D.Gokul Prasanth wishes to thank the Management, the Director, the Principal, of their institute, KIT-Kalaignarkarunanidhi Institute of Technology, for providing all the necessary facilities and never ending support for the work. Their special thanks go to, Prof.Dr.R.Nedunchezian, Director-Research and Vice-Principal, for sowing the seeds of thinking big in research, his expert guidance and continuous motivation. They

wish to thank their Department Head, Prof.Dr.P.Raviraj for the freedom to pursue research and excellent research ambience provided by him.

REFERENCES

- [1] Mary P.Koss, Aurelio Joss Figuerdo, Iris Bell, Melinda Tharan And Shannon Tromp ,“ Traumatic Memory Characteristics: A Cross Validate Mediatonal Model of Response To Rape Among Employed Women”,*Journal Of Abnormal Psychology*, Vol. 105, No. 3,421-432, 1996
- [2] Gillian C.Mezey,“Treatment Of Rape Victims”,*Advances In Psychiatric Treatment*, Vol. 3, Pp. 197-203, 1997
- [3] Lori K.Sudderth,“It Ll Come Right Back At Me”,*Violence Against Women*, Vol 4, No 5,October 1998
- [4] Jillian C.Shipherd, J. Gayle Beck,“The Effects Of Suppressing Trauma-Related Thoughts On Women With Rape Related Posttraumatic Stress Disorder”,*Behaviour Research And Therapy* 37 (2), pp.99-112, 1999.
- [5] MonicaJ.Descamps,EstherRothblum,JudithBradford,Caitlin Ryan,“ Mental Health Impact of Child Sexual Abuse, Rape, Intimate Partner Violence, and Hate Crimes in the National Lesbian Health Care Survey”, *Journal of Gay & Lesbian Social Services* · June 2000.
- [6] Rebecca Campbell, Courtney E.Ahrens, Tracy Sefi, Sharon M.Wasco, Holly E.Barner,“Social Reactions To Rape Victims: Healing And Hurtfull Effects On Psychological And Physical Health Outcomes”,*Violence And Victims* Vol 16,No 3, 2001.
- [7] Sharon M. Wasco ,“Conceptualizing The Harm Done By Rapeapplications Of Trauma Theory To Experiences Of Sexual Assault”,*Trauma, Violence, & Abuse*, October 2003.
- [8] Ingrid Sochting, Nicholl Fairbrother and William J.Cock,“Sexual Assault Of Women (Prevention Efforts And Risk Factors),” Vol. 10 No. 1, pp.73-93 Doi:10.1177/107780120325568, 2004.
- [9] Sarah E. Ullman,“Criminal Justice And Behaviou,” Vol. 34, No. 3, pp.411-429, March 2007.
- [10] Jocelyn A. Hollander, “Why Do Women Take Self-Defense Classes?”, *Violence Against Women* 2010 16: 459
- [11] William F.Mckibbin& Todd k.Shockelford, “: Women’s Avoidance of Rape”, Vol 10 No.3, 2011
- [12] CorinPerillouer ,JoshuaD.Duntley,DavidM.Buss, “Cost of Rape”, 2011
- [13] Lorelei Simpson Rove ,ErnestN.Jouriles ,Renee Mc Donald,CoraG,platt,GabriellaS.Gomez, “ Enhancing Women’s Resistance to sexual coercion : A Randomized controlled Trial of the DATE program”, 2012
- [14] Jeffery K.Snyder ,DanielM.T.Fessler, “ Reexamining Individual Differences in women’s Rape Avoidance Behaviors”, 2012
- [15] R.SeanBannon ,MathewW.Brosi,JhonD.Foubert, “ Sorority Women’s and Farternity men’s Rape Myth Acceptance and Bystander Intervention Attributes”, 2013.
- [16] Jocelyn A.Hollander, “ Violence Against women”, 2014.
- [17] Mary Ellsbery, DianaJ.Arrango, MathewMorton, HorizaGennari, Sveinungkiplesund, ManuelContreros, Chorlotte Watts, “Violence Against Women and Girls”, 2014.
- [18] Claudia Garcia ,Cathyzimmerman ,Alison Morris-Gehring ,Lori Heise ,Auni Amin ,NaeemahAbrahams,OswaldoMontoya,PadmaBhate-DeosthaliNdukuKilanzo,Charlotte Watts, “ Violence Against Women and Girls”, 2014.
- [19] Rachel K Jeukes,MichaelG.Hood ,James Lang,“ From work with man and boys to changes of social norms and reduction of inequalities in gender relations: A conceptual Shift in prevention of violence against women and girls”, 2015
- [20] RoeAnnE.Andreson ,AmandaM.Brouwer ,Angela R.Wendrof,ShawnP.Cahill, “ Womens Behavioural Response to the Threat of a Hypothetical Date Rape Stimulus : A Quantitative Analysis”, 2015
- [21] Paul A.Schewe, “ Date Rape Prevention among Adolescents and Young Adults”, 2016.
- [22] ContneyA.Franklin,Hae Rim Jin ,Lindsay M.Ashworth& Jane H.Viada, “ Sexual Assault resource availability on Texas Higher Education Campus : A web Site Content Analysis”, 2016 .