

# Application of AI in Prevention and Awareness of Domestic Violence

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## Abstract:

Domestic Violence has always been prevalent. In 2020 we were unexpectedly hit with the pandemic, COVID-19, it caused people to panic and led to frustration. While most of us faced financial, psychological or social problems, it posed an additional trauma of inmate terror for some. The pandemic saw a rise in the number of reported cases of domestic violence. One can only imagine the number of unreported cases there might be. This topic is seen as taboo and not spoken about even in front of close relatives or friends. So, we need to figure out a way to identify it and solve it without talking about it. In this paper, we look at the various ways and possibilities where Artificial Intelligence can solve this issue and figure out the optimal approach by analysing each idea's pros and cons. Knowing that a simple scream will make the neighbours aware and help will arrive may make the abuser think twice before committing domestic violence.

And knowing that help is readily available will make the victims feel safe.

**Keywords —Domestic Violence, AI, Artificial Intelligence, NLP, Natural Language Processing, Sentimental Analysis, COVID-19, Pandemic, Deep Learning.**

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## I. INTRODUCTION

According to Wikipedia, Domestic violence (also called domestic abuse or family violence) is violence or other abuse that occurs in a domestic setting, such as in a marriage or cohabitation. Domestic violence is often used as a synonym for intimate partner violence committed against another by one of the people in an intimate relationship, either within the relationship or between ex-spouses or partners. can occur. Domestic violence broadly includes violence against children, parents, or the elderly. It can take multiple forms including physical, verbal, emotional, financial, religious, reproductive or sexual abuse. It can take various forms such as physical abuse, emotional abuse, psychological abuse, social harassment, economic abuse or sexual violence. Domestic violence disproportionately affects women worldwide, and women typically face more severe types of violence. One in three women, according to the World Health Organization (WHO), experience domestic violence at some point in their lives. Additionally, they are more likely than men to defend themselves by using intimate partner violence. In some countries, domestic violence may be seen as justified

or legally permitted, particularly in cases of actual or suspected infidelity on the part of the woman. The degree of gender equality in a nation and its domestic violence rates have been found to be directly and significantly correlated, with greater domestic violence rates in countries with lower levels of gender equality. Domestic Violence has been around forever. People started talking about it openly in the 80s but the condition hasn't seen much improvement. People are afraid to talk about it. The victims often don't open up fearing public embarrassment or an increase in abuse. Most people don't get the gravity of the problem due to less information available on it. No one except the victim knows what he/she is going through.

## II. UNDERSTANDING THE PROBLEM

Domestic Violence has been around forever. People started talking about it openly in the 80s the condition hasn't seen much improvement. People are afraid to talk about it. The victims often don't open up fearing public embarrassment or an increase in abuse. Most people don't get the gravity of the problem due to less information available on it.

No one except the victim knows what he/she is going through.

Inherent practises involving violence or coercion, such as domestic violence and abuse, forced marriage, dowry murders, acid attacks, and female circumcision, are perpetuated by traditional ideas that view women as inferior to men or as playing stereotyped roles.

Such biases and behaviours could be used to defend against gender-based violence as a means of controlling or protecting women.

Because they occur in intimate relationships, many kinds of abuse, including physical and sexual abuse, are not recognized as violence—by the law or by victims.

Neighbours often are aware of the condition but are afraid to speak up due to societal pressure or stigma.

Helplines have been set up by the government but their accessibility and effectiveness are highly doubtful. There are cases when these lines are not reachable and even if they are reachable, they fail to provide the necessary support.

So far there is only government involvement in this matter. No start-ups or any private companies have been actively involved in solving the problem insinuating that the graveness of the situation is yet to be understood by a majority of people.

#### **A. Why don't people speak up about domestic violence?**

All too often we, as individuals and a community, notice signs of domestic violence but don't speak up. Let us look at some of the reasons and understand why.

**Intimacy** - The word 'home' is associated with love and safety so naturally; our mind finds it unsuited to talk about violence at home. Most relationships, especially in third-world countries are male-dominated, this slowly takes away a woman's sense of self and interferes with every thinkable facet of her life. Thinking "he can't be that bad," "She must have done something to offend him," or "they will figure it out" is more comfortable. Since intimate connections are the most important social context in a person's life, the alternative is too terrifying for us to consider.

**Privacy** - Perpetrators aim to garner unique knowledge about a partner's movements and vulnerabilities so they can personalise their abuse. People often think talking about someone being violated domestically could mean interfering with their personal lives and raise social problems so people keep stay far from it. It is really difficult for us as concerned friends or relatives to break through this wall of silence created by coercive control.

**Social Context** - Due to the extreme severity of the issue of gender inequality, sexism, and discrimination, we find it difficult to say anything about domestic violence. We are

hesitant to address gender inequity since doing so would jeopardise society's most fundamental foundations. In 2012, an estimated 17% of all women aged 18 years and over and 5.3% of all men aged 18 years and over had experienced violence by a partner since the age of 15.

**Fear or Embarrassment** - Victims lose their sense of self and fear being embarrassed by others for not being able to defend themselves. They don't want to be a burden to others. The victims alter their behaviour to withstand domestic abuse. They perceive being loyal as a strategy to try and stop the abuse, so they continuously try to win over their spouse and safeguard his reputation.

**Gender Norms** - As a community, we develop beliefs about women, men, and families, and these concepts are constrained by expectations of "acceptable" behaviour for women and men from families, cultures, and society. Examining our reluctance to address domestic abuse requires an understanding of this societal environment.

#### **B. Types of Domestic Violence**

Domestic violence can be of many types, not always physical. We need to exterminate all of its forms to call our endeavour successful. Definitions of abuse and domestic violence can be confusing. Many researchers have used physical violence, resulting in bodily injury as a primary definition. Yet it is clear that for many victims of domestic violence, psychological and emotional abuse is at least as harmful, if not more so than physical abuse.

**Emotional and Verbal Abuse** - Some examples of emotional and verbal abuse are:

- Ridiculing or insulting their partner.
- Ridiculing or insulting valued beliefs, religion, race, heritage, or class
- Humiliating partners in private or public
- Manipulating partners with lies and contradictions
- Continually criticizing, calling names, or shouting at partners

**Physical Abuse** - Some examples of physical abuse are:

- Pushing, kicking, slapping, punching or scratching
- Pulling or ripping out hair
- Throwing objects at or near partner
- Non-consensual rough play (i.e., martial arts, MMA, self-defence techniques)
- Spitting at or near partner

Nationwide, 10% of all female homicide victims and 4% of male homicide victims were killed by their intimate partners in 2007 according to the Bureau of Justice Statistics.

**Sexual Abuse** - Some examples of sexual abuse are:

- Birth control sabotage
- Subjecting the partner to unwanted touching

- Reproductive coercion
- Forcing a partner to participate in any form of unwanted sexual activity
- Sexually assaulting a partner

**Financial Abuse** - It occurs when one partner is controlling the financial independence and freedom of the other partner. Some examples of financial abuse are:

- Having all bank accounts in the abuser’s name
- Controlling how, when, and where money is spent
- Assigning an allowance (often a very small or unrealistic cost of living)
- Denying a partner, the right to work outside the home or make any financial contribution to the family

### III. STATISTICS

Year	No. of Cases	Year	No. of cases
2000	82	2011	1479
2001	188	2012	1867
2002	220	2013	1574
2003	29	2014	2183
2004	35	2015	1527
2005	77	2016	2043
2006	207	2017	1046
2007	17	2018	832
2008	485	2019	921
2009	579	2020	1579
2010	1159	2021	2383

Table 1: Number of Reported DV cases in the last 22 years

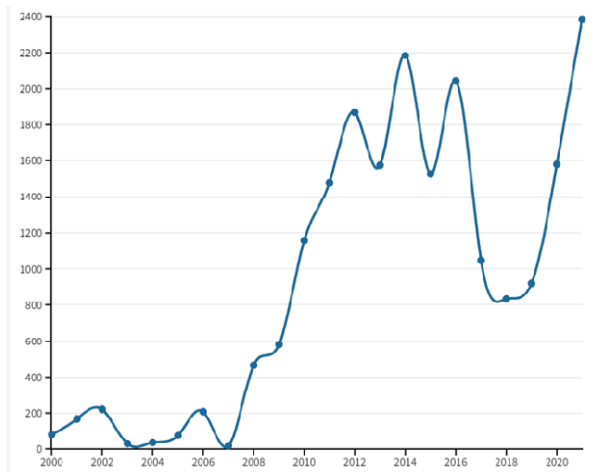


Figure 1: Comparative Graph of rising in DV Cases in the last 21 Years

### IV. THE SOLUTION

#### A. Why do we need the intervention of AI?

Many organisations have tried to solve the problem but with very little success.

We have helplines set up to help the victims but often the abuser cuts off the victim’s access to use these helplines. The victims are afraid of speaking about it in front of others fearing the consequences. We need a way to monitor it automatically without leaving any way for the abuser to restrict the victim from using the service.

#### B. Concept

Use of Natural Language Processing (NLP) and sentimental analysis to achieve the task.

#### C. Explanation

We need a system that’s accessible all over and throughout the world. Almost everyone owns a mobile phone nowadays be it a teenager or an old person. Moreover, everyone has the device on them at almost all times. So, a solution involving AI in mobile phones would mean surveillance and security all over the world and at all times. Smartphones nowadays, be it android or iOS come equipped with a voice assistant of some sort e.g., Google Assistant, Siri, Alexa, or Bixby. They can recognise speech and perform pre-defined actions based on that.

Knowing that a simple scream will make the neighbours aware and help will arrive may make the abuser think twice before committing domestic violence. And knowing that help is readily available will make the victims feel safe.

#### D. Methodology

##### Part 1 (Physical Violence)

First the user needs to define a set of keywords in the application. Here we will already have a set of pre-defined keywords. The user can either keep them or change them or add more keywords to them.

The keywords can be set in the default language i.e., English or any language that the user finds comfortable.

Then the user will have to set up emergency contacts. The application will call up or inform these contacts in case of a trigger.

The application needs to be calibrated once to detect the nearest police/help centres in the locality and store their phone numbers. [This is done to reduce the time taken to search for them each time the application is triggered].

This concludes the user’s involvement in setting up the app.

Now let us understand the internal logic of the application.

During the act of domestic violence when the user shouts any of the predefined keywords. The trigger will be activated.

The application will then ring an alarm, contact the emergency numbers (which were already set by the user) and inform the concerned authorities (e.g., nearest police station).

In case of false triggers, the alarm can be turned off manually with a PIN that only the user knows.

The following flowchart will help understand the model even better:

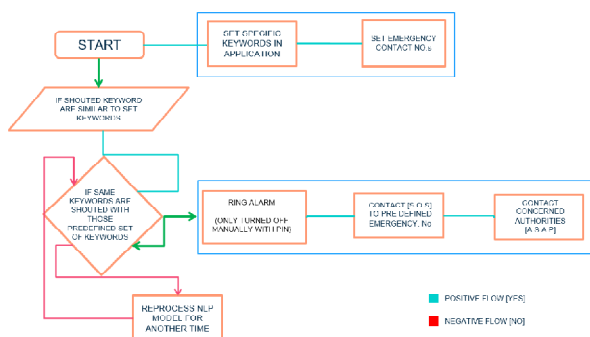


Figure 2: Flowchart to Understand the Working Principle of the Model

### Part 2 (Psychological Abuse)

To tackle the psychological and emotional part we are using NLP, and sentiment analysis to analyse social media posts, photos and interactions. This gives us an idea of the mental state of the victim.

Studies have shown that the social media posts we interact with or the posts we make are greatly affected by our mental state.

We can analyse the victim's psychological state from social media by:

- Implementing AI to analyse the linguistic markers in the victim's social media posts and comments.
- Analysing the victim's face in their pictures.
- Analysing pictures for any scars.

Combining these two results can help tackle domestic violence both physically and mentally at an individual level.

## V. REQUIREMENTS

To implement this, we must meet the following requirements:

- The victim must use a smartphone.
- The smartphone must have a voice recognition feature.
- The smartphone must be switched on and present at the time and location of the act of abuse.
- The smartphone company must allow third-party software to be installed at the time of manufacture.

### What needs to be done immediately?

Quite a few government agencies are working on solving the problem but there has been very little to no involvement of the private companies in the resolution of this huge issue. What this idea needs to be successful is the joint involvement of the public and private sectors to raise awareness and implement the solution on their devices. Many people are unaware of the schemes that have been made available by the government, so campaigns must be organised to make people aware of these.

More people need to come forward and talk about this topic. It needs to break free from the taboo. This will encourage the victims to speak up about their situation and instil fear in the abusers.

## VI. CHALLENGES

As we know no method is fool proof. Similarly, this solution too has its limitations.

- The mobile might discharge quickly.
- The help may arrive late to save the victim.
- Some people may disable this feature thinking it will breach their privacy.
- This feature can be in-built into the new smartphone models but the ones already on the market will miss out on this.
- The victim might not be in a position to speak the keywords.
- The abuser may come to know the security PIN.

## VII. CONCLUSION

Domestic Violence is a very serious problem that obviously requires drastic measures to solve. Almost all people are with their smartphones almost all the time. So having a pre-installed software in them is like having a guardian angel with them at all times. Just a cry for help and the software does its magic to save the victim. This is the simplest and the best possible way to cope with the issue at hand. We need to convince smartphone manufacturers to incorporate this idea into their devices and spread awareness about it. Knowing that a simple scream will make the neighbours aware and help will arrive may make the abuser think twice before committing domestic violence. And knowing that help is readily available will make the victims feel safe.

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