VRSafe with Augmented and Virtual Reality: Toolkit for Harassment Prevention and Deescalation - Sensitivity, Training and Best Practices

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Abstract—The goal of VRSafe project is to empower potential victims of harassment and aggression. Existing solutions attempt to stem aggression and harassment towards targeted individuals during travel or transportation but bypass the crucial need to prevent aggression: this is what VRSafe is designed to do. Our twin aims are to underscore the seriousness of this problem and to present an innovative, technology-based solution to address its prevention, sensitization and preparedness aspects. With VRSafe, we can apprehend harassment in an agile way, globally yet appropriately for local culture and need. A common, familiar platform will also encourage solidarity between users, raise awareness among diverse populations and aid citizen empowerment. VRSafe takes an immersive game-like augmented/virtual reality approach to help promote sensibility and educate potential victims of harassment. It aims to teach children and youth, learn and adopt the right behaviors to recognize, prevent and defuse situations of aggression.

Keywords: Virtual and augmented reality, harassment, prevention, sensitization training, data analysis, AI

1. INTRODUCTION

The issue of harassment at the public spaces has finally received public and governmental attention all over the world. Harassment (sexual, physical, ...) at the workplace, public spaces, etc. not only causes disastrous psychosocial and physical hardships to the victim, but also negatively impacts job performance, family relationships and civil society at large. At broader level, it also hampers the diversity of the labor force, current and future and the markets, and also erodes the economic prospects of a country.

VRSafe is a platform made up of different complementary educational tools adapted to engage the youth with serious games, utilizing the technology of Virtual and Augmented Reality, movies, comics, etc. By focusing on awareness, VRSafe allows simulation of real situations without the trauma of personal experience to sensitize, teach and train. Furthermore, VRSafe can be reproduced and deployed on a large scale.

The first results of these project are to be tested, exploited and validated by the first transportation company in France. We are also working with the big train transportation system in France and Europe. In the short term, the solution will be deployed in all France train transportation. Over longer term, this project will be funded by the European commission to deploy solution in Europe: Train stations, public spaces, schools, etc.

1.1 Harassment and women

It is common knowledge that women are frequent targets of harassment in many situations. The UN World Conference on Human Rights held in Vienna in 1993, identifies sexual harassment as a case of Human Rights violation and treats it primarily as a form of violence against women.

In our project, we focus on the harassment of women and other vulnerable individuals and support their rights in whichever country they reside.

Surveys indicate that 90% of women use public transportation either very regularly or regularly because it reduces traffic and pollution and primarily because it is also cheaper. But as many as 87% of women have already been victims of harassment, and they fear public transportation.
This data is shown in the two figures, Figure 1 and Figure 2, excerpted from a report of a transport association in France [1].

**In France:**
+ 30% aggression in 2018
1159 sexual aggressions signaled
52% in Paris, and

**In Canada:**
In a 2018, over a third of Canadian women surveyed said they had been harassed at work compared with 12% of men [2].

It is important to realize that not only the targets of aggressive behaviors are scarred, sometimes for life, but that there are other victims and costs to the society. There is a cost paid by the employers, and ultimately the country, when such behaviors are tolerated.
2. VRSAFE VS. EXISTING SOLUTIONS

In order to address the problems noted above the remedies proposed fall into the following broad technological categories:

- Provide help via mobile devices;
- Provide general video surveillance of target’s locale; and
- Police or security personnel.

Clearly, these present remedies do not suffice; neither the number of incidents of victimization or that of the victims has decreased. On the contrary, the incidents of attacks are on the increase not only in France but worldwide. These trends are accompanied by a general lack of societal civility.

Some reflection indicates the reasons why:

1- Providing help via Mobile applications is ineffective in places such as metro or trains because of connection problems.

2- General Video surveillance is only effective if the area is completely covered with cameras. This is an expensive solution because it will be a long installation process, and even at that total penetration is impossible. Besides, this passive, after-the-fact solution may not prevent every attack.

3- Police and agent security reactions are not proactive enough to prevent most situations. Victims cannot generally talk about what happened due to psychological trauma they suffer associated with physical assault.

In our approach, therefore, we focus on two main pillars that empower the potential victim: awareness and prevention. With awareness and prevention, all users are more likely to be able to protect themselves or contribute to their own security.

2.1 Awareness and Prevention

The awareness factor equips a potential victim to first recognize the signs of impending harm, starting with sensitization to forms of incivility. This will involve the ability to distinguish between a general lack of good societal manners and specific disrespect particularly projected at the victim by the aggressor.

In order to be effective, however, awareness must be accompanied by tools for prevention. For both factors, awareness and prevention, our solution provides multiple high technology tools. For example, by the measures to secure the train stations from acts of aggression on the one hand, and teaching a potential victim how to recognize and defuse acts of aggression on the other hand. Protection means limiting, reducing aggression and harassment at a locale, e.g., in railway stations. Furthermore, security, like incivility, has a cascading effect in the society: one who feels safe can help others as well. Thus, mutual aid is high a priority.

We develop a solution to empathize, put ourselves in others’ shoes, and to better understand the mechanisms of harassment, to know how to recognize it quickly and encourage solidarity between users.
2.2 The challenge and the promise of VRSafe

Our challenge is the creation of a new solution based on cooperation of all parties and reuse existing solutions and data sharing. In the project we focused on prevention of harassment, aggression and other acts against civil society by:

- The generation, processing and sharing of data in stations
- Use of a new approach with novel technologies, e.g., AI, Big Data, and Behavior etc.
- Facilitating intervention in case of harassment in real time by SNCF agents, witnesses.
- Rapid direct connection to the services concerned: police, hospitals, associations, etc.
- Facilitating with effective help for victims and witnesses, e.g., legal and psychological support.

2.3 Virtual Reality, Big Data and Artificial Intelligence

Virtual reality offers a unique opportunity to fight harassment. By implementing the techniques of Business Intelligence and Artificial Intelligence on the Big Data already available to public transportation authorities, it can provide a lever for the education of the new generation from young ages.

Table 1 shows the specific services that VRSafe platform can offer:

<table>
<thead>
<tr>
<th>Users</th>
<th>Services</th>
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<tbody>
<tr>
<td>Public spaces and transportation</td>
<td>Sensitization</td>
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<td>Training</td>
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<td>Collaboration</td>
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<td>Loyalty</td>
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<tr>
<td>Users</td>
<td>Sensitization</td>
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<td>Prevention</td>
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<td>Help</td>
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<td>mutual aid</td>
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<td>Kids-Teens</td>
<td>Sensitization</td>
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<td></td>
<td>Education</td>
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<td>Protection</td>
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<td>Newtechnology-New generation</td>
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<tr>
<td>Others</td>
<td>Sensitization</td>
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<td></td>
<td>Prevention</td>
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<td>Deployment</td>
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<td>Actor: Smart cities</td>
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3. VRSAFE: SOME EXAMPLES OF NOVEL TECHNOLOGY USE

3.1 Goals and advantages of Technology

VRSafe approach has two broad components: Prevention and Mitigation of an attack.

We plan to extensively use virtual / augmented reality wherein computer-generated information is superimposed on the real world, providing information and guidance to the first responders to start the rescue operation. By developing these AR / VR interfaces, they will help improve the effectiveness of training for on-site crisis preparedness activities.

With the VR / AR application in our solution, we can efficiently provide end users with dynamic information about their situation that can be tailored to the location, user profile, and other relevant parameters. In addition,
security aspects and potential threats are identified, and relevant solutions may address important aspects such as privacy and data security.

3.2 Virtual Reality, Big Data and Artificial Intelligence

It is also proposed to combine AR with object recognition, including face-to-face, can help authorities identify suspicious behavior and prevent crimes at an early stage. In addition to the deep-learning approaches other machine learning approaches will be developed that are complementary and result in reduced computational complexity.

One powerful example of novel technology that can be used is that of eye-tracking. An individual targeted for attack can learn to use eye-tracking to analyze the behavior of a would-be assailant. With this unobtrusive but effective technology an individual can avoid attracting unwanted attention and safely observe a suspicious person and make appropriate decisions to prevent or deescalate a situation.

Another example of learning and situational training to be deployed is by using Reverse Multiple-choice Method (RMCM), which allows a student or trainee to learn by a specific Q&A technique that combines built in contextual learning and reinforcement through working with targeted questions.

4. CONCLUSION AND PERSPECTIVES

Plans are underway to deploy the VRSafe system in real life situations in multiple countries in Europe, Asia and Africa. The police cannot be everywhere; citizens must band together and be empowered. The approach of VRSafe shows that it is possible to use technology to empower would-be victims of aggression, and to teach and train them to prevent unwanted acts, and to minimize their impact by defusing a situation when prevention fails.

5. REFERENCES