INCIDENTAL AUGMENTED REALITY

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Abstract-   The topic covers on how we can use the applications of Augmented Reality to recreate or recapture accidental incidents that has already taken place by gathering digital information and processing it into something that makes sense. The idea behind this case study is that an incident could be avoided if we analyze the factors that contributed to its occurrence. By placing all the relevant information into its right place we can predict the near future and be prepared for the outcome or say at the least minimize the casualties.

I. INTRODUCTION

What is Augmented Reality?

Augmented Reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called mediated reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality. By contrast, virtual reality replaces the real world with a simulated one. Augmentation is conventionally in real-time and in semantic context with environmental elements, such as sports scores on TV during a match. With the help of advanced AR technology (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world. This information can be virtual or real, e.g. seeing other real sensed or measured information such as electromagnetic radio waves overlaid in exact alignment with where they actually are in space.

Augmented reality basically brings out the components of the Digital world into our perceived Real world. – *source Wikipedia*

II. PROPOSED THEORY

The applications of AR are being widely used for different purpose and one such thing is when you use your GPS system on a real time view. The idea is pretty simple here the system lays a virtual layer on top of the Real world objects which in turn helps in a better assistance. We have seen the concept being used for various purposes like Architectural work, games, medical, military etc. The area of this application is very huge, and even though the uses differ it still holds a similar purpose.

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The proposed theory primarily focus on how can the application of Augmented reality serve in understanding accidental occurrence and the different ways it could be avoided by taking out the factors that resulted in the incident.The authorities can use this concept for investigative purpose as well. It will also help us visually understand an incident, on any devices integrated with this application.

To support the proposal there are few milestones that needs a thorough examination towards building an efficient application.

III.PRACTICAL CONCEPTS

A.ANALYSIS

In order to recreate the entire incident, we need a good understanding of each and every object that was directly or indirectly involved in the incidents, and this needs a lot of data points. Once we have ample amount of data to be proceed we will need to extract the useful pieces and term it as information. This information will be later analyzed and processed to be rendered into graphical/ visual state.

It is important that there is no loss of information nor should there be any negligence towards the tiniest piece of information relevant to the incident. Hence Analysis plays a key role in making an exact sense of why and how did the accident take place. It is obvious that an incident could be hypothesized into many possibilities and spending time and resources over different possibilities could defeat the objective in hand. Hence it is important that the data gathered is processed to precision and the result should be near to accuracy. This will help us to focus on one accurate situation rather than dedicating time for multiple possibilities.

B. Big Data Sync –

What is Big Data?

Big data is a term for data sets that are so large or complex that traditional data processing applications are inadequate to deal with them. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy. The term "big data" often refers simply to the use of predictive analytics, user behavior analytics, or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of data set

Synchronization of BigData with AR can help us understand and analyze the situation for the purpose of re-creating the exact incident that led to the accident. The goal here is to gather information from objects capable of saving data remotely into a separate infrastructure via different modes of wireless transmission. We could best understand the concept by considering an example:

Consider a democar speeding at 120 miles an hour and it is nearing a curve that flags the speed limit under 80 miles an hour. The driver unaware of the speed limit at a curve might just drop to 100 miles an hour which is significantly higher than the limit. The obvious result is the vehicle flipping at the curve or leading to an accident. Now what if this was properly and visually constructed for the future drivers using the same curve, so that they could be cautious and do the needful. This is where we sync Big Data and AR.

The data transmitted during the initially accident will be properly examined and the information will be re-used to create a virtual occurrence of the accident. Information about the cars speed, the curve angle, road type and frictions, other objects/ environmental factors will be gathered by the vehicles speeding at this curve and the information will be saved in a system for further usability.

C. Construction –

With all the useful information gathered, we could start re-constructing the entire timeline with all the objects functioning exactly the way they did at the time of the incident. The objects overlaid on real world can be programmed to give out different results at different motion. During construction one or more objects can be programmed to satisfy Conservation of linear momentum.

The entire incident can be exactly constructed using the tools that we configure into the system software. For instance, selecting the car model, tyre type, tyre pressure, the speed, the angular momentum etc. and using all this factors a timeline will be created to understand what went wrong during the accident. Using an Augmented reality to understand the incident precisely will help the user to come to an accurate conclusion rather than having multiple possibilities based on probability.

The figures below shows how the concept can be constructed into an application which combines two different timeline incidents into one and recreates a result that is termed déjà vu.

Figure 1: Present scene of the surrounding

Figure 2: showing how we capture the venue for overlaying objects over it

Figure 3: showing how we overlay objects and apply behavior to it.
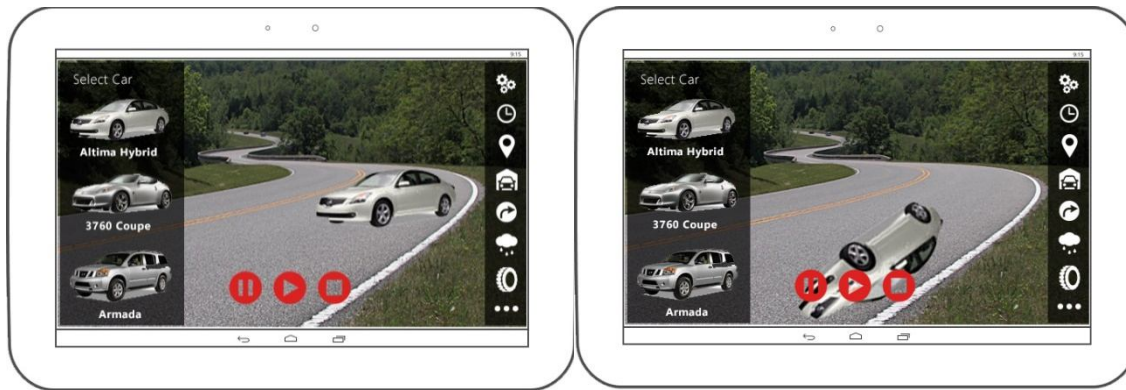
Figure 4: showing how an accident is recreated.

D. Deployment –

The final result will be rendered into a video or a frame by frame output which will help the users to understand the incident at a very accurate timeline. The margin of error will be very small and identifying this through other means wouldn't have been possible. Also the end result can be re-used again to develop an environment which can avoid any hazardous situation leading to an accident. Architects will be able to understand need for safety by reviewing these resourceful data.

IV. FUTURISTIC CONCEPTS

As mentioned earlier, the application of AR is widely used and we could easily integrate it with AI concepts for the application to be more resourceful. For instance, the end result of the rendered video can be put into good use by making an extension to GPS modules. A driver can be notified well in advance of the future curve that can lead to a fatal accident. Also for investigative purpose where you get a visual look at the incident by re-creating the entire incident.

This application is always open for enhancements, and one such introduction to this concept is looking at the near future. Suppose a system is built to store all the recorded data of vehicular movements, road traffic, road conditions for a 100 mile stretch of road. The AI built across this system will study and analyze the data recorded over a period of time and can predict what will happen at a pretty early stage, and this will warn the users of upcoming accidents. Traffic lights could be synced with this system and the authorities can also be notified of probable accidents so that they can avoid it or at the least make arrangements to minimize the damage.

It can also be a boon to the airline industry to investigate air crashes on an accurate basis and work on the errors that lead to the crash. The system will always predict and virtually show the outcome before even the actual incident takes place, and this way the data adapts itself to new scenarios based on previous information. And at some point the application will learn to build an Augmented reality without any human interference or communication. Looking at the Artificial Intelligence making a huge leap, we can also assume that the AI will be capable of even planning an alternative flight plan if it detects any warning on the initial set course.

V. CONCLUSION

Augmented Reality is being used for many purpose but since its launch, the concept has not found any solid grounds to nourish. It has not been used to its fullest capability. Augmented reality is another step further into the digital age as we will soon see our environments change

dynamically either through a smartphone, glasses, car windshields and even windows in the near future to display enhanced content and media right in front of us. This has amazing applications that can very well allow us to live our lives more productively, more safely, and more informatively.

Maybe in the future, we will see our environments become augmented to display information based on our own interests through built-in RFID tags and augmentations being implemented through holographic projections surrounding the environments without a use of an enabling technology. It would be incredible to no longer wonder where to eat, where to go, or what to do; our environment will facilitate our interactions seamlessly. We will no longer be able to discern what is real and what is virtual, our world will become a convergence of digital and physical media.

And all this can be put to good use if integrated with a decent purpose.

REFERENCES

[1]. www.wikipedia.com