IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified
Vol. 6, Issue 4, April 2017

Learning Application for Road Safety

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Abstract: The gathering of experience is a crucial matter in driver's education and training. Without experience, the driver has reaction times which are longer and visual search patterns are poorly developed, mental workload is high and drivers can more easily be distracted by the ongoing things on the road. The project Learning Application for Road Safety, aims at improving the driving standards of the citizens of India. The application is web based and allows users to either login in to their existing accounts or registers them if they are new users. Once they enter the application, they will select their preferred difficulty. Once through this, they will be presented with a couple of scenarios that have been already embedded in the application. They can choose between stationary or dynamic modules. The user performance will be examined at each stage and will be evaluated. The aim is to concentrate on young novice drivers, who has very little to less experience while also encouraging them to continue formal life-long learning. The user action based counter will let users know about their performance in the simulated environment. As the driver's behavior becomes more automatic, these abilities will gradually improve and mental resources will be freed up for safety-related tasks such as hazard detection.

Keywords: Driving standards, web based, user action based counter, hazard detection.

I. INTRODUCTION

Today, the need for road safety is at its highest point. Be it a young novice driver or an experienced adult, real world-based scenario cannot be tackled unless one has already experienced it. Young drivers who have very less experience in driving are the group most at risk and for whom investment is most worthwhile. The lack of automated behavior is also a major risk factor for drivers. In addition, we cannot just make a proper set of real world problems; they are dynamic and ever changing. But what one thing we can do is, with the help of this application, we can train the brain, give a simple type of experience in the form of learning to all the drivers. This will help them sometimes as they are given exposure to the real dynamic problems. The Australian Road Safety Paper says applied scientific principles to the evaluation of the effects of driver training on crash involvement, crash risk or other factors such as driver behavior [1]. Various papers have been presented in road safety conferences in the previous years like "Application of driving simulation to road safety"[2] and "EU Consultation Paper"[3].

II. OBJECTIVE OF THE STUDY

- Regional Transport Office: The Indian RTO faces a lot of issues with new and novice drivers. Currently it only houses a single system of 20 road signs, which the young drivers have to select correctly to pass the learner's license test. The actual test is also quite weak and damp in testing a driver's skill and learning ability. The application will therefore help them, to teach young drivers the various difficulties and scenarios they can face on the road and limit the possibility of an accident.
- Vehicle Learning Classes: The major problems these classes face is their inability to accustom new drivers with the various scenarios one faces with on road. This application, will help them to teach new drivers effectively.
- Technology-based hazard perception training recent research has focused on the training of hazard perception skills, often using computer-based or driving simulator technology. Technology based training programs can give participants exposure to risky scenarios, that they may otherwise rarely face on-road, in a safe environment. Results have shown some improvement in hazard perception, attention maintenance, visual scanning behaviour, and road hazard handling performance in simulated driving. At this stage the research is largely experimental and does not appear to be developed to the point where it could be considered as viable intervention alternative. In addition, more work is required to understand how the computer-based and simulator findings might transfer to the on-road environment and if the benefits are maintained over time.

III. SCOPE OF THE STUDY

Daily Automobile user needs a very well defined system to reduce the number of mishaps and accidents. This can only be done, if new and young drivers are well trained. One cannot just guess road signs and get a learner's license. System focus on training the users for handling many real life situations. Project provides the user with the in-hand real life

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environment to get the status of their expertise. The driving learning instates work at an instructional level. In India most of the people are taught by driving instructors or friends to pass the driving test. The persons who are taught using these methods just have a basic car control knowledge, road laws and enough to pass the driving license test but not enough to make them teach about the various conditions of road. Greater levels of supervised, real world experience during the learner period have been shown to reduce post-license crash involvement by up to about 35%[5]. ON comparing the post driving experience of drivers that were trained by parents, friends and those by professionals have not shown any difference. It may also be useful to provide guidance to professional instructors in respect of the type and extent of pre-license experience that learner drivers should receive (where, when, how and what) before being presented for initial license assessment.

IV. LITERATURE SURVEY

A. EU Consultation Paper[2]

This document, which is offered for public consultation, aims to analyse and summaries the results of various projects in this domain co-financed by the EU or run by the Member States [2]. Its objective is to provide a framework to help further define guidelines and recommendations for efficient driver training and traffic safety education in the European Union .In addition, a general objective for the Commission is to 'facilitate the free movement of persons, while ensuring safety and security of their people. This can be achieved through more harmonization of driver training and road user behaviour.

B. Australian Paper on Road Safety

This document is an update of a comprehensive literature review that was first published in 2001, and has since been updated in 2007 and 2011 [1]. It summarizes and references relevant reports, papers and other publications published in scientific journals, conference proceedings or by reputable sources such as government agencies, universities, and research organizations over the last 40 years. These publications applied scientific principles to the evaluation of the effects of driver training on crash involvement, crash risk or other factors such as driver behavior. Effectiveness means the degree to which driver training/education programs reduce the participant's risk of crashing compared with drivers who did not undertake such programs. While driver training and driver education are not the same, these terms are often used synonymously. Driver training is usually practical, often in vehicle, and focused on building specific skills and competencies, usually over a short time period. Driver education is broader. While it includes driver training, it also encompasses knowledge about road laws and road safety concepts together with attitudinal and behavioral issues and typically includes in-class learning. As many driver training programs have been termed "education" published materials labeled as both "driver education" and "driver training" are considered.

V. EXISTING SYSTEM

There are no similar existing projects that make use of virtual reality and have made a learning application based on road safety. But there are some traditional methods and tests that are always conducted for road safety. The model that prevails in the UK is on similar partly. Their test model is based on the idea of content and criteria. It speaks that the learning will be in unison to the content and criteria of the test, and hence no test will be required. It also relies on the physical reliability of the professional examiners. Any kind of learning is based on proper and clear feedback. Also learning is based of accurate and immediate goals that are necessary to excel in an examination. The model implemented in EU member states mostly judges the driver on the maneuvering skills of the driver in traffic conditions and in normal conditions. Both scenarios can be easily measured in an examination.

The driving school + accompanied driving model is a more sophisticated existing system. It has a minimum training and mileage criteria. This model is based on the idea that learning is most effective when the goals are clear (driving school training) and when the learner gains a lot of experience (minimum mileage obligation). The learner receives structured and intentional feedback from the instructor in addition to the feedback received during practice. The minimum mileage obligation tries to provide enough experience to automate the perceptual-motor aspects of driving, making driving an everyday task and diminishing the effects of emotions connected to independent driving. Such practice can help automated and planning skills of a driver.

But at the same time, the more amount a driver spends on the such a training model, the it is vulnerable to unsafe driving habits that he/she can inculcate from the environment or from the accompanying person.The existing systems lack the actual feedback that a user needs from the instructor. The certain real life threatening scenarios cannot be used by the instructors to train a new young novice driver. There needs to be an automated system which helps the user and the driver to understand such situations.

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VI. METHODOLOGY

Following are some of the methods used in the project cited above:

A. Raycasting

The raycast method was used in the project which is a part of Unity 3D. Raycast provides the flexibility of mapping two independent elements in the system environment. A 'ray cast' provides the facility of intersecting a ray with the objects present in an environment. A ray cast tells you what objects in the environment the ray runs into, and thus return additional information as well. Ray casting has many uses; for example, it can be used for line-of-sight tests or to determine what's 'in front of' an autonomous agent for AI purposes.

B. NavMesh

[4]A navigation mesh or navmesh is a collection of two-dimensional convex polygons that define which areas of an environment are traversable by agents. In other words, an object in a game can freely walk around within these areas unobstructed by trees, terrains, or other barriers that are part of the environment. Polygons are connected to each other in a graph.

C. UI Effects

UI effects components allow adding simple effects to Text and Image graphics, such as shadow and outline. Shadow and Outline:The Shadow component adds a simple outline effect to graphic components such as Text or Image. It must be on the same GameObject as the graphic component. A set of scripts built up from many examples for the Unity UI system. In this repository is a collection of extension scripts to enhance your Unity UI experience.

VII. PROPOSED WORK

Our project deals with the problem of road safety as novice drivers don't learn the driving properly and when such a situation arises they panic and because of which accidents happens. So to deal with this situation our project can be helpful as it will show the user various environmental conditions that a user can face while driving and will show various steps on how to avoid those situations, so when the user will come across those situations he will be packed with knowledge of how to deal with them and will avert the dangerous situations. The process flow of our project is given:

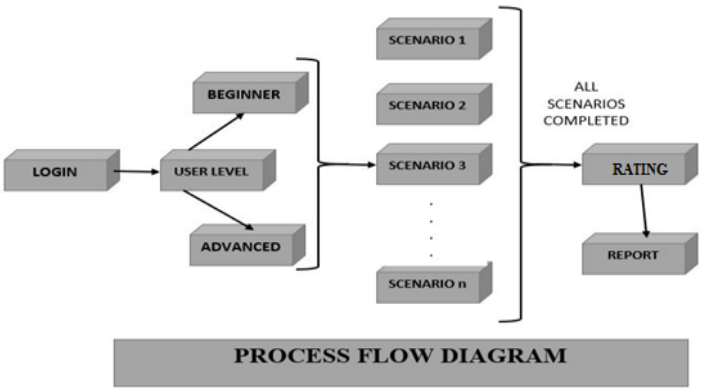

Fig. 1 Process flow of system

VIII. RESULT AND ANALYSIS

Road safety and driver training is a dynamic and real world scenario. Even if the scenarios and tests are designed in the most accurate way, still in a real world case, it's the instincts and reaction time that will count and avoid the accident. Still, nevertheless, the learning application is a better way to train drivers, especially young novice drivers. The tests have helped them in to getting a certain idea about the road conditions and problems. With the benefits of the learning application, the results of many drivers can change. Many of them, can have a judgement of what they are doing on road. The application gives insight about the working of a simulated environment of driving conditions in Unity Environment. As the user slowly progresses into the environment, the raycast will come into play to determine the distance between the car and the static target objects. The user will hence know his distance when he is at a compromising distance from the static objects such as trees etc. The advanced level is made using the unity nav mesh.

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Road is "baked" using the nav mesh, which helps the other AI cars to roam around. The user can successfully stay out of their pathways to complete the advanced level. The end result is the user completing both the levels successfully.

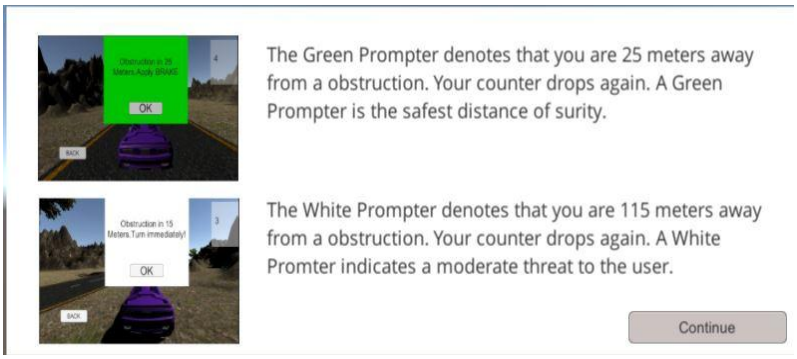

Fig. 2Description of various prompter used in the application

Fig. 3 System starts in static environment with counter 5

Fig. 4Low level Prompter appears at a distance of 25 meters from static object

Fig. 5 Mid level prompter appears at 15meters from object

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Fig. 6 Extreme level prompter appears at 5meters

IX. CONCLUSION

The conventional driver training techniques are definitely outdated, archaic and not at all suited in the current environment. Here, where there is a boom of technological advancements under the simulated riving techniques, we are still training young novice drivers under the traditional methods with maybe 20% technological advancement in 10 years. Research has clearly suggested that this is because the traditional training can encourage earlier licensing, increase exposure-to-risk and/or unduly increase the confidence of novices about their driving abilities.Also there is another problem of resources not allocated to the training of young drivers. Resources are allocated to other issues of road safety which are at times needed, but investment under such issues would not be needed of the foundation of young novice drivers is strong and concrete. Research into how training and education could be improved is continuing, for example the P Drivers Project, which is investigating best-practice approaches to the training of novice drivers.Training programs should give equal emphasis to theory and practical.Theory after practical sessions should not mean applying new concepts to theory lessons but to apply equal emphasis to theory of what they have learned in practical sessions. The driving test conducted by authorities should not only focus on driver's ability to drive on roads straight but should give equal emphasis to the basic training sets as well as various obstructions while driving and various scenarios that can be faced by a driver in various situations should also be considered. This can only be done by using the current system. As technology would advance, the system would gain more features and provide more benefits. The scenarios, object, users and other tangible property of the system can be changed for the betterment of the drivers. Such forms of driving skills and driving test which include activities such as independent driving, situation awareness questioning, self-evaluation and hazard-perception testing will be most beneficial to the young drivers, all road users and eventually the country and most importantly the environment.

REFERENCES

[1] The Effectiveness of Driver Training/Education as a Road Safety Measure Royal Automobile Club of Victoria (RACV) Ltd ABN 44 004 060 833
[2] Application of driving simulation to road safety by R. W. Allen M. L. Cook T. J. Rosenthal Systems Technology, Inc., Hawthorne, CA 90250, USA Advances in Transportation Studies an international Journal 2007 Special Issue
[3] Driver training and Traffic safety education Presented by the unit responsible for road safety policy of the Directorate-General for Energy and Transport, Brussels.
[4] https://en.wikipedia.org
[5] Indian Road Safety report 2015.