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Virtual Highway: A special case of flying cars

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ABSTRACT

While sitting in the ocean of cars and having lots of vehicles all around you,many of us have been suffering from road traffic in our daily life and due to this traffic not only we are going to be late in our work but also facing many other problems. In this Paper, I am trying to create a virtual yet real highway to reduce and maintain the traffic on the roads and the sky yet.Various companies are working towards the development of flying cars and which is now not a dream anymore and we can see the cars not only on the roads but in the sky also.This paper is all about the concept of how we can create a path and a highway for these flying cars so as to reduce the traffic on roads and a fastest medium to reach anywhere earliest possible on a personal basis. To design a highway in virtual era, a geometric B-Spline curve and virtual reality tools such as tracking system and augmented technology are used.

Keywords: Augmented Technology, Tracking system, Virtual Reality, Virtual weigh stations.

I. INTRODUCTION

Virtual Reality is defined as" "Real-time interactive graphics with three-dimensional models, combined with a display technology that gives the user the immersion in the model world and direct manipulation." [1].

Virtual Highway is a concept that involves the planning, design, construction, operation, and maintenance of virtual roads, bridges, and tunnels to ensure safe and effective transportation of flying vehicles and goods.Various techniques have been proposed by government agencies to control the traffic such as Laser and Radar Technology but they are expensive and harder to implement.Before moving on to the concept of virtual highway we must have a look on the flying cars that the companies are developing these days and are having a successful flight.

"A flying car is a personal vehicle that provides door to door aerial transportation which was earlier just a concept of dream world but now exists in a real world".

1.1 History and Evolution of Flying Cars:

The History of flying cars to the recent technology helps us to know about the technique being usedand improved in the newer versions of flying automobile. In today's era various renowned companies such as Wolkswagen, Toyota, Terrafugia, Aeromobile etc. are working towards the development of flying cars.

1. In 1926, Henry Ford displayed an experimental single-seat aeroplane that he called the "sky flivver". The project was abandoned two years later when a distance-record attempt flight crashed, killing the pilot.[2]

2. In 1956, Henry Ford's Advanced Design studio built the Volante Tri-Athodyne, a 3/8 scale concept car model. It was designed to have three ducted fans, each with their own motor, that would lift it off the ground and move it through the air.
3. Canadian Paul Moller: Canadian Paul Moller was the first one to develop a flying car. In 1965, he developed the first flying car with the name XM-2 which was not able to fly much and was fail to take off and land properly Later in 1989,a flying car M200X was developed by Moller International that took 200 flights safely and was able to fly at the height of 15m only which was too short .The latest version was M400 whose speed is 644 km/hr and can cover 1449 km at one tank of gas.
4. Macro Industries of USA: Sky Rider X2R with the capability of 2 persons and the ability of proper take-off and landing was designed by this company.
5. In the modern time, The Aero Mobil a Slovakian company is ready to launch its flying car Aeromobile3.0 in 2017 with the capability of Successful VTOL(Vertical Take-off and Landing Capability)[1]

6. Terrafugia,founded by MIT Grads is a Boston-based company that is expected to launch the Transition Model by 2017 after testing to check meeting standards for air and road safety underlined by Federal Aviation Regulatory body.

7. Zee Aero Google are developing the flying cars casually used as short distance taxi vehicles that run on the demand as Uber Industry.

II. REVIEW OF LITERATURE OF VIRTUAL HIGHWAY

2.1 According to kojimakane : A 3-d virtual highway can be constructed using the aerial photographs taken through stereoscopic device and 3d mouse systems which reduces the load on computers rather than actual digital terrain models. Virtual Reality-highway resource planning system provides a model with the proper

alignment of highway, also by using the concept of digital terrain model we can calculate the area and volume of earth for constructing the highways in a virtual reality.

2.2 **According to jasonorlosky and kioshikiokawa**:With the use of virtual and augmented reality the speed of mobile data transmission can be be 10 to 100 times faster as compared to 4G/LTE network.in 5G network. This real gain in speed and delay is really significant for faster transfer of information. The number of networked devices with capacity of about 1Tb/s/km2 can also be increased significantly.

Virtual Highway:

Virtual Highway is a concept for present and future IT demands that helps to reduce the traffic on roads and avoid the collisions of flying vehicles by using various simulators and tools. It is nothing other than the real world illusion of the driver's eye that help them to drive their vehicles properly. The most important thing that is to be kept in mind in the designing of virtual highways for flying automobiles such as cars and taxis etc. is the alignment of the route and a specific defined path. Virtual highway allow the vehicles to run safely in a proper pattern so that they do not collide with each other and also the flying fauna do not get harm. The designing of virtual highway involves the proper planning and it's designing because it is based on 3D virtual reality.

III.RESEARCH METHODOLOGY

3.1 Planning

While planning the virtual highway, must take into account future traffic flows, design of highway intersections/interchanges, geometric alignment and design, structural design of pavement thickness, and pavement maintenance maximum width that can be taken by keeping in mind the longitude and latitude dimensions. Other factors such as adverse effects on the environment, noise pollution, air pollution, water pollution, and other ecological impacts also need to be consider.

3.2 Design

3.2.a. Virtual reality (**VR**) typically refers to the technologies that use different software and tools to generate the realistic images, sounds and other sensations that replicate a real environment (or create an imaginary setting), and simulate a user's physical presence in the environment.

3.2.bTracking System tracks the position and orientation of a user in the virtual environment. The purpose of a tracking device is to determine the x, y, and z position, and the orientation (yaw, pitch, and roll) of some part of the user's body in reference to a fixed point. Most types of virtual reality interaction devices have a tracker on them. HMDs need a tracker so that the view can be updated for the current orientation of the user's head. [ref3].The tracker can help

the pilot of the flying vehicles to know the exact position of his vehicle in the environment so as to control accordingly.

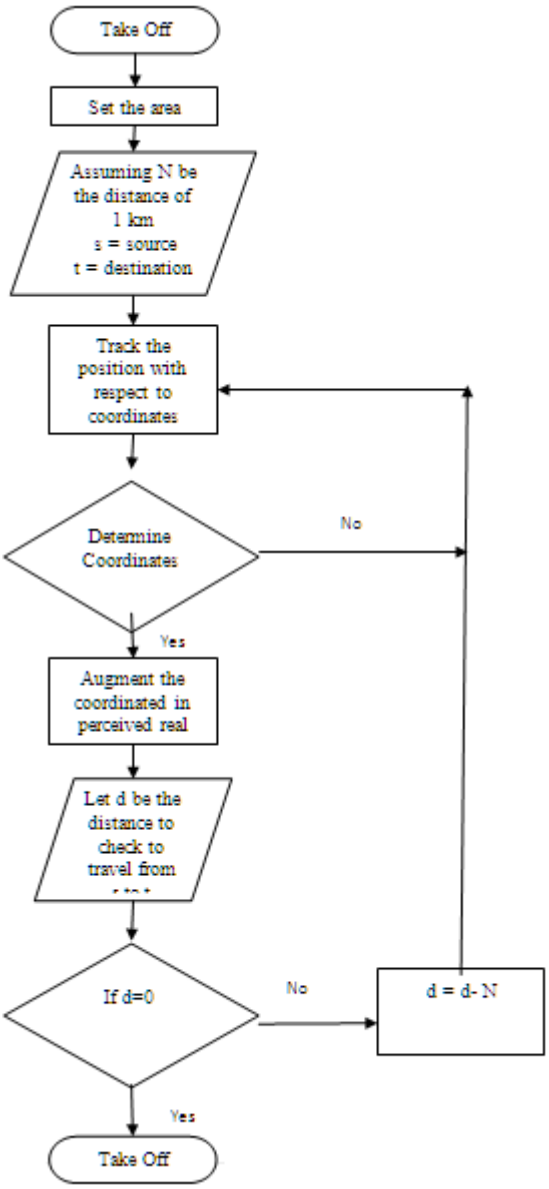
3.2.cAugmented Technology aims to develop the direct or indirect view of the physical or real world environment that helps to achieve the correct view of the environment. The augmented technology also helps to

make the information interactive and digitally manipulable about the real environment. It generates the information of the digital world to be realistically available in the real world.

Some studies have been developed the highway design systems using aerial photographs (4). They have used stereo plotters and not fully used the information on the planned alignments obtained from aerial photographs. In recent years, CAD systems using digital terrain model (DTM) are being used for practical purposes (5).

Flowchart:

This flowchart uses the concept of virtual weigh station to create an illusion of highways so as to reduce any collision between the cars .



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IV.ANALYSIS

Assuming the longitude and latitude concept with reference to the driving of automobiles in the virtual highway, it is necessary to understand the concept of augmented technology, we are considering the fact that when the vehicle is ready to take off it uses the technology named sensorama to sense the real environment and set its initial variables- s as source d as destination and t be the time taken to reach the destination from source. It periodically checks the real environment and a counter to measure the distance value whether it has reached zero so as to identify that the object has reached its destination or not. When the value of counter will become zero the vehicle is ready to land successfully.

V.ROLE OF VIRTUAL HIGHWAY ON SOCIETY

The explosion of lot of traffic on roads can be reduced to an enomorous amount as with the help of aerial automobiles various emergency services as ambulance, fire brigade vehicle, police vehicles,emergency rescue operations etc. to reach to the victims as early as possible without suffering from the tremendous traffic on roads. By the development of virtual weigh station the load of over vehicles on roads can be reduced to much extent as it can examine the traffic presently on the roads and also can reduce the collision problem by examining the traffic prior to the actual reach of vehicles on the same road and place. As the vehicle passes over the quartz sensor array, its image is captured along with its axle weights and speed. A vehicle record containing this information plus vehicle classification, time and date, location, and identification number is transmitted wirelessly to the Internet allowing the enforcement officer to monitor commercial traffic in real time from the lap top in the officer's vehicle. This information is also anywhere there is Internet service enabling supervisors to do manpower planning and designers to monitor traffic flows and patterns all while protecting your valuable infrastructure. Cardinal Virtual Weigh Stations can be used to monitor multiple travel lanes and, with available options and special software, can be tailored to your exact specifications

VI. CONCLUSION

In this study, a virtual highway path was designed in a simple and concise manner. This technique helps the planner of virtual highway designer to plan a route and allow the vehicles to fly without or less collision. By the use of different tools for aligning the proper path and balancing the vehicles on the virtual highway, better achievements in the present and future can be made to avoid the pollution and traffic on roads. The flying vehicles and the concept of this virtual highway can proved to be a boon for our society.The 3D alignment can evaluate the compatibility with the 2D design criteria. The tracking system and the augmented technology helps to track the position of vehicle and sense the upcoming vehicles in the environment.

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