



## Vrycle- A Virtual Reality Experience

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**Abstract:** *Vrycle is a Virtual Reality cycle simulator. In simple words one could experience the joyous thrill of cycling in the comfort of one's living room. Vrycle is a complete working model of a stationary cycle with rotary pedals and handles, capable of providing physical feedback of 3D visualization cycling via the virtual reality headset. Vrycle seamlessly integrate the virtual world, so that a complete cycle experience is provided. Vrycle is designed with all aspects of addictive games. As the quote goes- "All addictions are not bad"- Vrycle can be an addictive way to stay physically fit. Everyone riding the Vrycle will be awarded points based on the terrain covered and time elapsed. This point will be advertised across social media and be availed to fellow Vryclers. This will introduce a ranking which the fellow Vryclers will be sweating hard to break.*

**Key words:** *Vrycle – Virtual Reality Cycle*

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### I. INTRODUCTION

Virtual Reality (VR) has been defined as-a realistic and immersive simulation of a 3D environment, created using interactive software and hardware, and experienced or controlled by movement of the body or as an immersive interactive experience generated by a computer. A person using VR equipment is typically able to look around the artificial world, move about in it and interact with features or items that are depicted on a screen or goggles.

We are looking for way stop lay around with new technologies and we are eager to explore the possibilities of Virtual Reality. Virtual reality continues to disrupt the tech industry, we decided to build a VR cycle ie Vrycle experience with VR headset. The idea is to create a stationary cycle experience that allowed users to ride the cycle

### II. LITERATURE SURVEY

Paper [1] develops a pedometer with a three-axis acceleration sensor which can be placed with any angle. The pedometer measures the number of steps while users walk,jog or run. It can be worn on users' waistband or placed within pocket or within backpack. The work address to improve on the general pedometers, that can only be used in a single direction or can only count of steps without the continuous exercise judgement mechanism. Finally, experimental results confirm the performance of the proposed pedometer.

In Paper [2], Tachometer is used for measuring the speed of a rotating body. The unit of speed measured by tachometer is expressed in revolution per minute or RPM. Tachometers were purely mechanical in past days. In that time, the speed measuring parameters were sent to the tachometer through mechanical coupling (cable or shaft) and the rpm is measured using a gear mechanism and it is identified using needle mechanism. The tachometers have changed due to rapid development of modern electronics. Here it is for a contactless digital tachometer using Arduino. The speed of the motor is also controlled. The RPM, the duty cycle and other information are displayed on a LCD screen.

Paper [3] is based on a study of the characteristics of each step taken by a person, describes a reference design using the 3-axis ADXL345 accelerometer in a full-featured pedometer that can recognize and count steps. It can also measure distance, speed, and to an extent-calories burned. The ADXL345's proprietary (patent pending), on-chip, 32-level first-in, first-out (FIFO) buffer can store data and operate on it for pedometer applications to minimize host process or intervention, thus saving system power a big concern for portable devices. Its 13-bit resolution (4 mg/LSB) allows pedometers can measure even low-speed walking (where each step represents about 55 mg of acceleration change) with reasonable accuracy.

Paper [4] is based on methods for efficiently maintaining human head orientation using lowcost MEMS sensors situated in the Oculus Rift Development Kit. Oculus Rift is the most widely used virtual reality headset to date. It also present novel predictive tracking methods which dramatically reduce effective latency, that further improves the user experience. There is a micro controller interfaces between the sensor chips and the PC over USB. Each of the gyroscope, accelerometer and magnetometer provide three-axis measurements. Each orientation can be expressed as a 3 by 3 rotation matrix. The quaternion representation allows singularity-free manipulation of rotations with few parameters while correctly preserving algebraic operations. Tracking of head position in addition to orientation provides a greater sense of immersion in VR. The coordinate frame origin located at the midpoint between the retinas. This is used for positional tracking. It called as the retinal center frame (RCF). Without position information, this point remains fixed in the virtual world; That is before the left and right eye views are extruded to form a stereo pair.

Paper [5] is based on video tracking which is a CPU-intensive process. This process may have a negative impact on game performance. Here, examine this impact for different types of 3D content, using a game prototype built with two advanced components, they are CryENGINE2 platform and face API head tracking system.

Bringing natural human motion into virtual environments includes balancing between hardware cost, the tracking range and the fidelity of the motion data. Reliable tracking of head motion required special hardware such as accelerometers, magnetic or optical trackers etc. Special operating conditions or per-user calibration were also needed for certain systems. Web cam-based tracking technologies can deliver high-quality motion data on consumer hardware which will be practically on every desktop. Which allows to integrate natural head motion into 3D games easily. Most of the modern game engines are computationally demanding, often pushing host systems to their limits, both for CPU and GPU tasks.

In Paper [6], the SNG connects many people who don't know each other's around the world under one theme. Therefore it becomes a communication tool for establishing a new human network. In particular, a continuous expanding is exhibited in a sale along with the increase of users of SNS service, suggesting that the game industry would further activates. The growth of social network game market can shows a multi-platform expansion of social network game by linking the off/online of mobile app store and web one. But there is a lack of related experiences and developers. And the current social network games are created in a flash-based form, thus, there are problems in terms of multi-platform support and limits of 3D games. Therefore, the Unity3D Engine developed by Unity Technologies, gives an engine which capable of making high-quality games in a relatively easy and fast way used to overcome limits of 2D social network games, and design and develop the 3D SNG using 3D multi-platform engine unity. This is expected to contribute to an activation of the multi-platform-based smart SNG game market.

In Paper [7] VR is a rapid developing technique in present technical world. It is an immersive multimedia that can create a computer simulated environment which is capable of simulating the physical presence of users in the real or imaginary worlds. The user can be immersed actively, feeling their existence, and acting the real virtual reality which was brought by the development of the Augmented Reality. This paper discusses the aims to design the user experience to be actively immersed to the virtual world in the immersive game contents. The virtual world in this kind of game needs to be designed and implemented in such a way that the user need to create, arrange and perform the works freely in expanded 3D virtual work space. So it is observed that designing and defining a complicated system is necessarily an important issue when implementing a virtual reality based on game contents. In order to address these issues, a design methodology based on the Unified Modelling Language (UML) is used here.

Paper[8], New technologies often have the potential for disrupting existing established practices, but nowhere is this so pertinent as in education and training today. And yet, education has been glacially slow to adopt these changes in a large scale way, and innovations seem to be imposed mainly by students' and their changing social lifestyles than by policy. Education needs to become more modular and move out of the classroom into informal settings, homes, and especially the internet. Nationwide certifications based on these modules would permit technology to enter education more rapidly. Smaller nations may be more flexible in making these very disruptive changes.

In the paper[9], VR is use of computer technology to create effect of an interactive 3D world in which objects have a sense of spatial presence. The primary difference between conventional 3D computer graphics and Virtual Reality is that in Virtual Reality we are working with things instead of pictures of things. Interaction is an essential characteristic of virtual environments. Much has been published about interaction techniques in VR, but searching for truly intuitive and natural interaction techniques is still going on. Interaction between users and virtual environments is very complex.

In Paper[10], 3D visualization of navigation simulation is to visualize the environment conditions (e.g. nearby ships, dynamic characteristics, environment, terrain) for any users on ships at sea. Realistic 3D visualization enables the users to be immersed to it and guarantees the reliability of the simulation. In particular, terrain visualization contains many virtual objects, so it is time and cost-intensive for object modelling. This paper proposes a 3D terrain visualization method that can be realized in a short time and with low cost by using the Unity 3D development tool. The 3D terrain visualization system requires bathymetric and elevation terrains, and Aids to Navigations (AtoNs) to be realized. It also needs to include 3D visualization objects including bridges, buildings and port facilities for more accurate simulation. Bathymetric and AtoN elements are acquired from ENC, and the elevation element is acquired from SRTM v4.1 digital elevation chart database developed by NASA. Then, the bathymetric and elevation terrains are generated, and the satellite images are superposed by using this terrain information. The longitudinal and latitudinal information of the AtoNs are converted to the 3-axis information to position the AtoN locations. The 3D objects such as bridges, buildings and port facilities are generated and the terrain visualization is completed. The proposed method realizes more realistic 3D terrain visualization of Busan Port.

In paper [11], Virtual Reality can be referred to as immersive multimedia or computer simulated life, replicates an environment that simulates physical presence in places in the real world or imagined worlds and lets the user interact in that world. Virtual reality artificially relates sensory experiences, which can include sight, hearing, touch and smell. The simulated environment can be similar to the real world in order to create a lifelike experience for example, in simulations for pilot or combat training or it differs significantly from reality, such as in VR games. The proposed solution stands on virtual reality, for providing a virtual tour of amine. Card board, an easily affordable gadget which enables virtual reality for the headset, is used for this purpose. Software magic takes over, then. The software splits the screen into a right and left pane, one for each eye. The effect is a stereoscopic image that completely fills the field of vision, and immerses into a virtual world.

This paper [12] present a robust implementation of stereo-based head tracking designed for interactive environments with uncontrolled lighting. We integrate fast face detection and drift reduction algorithms with a gradient-based stereo rigid motion tracking technique. Our system can automatically segment and track a user's head under large rotation and illumination variations. Precision and usability of our approach are compared with previous tracking methods for cursor control and target selection in both desktop and interactive room environments.

In paper[13], in the area of geographic information system, there are always two methods to get 3D virtual reality, one is to use a 2D professional platform such as ArcGIS software to get the virtual reality by secondary development, the other is to use a 3D or 2.5D software as a platform for development, such as the Skyline software.

In paper [14], Massively Multiplayer Online Games (MMOGs) continue to be a popular and lucrative sector of the gaming market. Project Massive was created to assess MMOG players' social experiences both inside and outside of their gaming environments and the impact of these activities on their everyday lives. The focus of Project Massive has been on the persistent player groups or "guilds" that form in MMOGs. The survey has been completed online by 1836 players, who reported on their play patterns, commitment to their player organizations, and personality traits like sociability, extraversion and depression. Here we report our cross-sectional findings and describe our future longitudinal work as we track players and their guilds across the evolving landscape of the MMOG product space.

Paper [15], in today's online gaming world, powerful database systems are needed however to power all this virtual activity. MMOGs host a large number of players and all these players can interact with each other at any given time. Because of scale, a game universe can 'be shard' in several ways. One way may be where each shard is a smaller universe deployed on a server. Another way is to have the shard hold a certain number of simultaneous players on a complete universe or playing field. Other games might feature a single universe, which is divided and placed on different servers. Players who log into a particular server will be in one part of the universe; they will need to switch servers to go to another part of the game universe.

### III. PROPOSED SYSTEM

Patient Monitoring System using Raspberry Pi is an Internet of Things (IOT) project. This project is used to monitor patients in an ICU in a hospital, with the help of live video streaming and gives information about the parameters of health of the patient .And also helps the doctors and relatives to monitor the patients live conditions. Continuous information of the patients in ICU could be analyzed using our system. Live streaming of the video could be done with the help of Raspberry pi .Our system is designed to be used in ICUs for measuring and monitoring various parameters of patient like temperature, blood pressure and heart beat. And also the parameters of the patient can be compared with threshold values and if there is any variations immediate messages could be sent to doctors and relatives. Advantage of this system is that it provides current video and status of the patient at any time. In our project we use wearable sensors to measure temperature, pulse, diastolic and systolic pressure. These parameters are measured to know whether the patient is in safe state or not. And a video of the patient in the ICU will also be displayed in the web page designed. And the patient will be well monitored. Doctors and relatives can monitor them from faraway places. If any of the values crosses the limit, an alert will be sent. This live streaming will be done with the help of Raspberry Pi. Database is also created to store the values of parameter periodically. Features of the system are, Relatives could monitor the patient with live video streaming, The doctor can view the condition of the patient and do the treatment accordingly, The attention towards the patient is much more than before with this system, Doctors and relatives can login into the website using username and password which enhance the security of the system and Database will be updated periodically.

### IV. CONCLUSION

We propose a virtual reality system in which the user will be having immersive experience for exercising in 3D world. Nowadays indoor cycling is one of the best type of exercise. Traditional cycling system is preferred by many health conscious users but virtual cycling adds features that makes cycling more appealing and interactive to the people.

The application can be used by physical trainers in gyms or in homes to observe and improve the exercise pattern. Thus the main intention of the project is to develop a user-friendly application for the fitness maniacs. To exercise along with 3D experience and to introduce VR application in cycling. Vrycle is a Virtual Reality cycle simulator. In simple words one could experience the joyous thrill of cycling in the comfort of one's living room. Vrycle is a complete working model of a stationary cycle with rotary pedals and handles, capable of providing physical feedback of 3D visualization cycling via the virtual reality headset. Vrycle seamlessly integrate the virtual world, so that a complete cycling experience is provided.

As the saying goes, Not all addictions are bad.

Vrycle will be,

- Fitness Companion
- Low cost VR Experience
- An addictive Game

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