“Rajni Physics” - XNA Based Game

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Abstract **- Recent years have seen the rise of computer users with PCs, laptops and the pocket-sized computing devices like smartphones, gaming consoles. Worldwide there are over 3 Billion computer users roughly half of the world’s population [1].**

Game development industry is currently at its pinnacle. A lot of focus has been shifted to developing enthralling and entertaining gaming products. This paper focuses on recent trends of game development using XNA framework. This work presents an overall design for an arcade-adventure game (Rajni Physics) to address laws of physics in a contradictory manner.

Keywords - Physics, XNA, Game, Entertainment

I. Introduction

This paper focuses on the recently used game development methodology with help of a game development project “Rajni Physics’. This game is unique in the sense that it defies the laws of physics. It is based on a famous Indian personality which allows gamers to easily attach to the game.

Due to the great distance between design and implementation worlds, different skills are necessary to create a game system. To solve this problem, a lot of strategies for game development, trying to increase the abstraction level necessary for the game production, were proposed. In this way, a lot of game engines, game frameworks and others, in most cases without any compatibility or reuse issues between them, were developed. This required a new generative programming approach, able to increase the production of a digital game by the integration of different game development artifacts, following a system family strategy focused on variable and common aspects of a computer game. As a result, high level abstractions of games, based on a common language, can be used to configure Meta programming transformations during the game production, providing a great compatibility level between game domain and game implementation artifacts.

The project uses XNA framework to support game development. The XNA Framework is based on the native implementation of .NET Compact Framework 2.0 for Xbox 360 development and .NET Framework 2.0 on Windows. It includes an extensive set of class libraries, specific to game development, to promote maximum code reuse across target platforms. The framework runs on a version of the Common Language Runtime that is optimized for gaming to provide a managed execution environment. The runtime is available for Windows XP, Windows Vista, Windows 7, and Xbox 360. The XNA Framework encapsulates low-level technological details involved in coding a game, making sure that the framework itself takes care of the difference between platforms when games are ported from one compatible platform to another, and thereby allowing game developers to focus more on the content and gaming experience. The XNA Framework provides support for both 2D and 3D game creation and allows use of the Xbox 360 controllers and vibrations [2] [3].

II. Background

The gaming industry has come a long way in a short period of time, since its humble beginnings more than thirty years ago. Gone are the days when people were thrilled to see a square white block and two rectangular paddles on the screen. Today, exploring three-dimensional worlds in high resolution with surround sound is a common gaming experience [6].

Game development is the latest buzzword. The use of new peripherals, programmed for a wider array of mobile platforms, will develop the new games which will in many respects differ greatly from past. If one wants to secure a place in the game development future, the games should have more fun element and cross the barrier of gender and age limitations.

At the instigation of game development the methodology employed was quite different from what is used now. Earlier, it began with development in C++ without any packages or APIs. It was very disoriented way of programming which didn’t lead to creation of high quality games. Initially games were just a sequence of actions without any graphics, getting outcome of each action at every point in the game. Later, the strategy changed and along with amazing graphic audio was also included in the game. The process went on to become more and more complex and as the recent trends suggest using object oriented methods utilizing the functionalities provided by a game engine or a framework is the most productive way of game development.

The XNA framework was used for the implementation of Rajni Physics. The XNA framework was selected since it allows developers to create games that can run on both a PC

and a game console – the Xbox 360. XNA Game Studio is a Software Development Kit (SDK) with a set of "prebuilt program components" that can be used as part of other programs. Using XNA Game Studio and the underlying language C#.NET (the official language of XNA), video games can be developed for Windows. XNA also allows one to write games for the Xbox 360[4] [5].

Currently, there are many games developed in XNA are mentioned in the literature. One of the games is based on Story of Lord Shri Ram. No XNA based games are known to cover physics defying logic. However, many PC games do exist, mainly for the entertainment and fun [17].

III. RAJNI PHYSICS

Rajni Physics' is a casual game. A casual game is a video game or online game targeted at or used by a mass audience of casual gamers. Casual games can have any type of gameplay, and fit in any genre. They are typically distinguished by their simple rules and lack of commitment required in contrast to more complex hardcore games. They require no long-term time commitment or special skills to play, and there are comparatively low production and distribution costs for the developers. Casual games typically are played on a personal computer online in web browsers, although they now are starting to become popular on game consoles and mobile phones, too. Casual gaming demographics also vary greatly from those of traditional computer games [18].

A. Story Line

Somewhere in a random location, a Legend, Rajni with no fear is trapped by the enemy of humanity, Adi. He is the one who defines his own laws. All he has with him is not his weapons but the power to run his imagination in any dimension. Adi is out to destroy the world but only one who can destroy him is our saviour, Rajni. Adi has let out his guards to fight Rajni.

At every level of the game, Rajni fights these guards with his unique and out-of-box thinking. There are various obstacles as well for Rajni to tame. He can win over Adi using his physics "RAJNI PHYSICS."

B. Level 1

Rajni enters an old 4-storey building full of enemy guards and obstacles. On ground floor he faces constantly fired cannon balls, which he can evade by jumping over them, consecutive fire balls will kill him, and then he takes the ladder to 1st floor. Now, he has an enemy to fight with and again a ladder to move onto next floor.

Now, enemy starts running so Rajni has to get catch the enemy before he runs away in order to get the gun. There are assisting power-ups like speed up and speed down to be aware of. Here level one ends.

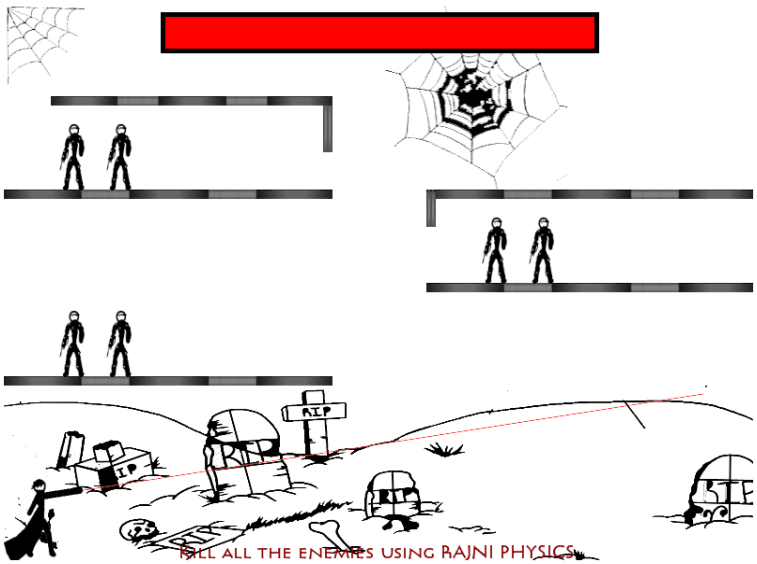

FIGURE 1
LEVEL 2 PLAN

C. Level 2

Rajni is trapped inside a graveyard where lots of enemy's are present. Each floor has two enemies walking on the floor randomly. Now, Rajni has to kill them using the notion of rebounce, by hitting at angles on the wall. He has got limited bullets as well as limited time. Beware even Rajni can die if there is a miscalculation in the re-bounce logic.

D. Level 3

Rajni has fallen into a trap, a virtual whirlpool, where a fan in the duct is operating at full speed throwing off objects (clockwise way) and Rajni is floating around (anticlockwise way) .Rajni has to shoot at the object and destroy them before he is smashed. The whole idea is to make shooting tricky by two separate directional rotating feel.

E. Level 4

Rajni finds himself in a maze and the girl of his life, Saee is trapped by a giant, all Rajni has is a limited number of bullets. Once they get exhausted he will get a hunter in his hand, so he has to get some more powers like –

- Sound power play (Ability to kill enemies with sound even before enemy's bullet reaches Rajni, this sound will work only in close proximity.)
- Rajnikantha Turbo shield (He will get a shield which he can place so that enemy's bullet rebounces and kills enemy)

- Coconut-Shoconut (Finally he reaches the Giant enemy and has to be of his size to fight with him, so he drink Coconut-Shoconut to grow in size.)

And finally with all might he saves Saee.

IV. Development Strategy

A key decision in game programming is which, if any, APIs and libraries to use. Today, there are numerous libraries available which take care of key tasks of game programming. Some libraries can handle sound processing, input, and graphics rendering. Some can even handle some AI tasks such as path finding. There are many game engines that handle most of the tasks of game programming and only require coding game logic and it is very crucial to select one properly [19].

One of the essential modules of game development is movement of character on input from external device and performing stunts like jump, climb, run and other antics. However, the movement should not be free and there has to be constraints on movement, which brings collision detection into action. Collision occurs when the character moves across the play area and collides with a physical object. This is essential to give the game a realistic feel by projecting lifelike environment.

Graphics is the heart and soul of the game. Graphics include the characters and backgrounds, termed as Sprites [20] .The sprite plan depends on the design, the storyline of the whole game. The sprite sheets need to have a transparent background to allow overlapping of layers without depicting the presence of layers of graphics. Development of graphics can be done with any image editor like Adobe Photoshop, Corel draw and others.

All the graphics developed needs to be the refined to create a meaningful animation. Animation and audio are major components of a game which make it interesting and exciting. Animation tools like Gif animator, Pivot are simple to use and efficient. Audio engine like Miles is the best available solution for sound development.

After all the initial deployment and development comes the core part of programming that involves physics and artificial intelligence. No self-respecting action game can get without a physics game engine. By means of game physics we mean classical mechanics: the laws that govern how the larger objects move under the influence of laws of gravity and other forces [21]. The objects are made to be felt as solid things with mass, inertia, bounce and buoyancy. Game artificial intelligence is all about making computer characters do things in a human way and to make a simulated environment look like real setup [22].

V. Conclusion

The aim of the project is to develop something that has a universal appeal and is not restricted to a particular user group. The game developed has no age or professional barriers and also tests the analytical and puzzle solving capabilities of a gamer.

This paper presents the initial work of the project. We intend on increasing the number of levels as our further research. The graphics of the game will also be improved as we advance in the development.

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