# DESIGNING RAIL SHOOTER GAME "ZOMBIE ARCADE" BASED ON ANDROID WITH GYROSCOPE

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***ABSTRACT***
*"Zombie Arcade" is a three-dimensional rail shooter game designed specifically for Android smartphones. The game will be created using Unity 3D game engine, which is a widely known and frequently used platform for developing Android games. In "Zombie Arcade," players will face with various challenges in order to defeat all enemies, with the goal to reach the safe area. The game will utilizes the Gyroscope feature found in smartphones, allowing players to move the camera, aim enemies, and shoot them.*

*Keywords: Android, Rail Shooter, three-dimensional, Unity, Zombie Arcade*

## 1. INTRODUCTION

In this digital era, technology is developing rapidly, many jobs or activities can be done using technology, one of which is playing video games. The definition of video game itself is a game that uses interaction with the user interface through images generated by a video intermediary (computer, console, or cellphone). As technology develops, game genres are also increasing. Among them are arcade shooter, massively multiplayer online role-playing game (MMORPG), battle royale, fighting, role-playing games (RPGs), survival, and others. Nowadays, gaming is not only for entertainment, but it has also become a career path and has also entered into sports (e-sports) that are competed in the national and international arena. [1]

Arcade games are coin-operated game machines installed in public places of business, some places that usually have arcade games are restaurants, cinemas, bars and entertainment game centers. One of the most popular arcade game genres is the rail shooter. The game to be designed is titled "Zombie Arcade", this game is an Android-based rail shooter game that is single player. In a rail shooter game, players can only move the direction of the target to shoot, what makes this game different from other rail shooter games is the camera that is controlled with a Gyroscope.

**Game References**

"Zombie Arcade" draws on conceptual and mechanic references borrowed from several prominent games. Some examples of games that serve as sources of inspiration or references are Virtua Cop / Virtua Squad, House of the dead, Time Crisis, and Full Metal Parabellum.

One of the games that influenced the development of "Zombie Arcade" is "Full Metal Parabellum" by Carmello Fabrian Husen (535160050), a Computer Science student at Tarumanagara University. This game tells the story of a player who wants to escape from the villain. This game is made for android platform and uses Gyroscope system to aim the enemy.



Figure 1. Full Metal Parabellum
Carmello Fabrian Husen,Darius Andana Haris, Jeanny Pragantha**,** Gyroscope Implementation in Arcade Shooter Game "Full Metal Parabellum", vol. 6 No.2 ,2021, https://journal.binus.ac.id/index.php/jggag/article/view/7745

## 2. RESEARCH METHOD

Video Games are a means of entertainment that is carefully created through predetermined stages and processes. designing a game requires a template as a foundation, but these templates often lack standardization. Therefore, this research utilizes the methods in "Game Design Second Edition 2004" by Bob Bates. including design methodology, game genre, and software used. [2]

**Design Methodology**

"Zombie Arcade" is a single player Android game. This game can be played on smartphones with operating systems of at least Android 10 (Quince Tart). The genre of this game is Rail Shooter. Like most other rail shooters, this game has a first-person view. [3]

**High Concept**

High Concept is used to determine what kind of rough design will be done during game design. The conceptual specifications of the game to be designed are as follows:

1. Name of the Game        : Zombie Arcade

2.  Game Category : Rail Shooter

3.  Language of the Game : English

4.  Intended Players : Those aged 16 and above

5.  Player Count : Single Player (1)

6.  Visuals : 3D

7.  Game Development Tool: Unity Engine

8.  Coding Language : C#

9.  Game Controls : Touchscreen and Gyroscope

10. Supported Platform : Android 10 or latest

## Gameplay

"Zombie Arcade" In this game the player must save himself and defeat all the enemies and bosses in each level. Each level has several enemies, the player must defeat all enemies to complete the level. In this game there is a feature of shaking the Smartphone to escape from the zombie attack.

## Storyline

This game tells the story of a human who is not infected with a zombie outbreak. Armed with a gun with unlimited bullets, the human must find a way to the safe area. Along the way the human will meet various kinds of zombies who want to kill him. The human must survive in order to meet other humans who are in the safe area. [4]

## Audience

This game has a target audience of teenagers to adults. The battles that occur in this game are shown with three-dimensional animation. Therefore, this game contains elements of violence. This game has a tutorial with picture illustrations that can help players understand how to play. With the tutorial, it is expected that every player can understand how to play and enjoy the game "Zombie Arcade".

## Hardware and Software

Hardware Platform is a specification of the hardware and software used for game design and gameplay. Here are the hardware and software specifications used in the game design process: [5]

1.  CPU: Intel Core i3-10105f

2.  GPU: Nvidia GeForce GTX 1050Ti

3.  RAM: 8.00 GB

4.  SSD: 500GB

5.  Operating System: Windows 10 Home

6.  Game Engine: Unity

7.  Other Devices: Android Smartphone

**Action Rail Shooter**

Action Game is one of the most popular game genres from the past until now. The characteristics of this game present elements of action and action in the game. This game deals with shooting, war, hitting each other and other reflex movements. The genre in action games is dominated by FPS (First Person Shooter). Enemies in action games are controlled by artificial intelligence (AI) or controlled by other players connected to the internet. The designed "Zombie Arcade" game has a rail shooter genre which is a sub-genre of FPS and Action Game. In the rail shooter genre, the player only focuses on shooting and most of the character movement is done by the computer [6].

**Software Utilized for Development**

In game development there is software used for game design, scripting, 3D modeling, and creation of graphical assets. the following are the tools used for the development of this game:

1.  Unity is the main platform used for game development. Unity offers various features in game creation.

2.  Visual Studio Code has a lightweight cross-platform code editor.

3.  Adobe Photoshop is an application used for photo editing, graphic design, and digital art.

4.   Blender is a 3D graphics software used to create animated movies, visual effects, 3D printed models, interactive 3D applications, and more.

5.  Gyroscope serves to determine the direction of rotation and the amount of angular velocity.

**3.  RESULT AND DISSCUSIONS**

**Control Design**

"Zombie Arcade" can be played using the touch screen as the main input device for shooting and the gyroscope moves the camera field of view 360 degrees horizontally and vertically. This

control is done by moving the smartphone while aiming the weapon, so that the player is not only fixated on the enemy in front of him, but also above and below the camera's field of view.

**Character Design**

1. Main Character

   The player character of the game "Zombie Arcade" is an uninfected human during a zombie outbreak. The main player has a gun that is used for hunting in the forest. The player must find a way to the safe area

2. Enemy Character

   The enemy characters in this game are zombies who are on the way when the main character is trying to find a safe area. The details of the enemy characters are as follows:

   a. Common Enemy is an enemy that exists in every stage. This enemy has no special abilities, first the enemy appears, approaches the player until it enters the attack distance radius, the enemy will attack the player with melee attacks within the attack distance radius.

Tabel 1 Common Enemy Design Specifications

| No. | Nama *Enemy* | HP | *attack* | *Speed* |
|-----|--------------|----|----------|---------|
| 1 | Eye Zombie | 3 | 2 | 1 |
| 2 | Common Zombie | 3 | 2 | 1 |
| 3 | Fat Zombie | 4 | 2 | 1 |
| 4 | Jockey | 1 | 1 | 4 |
| 5 | Crying Zombie | 1 | 2 | 2 |
| 6 | Slasher | 8 | 3 | 1 |
| 7 | Ugly Face | 10 | 2 | 2 |

   b. Enemy Boss is an enemy that appears at the end of the stage. This enemy will appear at the end of levels one, three, and five. This enemy has more varied aggression and is more difficult to defeat than the Common Enemy.

Tabel 2 Boss Character Design Specifications

| No. | Nama *Boss* | HP | *Attack* | *Speed* | *Stage* |
|-----|-------------|----|----------|---------|---------|
| 1 | Burned Zombie | 36 | 2 | 2 | 1 |
| 2 | Tanuki | 46 | 3 | 3 | 3 |
| 3 | Lizard Zombie | 52 | 5 | 3 | 5 |

**Design Object**

The objects contained in this game are Explosive Kegz and Extras Weapon. Explosive Kegz is an object that will explode if shot by the player character and kill all enemies in the surrounding area with a distance of 2 unity magnitude instantly, the explosive effect of Explosive Kegz has

no effect on the player. Extras Weapon is a weapon that can be obtained by the player by shooting this weapon to be taken. The weapon that the player character gets is a rapid-fire rifle. This weapon can shoot bullets in succession by pressing hold the shoot button. Extras Weapon consists of 3 weapons AK47, M4A1 and MCX. An example of an image for the object can be seen below: [7]



Figure 2 Explosive Kegz
Source: open3dmodel, Explosive barrel3D,
https://open3dmodel.com/3d-models/explosive-barrel_34997.html



Figure 3 Extras Weapon (AK-47)
Source: 7XF Design, Modern Weapons Pack,
[8]



Figure 4 Extras Weapon (M4A1)
Source: 7XF Design, Modern Weapons Pack,
[9]

Figure 5 Extras Weapon (MCX)
Source: Delthor Games, Free FPS Weapon – MCX, [10]

**Level Design**

The game "Zombie Arcade" has 5 stages with 3 of them having a Boss marked with a red circle. The player must fight all the zombies in each stage. Each stage has a shoot-out point marked with a yellow dot. Shoot out points serve as shooting-positions, players must kill all zombies in that position to move to the next position. Each stage starts from the bottom left point. Regular enemies are marked with orange circles, Explosive Kegz are marked in pink, and Extras Weapon are marked in blue. here is one example of the game map "Zombie Arcade". [11]
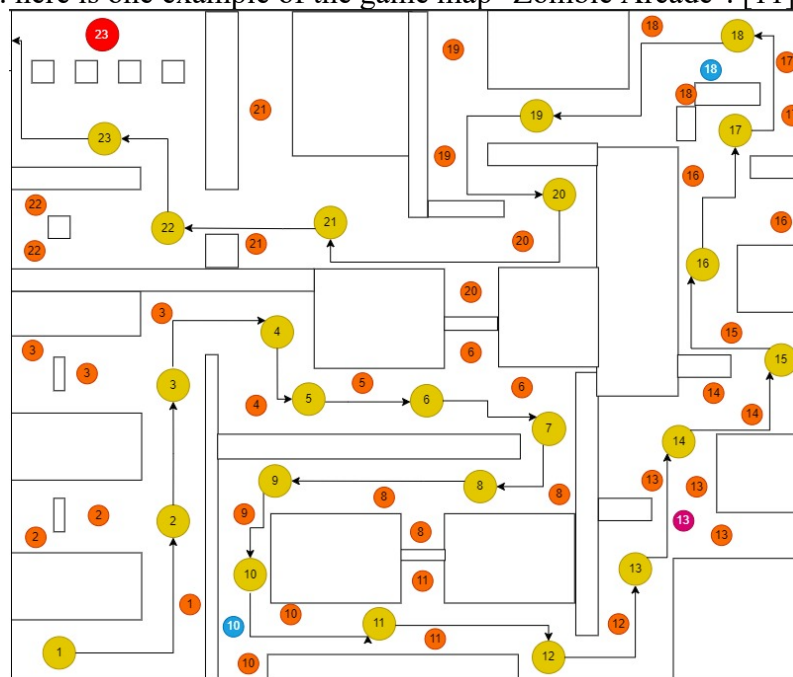


Figure 6 Stage 1 Map Design

**Sound Design**

The sound design in this game consists of two types, namely Background Music and Sound Effect. Background Music is used in each display as game accompaniment, while Sound Effect appears when the player character interacts in the game. Background Music and Sound Effect of this game are taken from various sources.

**Display Design**

Display is an important element in the game, because with an attractive and easy-to-understand display, players will have no difficulty in navigating the game. The display design implemented in the game theme created is as follows: [12]

1. Main Menu Display
   The main screen that will appear when the game is first run. On this display there is a title and several menus that can be selected, namely: Start, Tutorial, About and Exit Game



Figure 7 illustration of the main menu

2. Gameplay Display

   The game view is the screen that appears when the game is running. There is an HP bar and the number of bullets for the player character. This display has Fire, Reload and Pause buttons. [13]
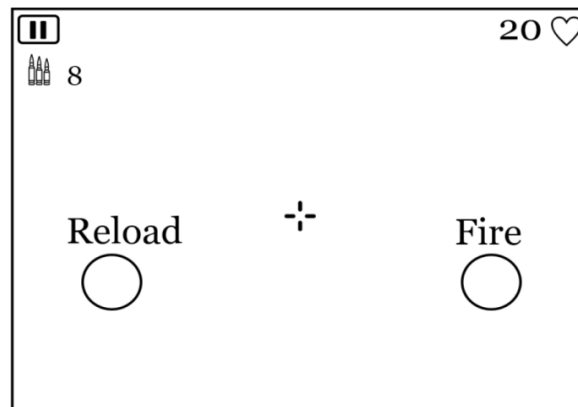


Figure 9 illustration of Gameplay Display

3. Tutorial view

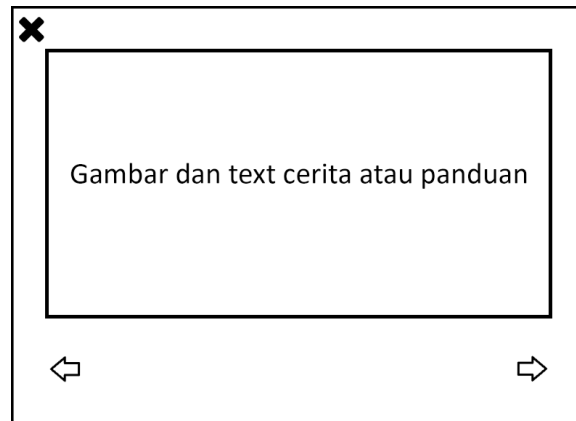   The tutorial view contains a guide to learn how to play this game.

Figure 9 illustration of Tutorial View

4. Stages Selection View

This view is the view for Stage selection. There are 5 buttons to select the stage you want to play and a button to return to the main menu display.
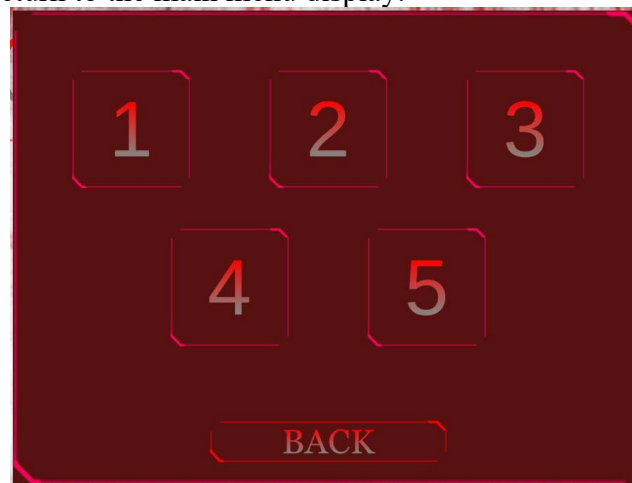


Figure 10 illustration of stage selection

## 4. CONCLUSIONS AND SUGGESTIONS

"Zombie Arcade" is a game designed for fans of Rails Shooter games. This game has a 3d appearance and also uses a gyroscope to direct shots at enemies. this game consists of 5 different levels where 3 of them players will fight boss enemies. where each boss has different abilities,

This game is also designed by considering the needs of its target audience. This game is designed for individuals aged 16 and above who like Rail shooter games. this game offers a 3d display, where this game has a story about a human who is not infected with a zombie outbreak and must reach a safe zone to meet other humans who are not infected with this zombie outbreak. [14] [15][16]

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