

Multi-Platform Car Game Controller and Driving Simulator

Roshan Chavan¹, Vishwajit Nimhan², Siddesh Katkar³, Nikhil Rai⁴

^{1,2,3,4}Students, Department of Computer Engineering, All India Shri Shivaji Memorial Society Polytechnic, Kennedy road, Pune, Maharashtra, India.

Abstract - Our main goal behind this project was to recycle and make something innovative in the field of Gaming as well as to contribute something to reduce the risk and difficulty faced by the new drivers in the learning process of driving. In this project we have Designed and Developed a Multiplatform Car Game controller or Driving Simulator by recycling e-waste like potentiometers, arduino, etc and waste like broken benches, chairs, tables etc. The Car Game Controller includes a steering, lever, acceleration and brake pedals which provides the user with the feel of driving a real car or truck. This Car Game Controller is plug_and_play and can be used to play any Car racing game or Truck simulator on MacOS, Windows and Linux.

Wii game Mario Kart Wii is bundled with the Wii Wheel: a steering wheel-shaped shell that the Wii Remote is placed inside thus using the Wii Remote's motion sensing capabilities to control the kart during the game. Hori also has a steering wheel that is made for the Nintendo 3DS game Mario Kart 7. When the steering wheel is placed on the back of the console, then it will have the same ability as in Mario Kart Wii by using the gyroscope in first-person mode.

Pedals may be used for driving simulations or flight simulations. In the former case, an asymmetric set of pedals can simulate accelerator, brake, and clutch pedals in a real automobile. In the latter case, a symmetric set of pedals simulates rudder controls and toe brakes in an aircraft

1. INTRODUCTION

A **game controller** is a device used with games or entertainment systems to provide input to a video game, typically to control an object or character in the game. A controller is usually connected to a game console or computer by means of a wire or cord, Input devices that have been classified as game controllers include keyboards, mice, gamepads, joysticks, etc. Some controllers are designed to be best for one type of game and are termed as special purpose game controllers such as steering wheels for driving games, or dance pads for dancing games.

1.2 Increasing E-Waste

Our world is facing an alarming problem of e-waste, which has a deep impact on humanity and our environment. According to the Global E-Waste Management Market, from 2014 to 2016, the rate of producing e-waste exceeded 93.5 million tons annually.

1.1 Steering Wheel and Pedals

A Racing wheel, is used in most racing arcade games as well as more recent racing simulators such as Live for Speed, Grand Prix Legends, GTR2, and Richard Burns Rally. While most arcade racing games have been using steering wheels since Gran Trak 10 in 1974, the first steering wheels for home systems appeared on fifth-generation consoles such as the PlayStation and Nintendo 64. They usually come with pedals to control the gas and brake. Shifting is taken care of in various ways including paddle shifting systems, simple stick shifters which are moved forward or back to change gears or more complex shifters which mimic those of real vehicles, which may also use a clutch. Most wheels turn only 200 to 270 degrees lock-to-lock but some models, such as the Logitech Driving Force Pro, Logitech G25 and Logitech G27 can turn 900 degrees, or 2.5 turns, lock-to-lock. The Namco Jogcon paddle was available for the PlayStation game R4: Ridge Racer Type 4. Unlike "real" video game steering wheels, the Jogcon was designed to fit in the player's hand. It's much smaller wheel (diameter roughly similar to a soda can's) resembles the jog-and-shuttle control wheel used on some VCRs. The Nintendo



Fig-1: E-waste Dustbin of our college

There are currently various techniques for handling e-waste such as recycling, reducing consumption, and reusing containers, which are helpful but have their limits, as these efforts eventually require the use of landfills, which is not optimal for the environment.

Data provided by ecofriendly organizations, such as the International E-waste Management Network, states that the rapid increase in the demand of electronic gadgets leads to

two major problems: 1) a significant increase in mining and the procurement for the materials needed for the production of gadgets and 2) a surge in the amount of discarded waste material. Both issues can be controlled to some degree with the help of efforts including reuse, resale, and repair.



Fig-2: Backyard of our College

There was a time when people used to keep their household television sets and other devices for more than a decade, which was helpful in maintaining the balance of the production and the proper decomposition of electronic gadgets. But rapid advancements in technology have resulted in a spike in the demand for these goods, for example, according to the Pew Research Centre, nearly 89% of people between the ages of 18 to 29 own a Smartphone and use it for no longer than one year, before buying a new one

2. STUDY OF EXISTING SYSTEM

All the Game Controller Present in the market are too expensive price starting around Rs10000 the most basic versions which are only compatible with PC(Windows Os). There are few Controllers which are either compatible with PlayStation and PC or Xbox and PC, present controllers at most support compatibility with two platforms one of them is mostly a console and other is PC.

There are various different types of racing game controllers available in market which are shown in table below

Table -1: Comparison of Existing Game Controllers

NAME	PRICE	COMPATIBILITY
Logitech G27 Racing Wheel	₹ 64,056	Only Play Station - 3 and Play Station - 4
Thrustmaster T300 RS GT Racing Wheel	₹ 33,123	Only Play Station - 3 and Play Station - 4 OR Only PC (Windows)
HORI Racing Wheel	₹ 19,412	Only PS - 4 OR Only X-Box One
Fanatec Forza Motorsport Racing Wheel	₹ 84058	Only X-Box One

3. PROBLEM STATEMENT

To design and develop a Car Game Controller which is compatible with Windows, MacOS, Ubuntu(Linux), Playstation and Xbox from waste like potentiometer, broken benches etc.

4. PROPOSED SYSTEM

An Arduino based game controller is designed, the game controller consist of following components Steering wheel, a lever and two pedals(one for acceleration and second for brake). The Steering is made from packaging cardboard and broken lid of 15 litre hard plastic water tank, Lever is made from cardboard and polyfoam which is taken from packaging material of Refrigerator. Pedals are made from wood, hinges, screws and spring obtained from broken benches, door and furniture.



Fig-3: Pedal Design

Wires, potentiometer, arduino etc were taken from E-waste dustbin of our college lab which is the collection of components extracted from old non working projects.

Each component of the game controller is attached to a potentiometer which passes positive or negative values individually to the arduino depending on the movement of component.

Arduino Uno R3 is the brain of this controller. To make the game controller plug and play and compatible with multiple platforms, code for game controller is written and UNO joy Firmware is directly updated to arduino

5. Circuit Diagram

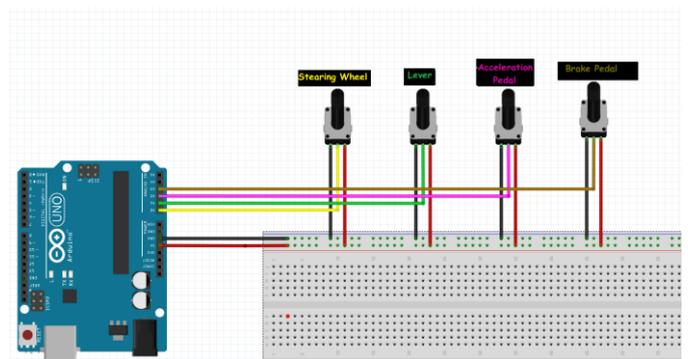


Fig-4: Circuit Diagram

6. APPLICATIONS

- Can be used as Racing Car game controller
- Can be used as a controller for Truck Driving Simulation
- Can be used to give practical experience to learners before giving them an actual car for driving on road

7. IMPLEMENTED WORK



Fig-5: Lever

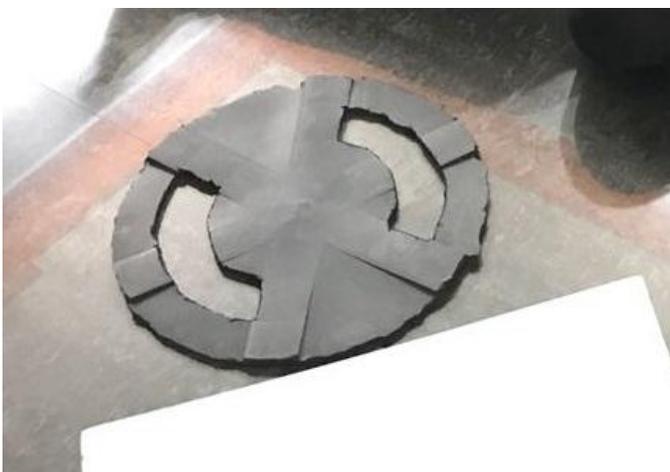


Fig-6: Steering Wheel

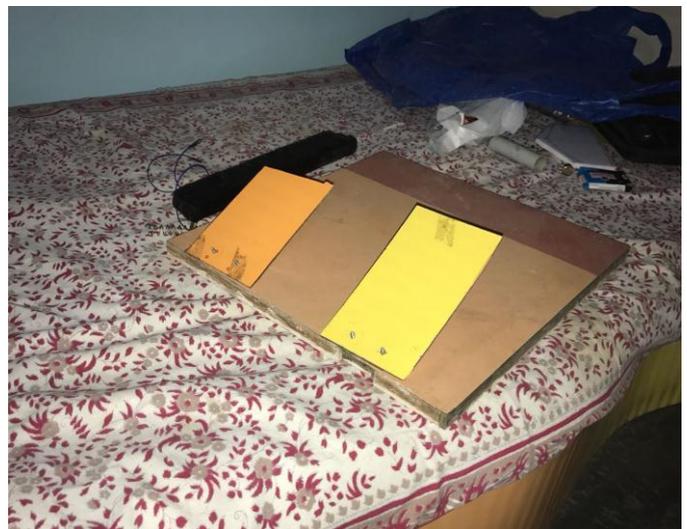


Fig-7: Pedals

REFERENCES

- [1] <http://www.racingfr.com/forum/index.php?showtopic=49848>
- [2] https://en.wikipedia.org/wiki/Game_controller
- [3] <http://mertarduinotutorial.blogspot.in/2017/02/arduino-tutorial-26-game-controller.html>
- [4] <https://blog.arduino.cc/2012/05/14/unojoy-a-usb-joystick-for-mac-pc-linux-or-ps3/>