

Android Application Based Electronic Skating Board

SIDHANT S. KULKARNI¹, SUMEET K. GUPTA², NITIN I. BHOPALE³

^{1, 2, 3} Assistant Professor, SRES's Sanjivani COE, Kopergaon

Abstract- *The Skating system which will operate on the android phone also we can control the device direction. it will also charging the battery of the system on the self-generating power as l as on the mains and battery the system will allow to us to travel the skate will be 100% eco-friendly. It was designed for local transport as well as for fun and making enjoyable for whom unable to ride it. The design of a skate board is developed by considering an age factor; we mainly focused on some key factors because of which some people unable to ride it. To control motion and thrust of skate board has provided four controls on the glove, glove is not a normal glove in this glove the skateboard function controls are given, one is for start and stop and other for steer the stepper based steering mechanism.*

Indexed Terms- *Android, skating board,*

I. INTRODUCTION

According to the survey 19% population of world is handicapped hence for day to day life travelling they used normal wheel chair. Normally cost of wheel chair is around 8500/-.Our prototype model just made in 6450/-.so it's cost effective as compare to normal wheel chair.

A. Self-Balancing Electronic Skate-Board:

Powerful microcontrollers are used as parts most intelligent automated system. Integration of field of transportation with these intelligent devices will aid in development of new generation of transportation. With the use of efficient microcontrollers and sensitive sensors has helped a lot in achieving this milestone. These devices play a vital role in today's world, where the conventional means of transport keep depleting the non-renewable resources and increases the population, taking steps towards the seize of existence of life. This paper implements the self-balancing mechanism onto a skate-board that can be used as alternate mode of transport for short distance in day-to-day life. This implementation is based on the inverted pendulum

concept to counter the disturbance in balance and involves PID controller algorithm for the smooth self-balancing of the system.

B. Motion Controlled Skateboard:

An electric skateboard is a modified skateboard propelled with the help of electric motor, the motion and the thrust of which is controlled by RF (Radio Frequency) controller circuit. The regular skateboard steered by the rider shifting his or her weight, but in this case it is steered by RF controller only making use of servo motor based steering mechanism, which provide flexibility and the powerful command over the skateboard. It was designed for local transport as well as for fun and making enjoyable for whom unable to ride it. The design of a skate board is developed by considering an age factor; we mainly focused on some key factors because of which some people unable to ride it.

The factors are: Stability, balancing, turning problem (weight balancing problem), tire types etc. thus there is no age limit to ride this skateboard. To control motion and thrust of skate board has provided four controls on the glove, glove is not a normal glove in this glove the skateboard function controls are given, one is for start and stop and other for steer the servo based steering mechanism. Start-stop control provide supply to electric motor by sending wireless signal, and for steering the three type of wireless signals are transmitted according to that the servo controller generates the PWM (Pulse Width modulation) signal to direct the direction of the steering.

In the proposed system, an electric skateboard is a modified skateboard propelled with the help of electric motor, the motion and the thrust of which is controlled by RF (Radio Frequency) controller circuit. The regular skateboard steered by the rider shifting his or her weight, but in this case it is steered by RF controller only making use of servo motor based steering mechanism, which provide flexibility and the powerful command over the skateboard.

II. PROJECT SPECIFICATIONS

A skateboard is a modified skateboard propelled with the help of electric motor, the motion and the thrust of which is controlled by Android app through connect with Bluetooth modem . Because of self-power generation technic we increase the efficiency of the battery, the skateboard steered by the rider shifting his or her weight up to maximum distance.

Table 1. Proposed System Specifications

Sr. No.	Component	Specification
1.	motor with controller	350 watt 200rpm
2.	Battery Pack	20Ah (12volt, discharge current 19A)
3.	Atmega 32 microcontroller	32 KB flash Memory
4.	Bluetooth module	HC-05
5.	Relays	12v SPDT
6.	Wheels	6.5cm x 5.5cm
7.	Transistor	CL100
8.	Resistors	1k, 10k, 220ohm
9.	Dynamo	6 volt, 3 watt
10.	GI Pipes for frame	¾ inch
11.	MAX 232 DB9 Connectors	
12.	Capacitors	22uf, 100uf, 1000uf
13.	Miscellaneous	Power cords, Pulleys, belts, screw, nut and bolts, wires, connectors, etc.

III. BLOCK DIAGRAM AND ITS EXPLANATION

A. Transmitter Mobile side (Mobile app controlled):

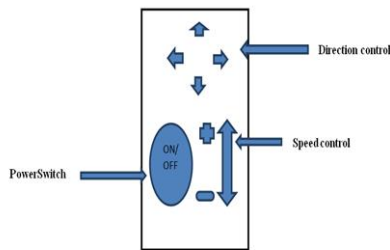


Fig 1. Block diagram Transmitter side

B. Receiver side (skating board):

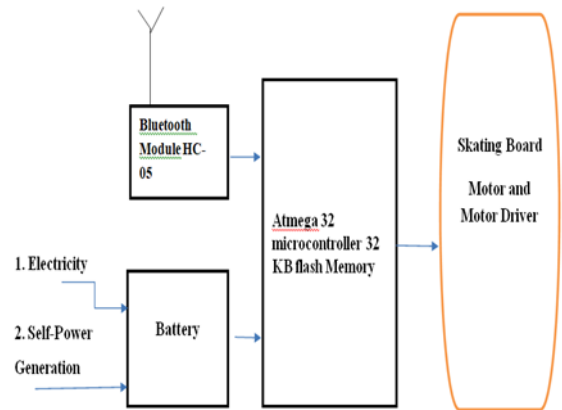


Fig. 2. Block diagram of receiver side

i. Transmitter Section Speed Control:

Motor of skating board will be controlled by a speed control box. Mount this unit under your deck next to the motor. Speed controllers must match the voltage and wattage of the motor. The least expensive controllers drive the motor at a constant rate, but opt for a control module with a remote throttle. A throttle lets you adjust the speed of the motor to suit the terrain or your mood. Basic speed controllers use a wired connection, though wireless controllers are also available. A speed control box won't slow your board if you need to stop. If you want to be able to slow your board, install a hand-operated disc brake unit to the rear axle opposite the drive belt. For a cordless braking system, mount housing over your front wheels. When you lean forward, friction will slow the wheels (but will lower tire life).

ii. Power Switch:

Power switch is for the start and stop the power supply to the system

iii. Direction Control Switches:

This four switches is used for the controlling the direction of skating board like Forward, backward, Left and Right.

• Receiver Section:

i. ATmega328:

The ATmega328 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328 achieves throughputs approaching 1 MIPS per MHz allowing

the system designed to optimize power consumption versus processing speed. The AVR core combines a rich instruction set with 32 general purpose registers. All the 32 registers are directly connected to the ALU, allowing two independent registers to be access in one single instruction to be access. The device is manufactured using Atmel's high density non-volatile memory technology.

The On-chip ISP Flash allows the program memory to be reprogrammed In-System through an SPI serial interface, by a conventional non-volatile memory programmer, or by an On-chip Boot program running on the AVR core. The Boot program can use any interface to download the application program in the Application Flash memory. Software in the Boot Flash section will continue to run while the Application Flash section is updated, providing true Read-While-Write operation. By combining an 8-bit RISC CPU with In-System Self-Programmable Flash on a monolithic chip, the Atmel ATmega328 is a powerful microcontroller that provides a highly flexible and cost effective solution to many embedded control applications.

ii. Bluetooth Module HC 05:

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

iii. Battery:

Most electric batteries are 12 volt, so wire two batteries together in series (positive to negative terminals) to run 24-volt motors or three batteries for 36-volt systems. Sealed lead acid batteries are cheap, but heavy. Nickel metal hydride (NiMH) batteries are 40 percent lighter but can cost five times as much. Select batteries have the highest amp-hour rating that will fit under your board. Mount the batteries so they can be removed for charging or replaced with fresh batteries away from home.

iv. Skate board:

A skateboard is a small piece of wood in the shape of a surfboard with four wheels attached to it. A single person rides the skateboard, guiding the movement with his feet. While some use skateboards as transportation over short distances, most are used to perform stunts. Skateboards consist of three parts:

deck (the actual board), the truck (a component usually made of metal that holds the wheels to the deck), and the wheels. The average skateboard deck is about 32 in (81.3 cm) long, 8 in (20.3 cm) wide, and is a little less than 0.5 in (1.3 cm) thick. The deck has a defined nose and tail with a concave in the middle. Skateboard wheels are usually made of polyurethane and range in width from about 1.3-1.5 in (3.3-3.8 cm). While nearly all skateboards have similar shapes and characteristics, their dimensions vary slightly based on use. There are skateboards built for speed, slalom, and freestyle. Since skateboards first came into widespread use in the 1960s, their popularity has come in waves. Newfound interest is usually related to technical innovation, though a core constituency of skateboard enthusiasts.

v. DC Motor:

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The DC motor is used to rotate the solar panel accordingly where we obtain maximum voltage. The angle error per steps is very small and non-cumulative and rapid response to starting, stopping and reversing. It is mechanically simple and requires little or no maintenance.

IV. PCB AND SOFTWARE DESIGN

A. PCB Design

The design part of PCB is carried out on PROTEUS8 software

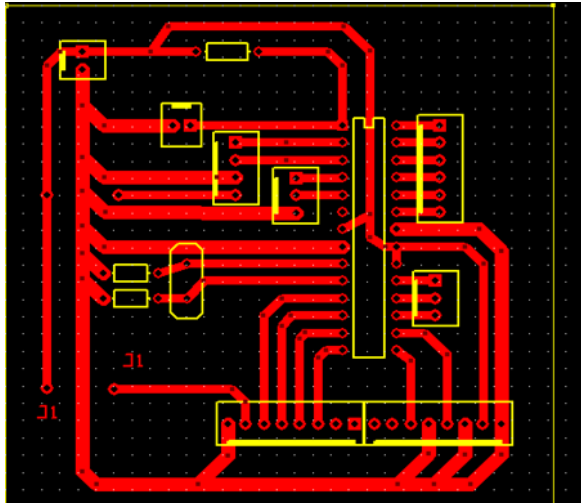


Fig. 3. Layout of Skating circuit

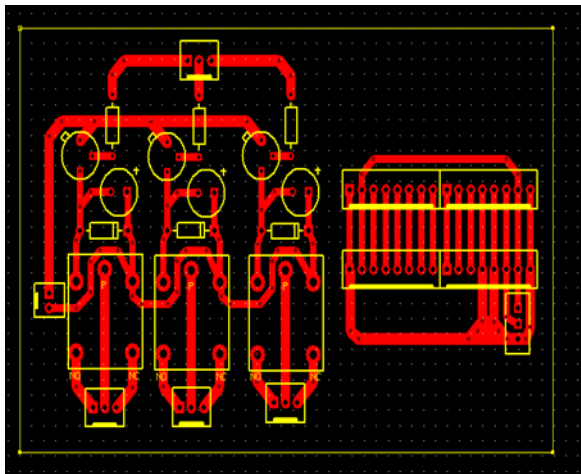


Fig. 4. Layout of relay circuit

B. Software Design:

Task Assigned to Software is to scan the input available at input port of microcontroller. Take corresponding action and display it on LCD.

Algorithm:

Step 1: Start

Step 2: Initialize system Parameter

Step 3: Track the system position

Step 4: Balanced? (If balance is ok then go to the step 3. If no then go step 5)

Step5: Balance system and direction using android app.

Step 6: Direction interrupt (if yes then go to step 3. If no then go to step 7)

Step 7: Is that system that direction.

Step 8: Stop.

Software implementation involves the programing of the entire system. System operation logic can be explained with the help of a simple flow chart

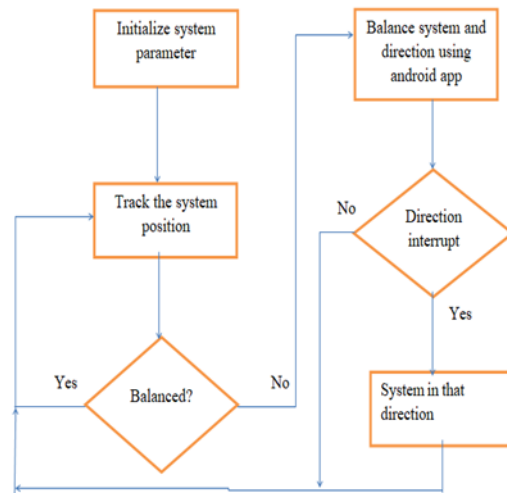


Fig. 5. Flowchart of proposed system

V. DESIGNED PROTOTYPE OF PROPOSED SYSTEM

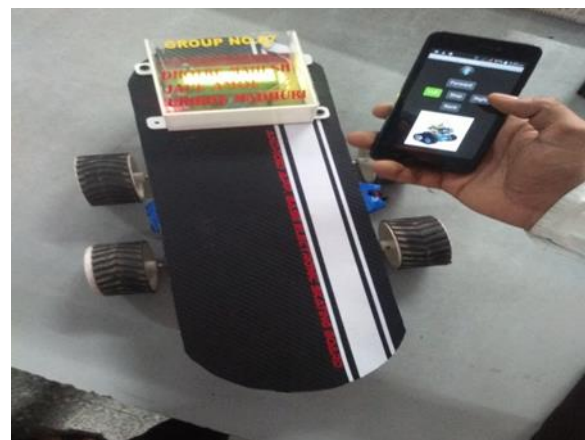


Fig. 6. Left movement of Skating board



Fig. 7. Stop movement of skating board

Table.2: Movement of Skateboard

Sr. No	Direction of tilt	Motor in action	Action to perform
1	Forward	M1,M2 M3,M4	Move forward
2	Left	M1,M2	Move left
3	Right	M3,M4	Move right
4	Stop	-	Stop

CONCLUSION

“Android Application Based Electronic Skating Board” is our project saving much more fuel because it works on 12 volt battery supply and because of self-power generation we increase efficiency of battery and save electricity and because of android app it’s easy to control .If this concept used in wheel chair then it makes the life of handicap person easier as it’s portable so we can pick it where you want If it’s compare with bike then cost of this design is less which is useful for short distance travelling.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

ACKNOWLEDGMENT

The Authors of this paper are very much thankful of Sanjivani College of Engineering, Kopargaon for their support and for providing the best infrastructure.

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