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Basketball Shooting Machine

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Abstract: The machine developed by us helps basketball athletes to excel, improve and complete their training in minimum time and effort. It cuts down the need of another human who collects and passes the ball to the athlete as well as it saves the athlete's stamina by not letting him/her run continuously around the court. This machine is placed under the basketball rim where it collects the ball shot by the athlete and shoots it back towards him/her and the cycle continues.
Keywords: Basketball, intelligence, practice, shooting, simple machine

I. INTRODUCTION

Shooting is the main (and only) scoring method in basketball, so in the game it holds an important position. An important factor in enhancing the basketball hit rate is to increase the amount of shots made during practice, training and games. Increasing this number will significantly raise the chances of scoring.

This happens due to a biological concept called “Muscle Memory”. It’s a form of implicit memory which prints a specific task into memory through repetition,when an action is performed again and again. Usually when a movement is repeated for a longer duration with little to no changes, the brain creates a long-term muscle memory for that task. Next time it requires very little conscious effort when performed. It decreases the need for attention of the brain for that specific muscle resulting in maximum efficiency.

II. METHODOLOGY/EXPERIMENTAL

A. *Components used*

1) Cardboard
2) Wooden ply
3) Aluminium wire 3mm thick
4) Adhesives (cellotape, fevikwik etc.)
5) Net made from plastic
6) Plastic pipe
7) Ultrasonic sensor
8) Arduino board
9) Jumper Cables
10) I2C module
11) Battery
12) Ball
13) Resistor
14) Breadboard
15) DC motors
16) Wheels

B. *Method*

We cut a pipe in half and made a path out of it for the ball to slide down. Near the bottom of the path 2 DC Motors are going to be connected with wheels. These wheels are made to rotate in opposite directions of each other so that it will create an outward centrifugal force and the ball will shoot.

To count how many baskets are made by the athlete, we have attached an ultrasonic sensor just below the ring. As soon as the ball is passed through it, it increments the counter by 1 and displays it on the LCD display for the user to see. (Refer the final image of product)

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C. Pseudo Code and Testing

Arduino code for a counter using an ultrasonic sensor and LCD display typically begins by initialising the required components, such as the ultrasonic sensor and LCD display, in the setup section. Ultrasonic sensor is used to detect objects (in our case the basketball) in its surroundings by sending out ultrasonic waves towards the objects and measuring the time it takes for the waves to bounce back. It then increases the counter every time it receives a bounced signal. The code configures the LCD display to show relevant information, such as the count value. In the loop section of the code, the Arduino continuously reads the distance data received from the ultrasonic sensor. When an object is detected within a specified range, the code increments the counter variable and updates the LCD display to reflect the new count. This process repeats as the Arduino continually monitors the sensor input, providing real-time counting.

By combining the functionality of the ultrasonic sensor and the LCD display, the Arduino code for the counter creates an interactive and informative system that counts objects in the sensor's range and displays the count on the LCD screen in a user-friendly manner.

III. RESULTS AND DISCUSSIONS

There are some Chinese machines available on Aliexpress etc. and 2 major brands in the US, Europe named as The Gun and Dr. Dish which have been selling Basketball machines for 20 years.

John Joseph invented a model in 1998 which was The Gun 6000. It was capable of collecting missed/made shots of athletes, and passing the ball back to the athlete for his/her another attempt. It had a timing device & software so that players could determine the number of shots made, time taken to make them and accuracy percentage in the whole practice. The distance and speed of return passes was adjustable according to the user.

Later in 2017, Gun 10k was introduced by the same company. It was more advanced because it consisted of a screen to select in which direction the athlete wanted the pass directed, if he/she wants a slight gap in between each pass etc. It also came with an option to input a number of passes to be given to a specific spot before going to the next one.

Dr. Dish is another company which produces basketball shooting machines that help players enhance their shooting skills through targeted practice.These machines claim to simulate game-like scenarios for training. Features include customizable shooting programs and real-time feedback.

IV. FUTURE SCOPE

1) Using Solar energy as power source
2) Increasing speed of shooting
3) Increasing accuracy of sensor

V. CONCLUSION

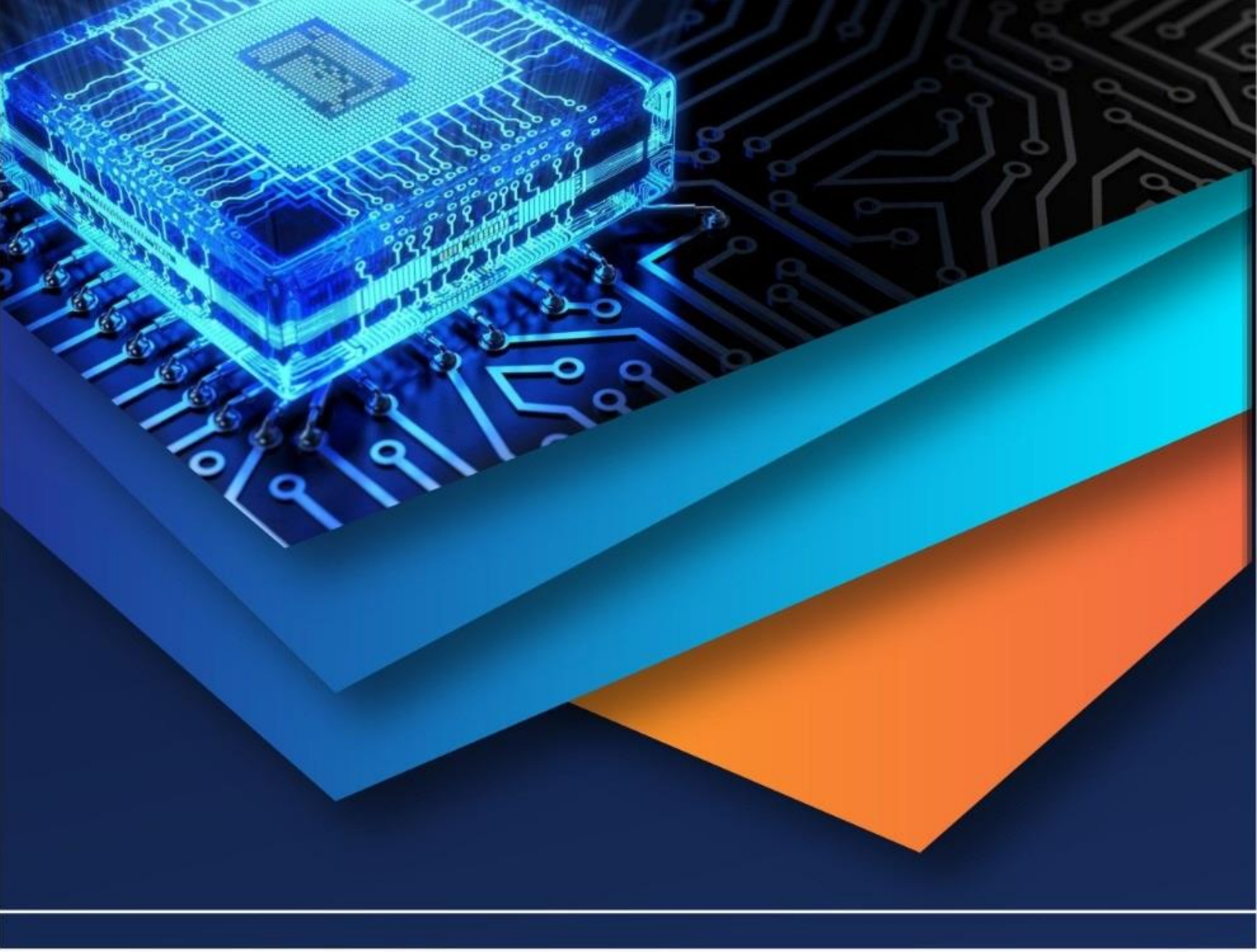
To enhance the athletes' responsiveness on the court, a strategy has been adopted that incorporates an intelligent basketball shooting training machine.

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This smart machine increases the number of shots made by athletes in a fixed time, thereby improving training efficiency and skill level. By integrating this technical solution into standard basketball equipment, the storage vehicle becomes intelligent and multifunctional. Athletes then gain the ability to capture shooting targets more quickly and respond faster, which in turn boosts their shooting rate. Ultimately, the intelligent basketball shooting training vehicle's operational capability and efficiency are validated through practical shooting drills, effectively raising the athletes' shooting accuracy.

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