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Design and Fabrication of Elliptical Bicycle

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Abstract: ***The elliptical bicycle is a novel human-powered vehicle that combines the mechanics of a conventional bicycle with the motion dynamics of an elliptical trainer. It is designed to deliver a low-impact, full-body cardiovascular workout while offering the practicality and freedom of outdoor transportation. The primary goal of the project is to create an ergonomic and efficient transportation alternative for health-conscious users, athletes undergoing rehabilitation and those seeking a more joint-friendly riding experience.***
Fabrication includes selecting suitable materials such as aluminum or steel, welding the custom frame, assembling the elliptical motion system, and integrating gear transmission and braking components.
Once assembled, the prototype undergoes performance testing to evaluate smoothness of motion, comfort, and mechanical reliability.
The final product demonstrates improved rider posture, reduced joint strain, and an engaging ride experience, making it a viable and health-oriented alternative to both indoor elliptical machines and conventional bicycles
Keywords: elliptical bicycle, gear transmission, braking components.

I. INTRODUCTION

A bicycle is a single-track, pedal-powered, human-powered vehicle with two wheels mounted to a frame, one in behind of the other. Karl von Drais, a German aristocrat who created the "running machine" in 1817, is credited with creating the first bicycle. With the development of the chain drive in the 1860s, the design was enhanced to allow for increased efficiency and speed. Since then, bicycles have gained popularity as a means of transportation, entertainment, and sport.
Elliptical trainers are, and have been for a long time, a very versatile and well-liked piece of fitness equipment. They enable one to perform full-body cardiac workout without subjecting their muscles and joints to undue stress. As a result, users who prefer a low-impact or high-intensity workout benefit from this piece of equipment. By creating the low effort run cycle, high performance can be achieved with little effort.
This bike is more stable than it appears to be and is simple to ride. Equivalent balance is needed to ride this kind of cycle as it is to pedal a standard cycle.

II. PROBLEM DEFENIATION

Treadmill is no longer used to move farm equipment; instead, it is a useful exercise alternative for issues like bad weather, a busy schedule, and physical limitations brought on by crowded areas, busy streets, and congested areas. To reduce fuel and environmental pollution, people use cars, bikes, and other vehicles frequently in daily life. Persons can utilize a treadmill bicycle if their commute is less than 5-7 kilometers. We use the roller bearings to slide the pedal from one point to another point in the bicycle.

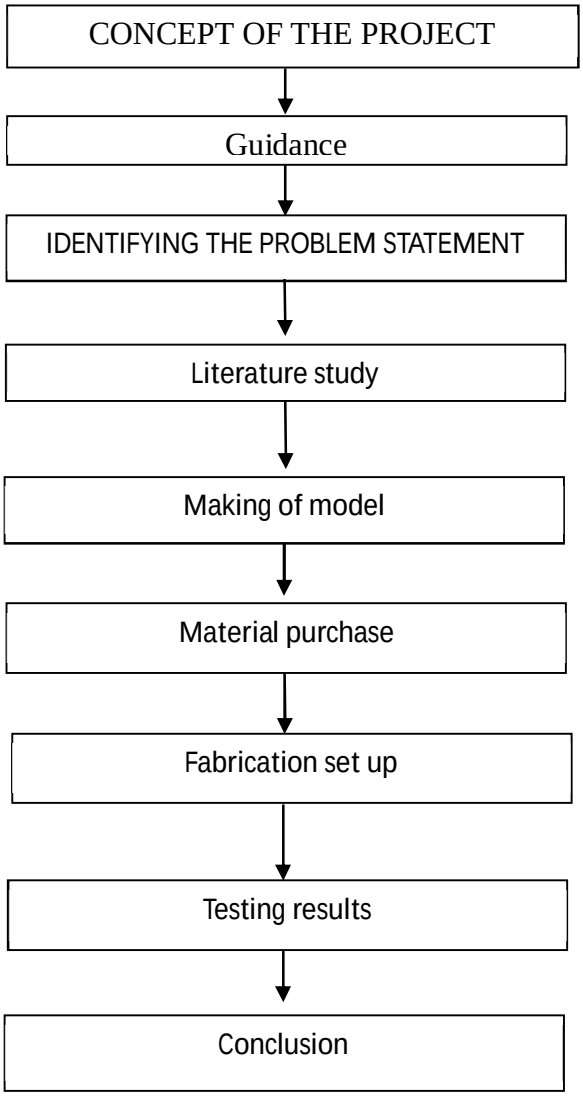
III. OBJECTIVES

1) To design out outdoor low effort run cycle.
2) Develop cost effective cycle.
3) By this the rise in pollution can be greatly minimized and also make people exercise while they travelling to various destinations.
4) It has also played a predominant role in global warming and also took up some part in fuel less transportation method.

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IV. METHODOLOGY

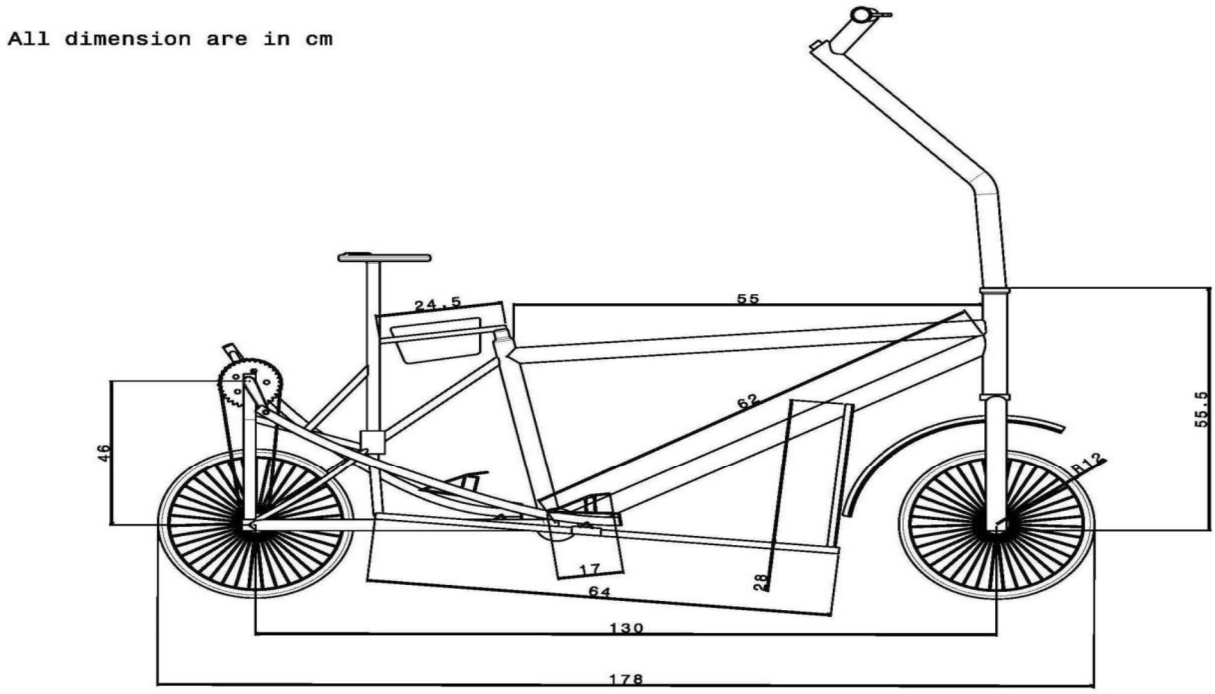


V. MATERIAL SELECTION

S.NO.	Component	Material selected	Reasons
1	Frame	Mild steel	High wear resistance, high strength, good rigidity
2	Connecting rod	Low Carbon steel	Highly malleable and strong.
3	Wheel	Rubber line	Highly resilient and tear resistant.
4	Lorry hinges	Stainless steel	Limited movement.
5	Sprocket	Steel	Low cost and light weight,
6	Chain	Alloy steel	High resistance to corrosion.

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VI. DESIGN & WORKING OF ELLIPTICAL BICYCLE





LEFT SIDE VIEW



RIGHT SIDE VIEW

Followed by the fabrication of the actual model, the model has been tested for different road, different load and various environmental conditions to identify any defects or flaws in the design or fabrication processes, and eventually no defects or flaws where noticed or observed. The model was tested on smooth, rough, dirt and uneven road surfaces to observe the behavior of the bicycle on the above mentioned road conditions, and fortunately the bicycle behaved in a well mannered way, hence eliminating any chances of misbalance or mishap.

VII. ADVANTAGES

1) Low impact: A smooth, elliptical motion provides a great workout that's gental on your knees, hips, ankles and back.
2) Comfortable: The natural "stand up" riding position reduces stress on your neak and back while completely eliminating seat pain.
3) Heart healthy: Burns 33% more calories than a traditional bicycle providing a better workout in less time.

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4) Outside: Meant to ride outdoors on the same path that you walk, jog, run or bike but compatible with indoor stationary trainers (3C/8C/11R only), so you can train year round.
5) Increased visibility: A higher riding position makes it easier for you to see and be seen.
6) One/size fits: All the steering height and pedaling motion are adjustable so riders from 4'10" to 6'10" can find their optimal fit for comfortable ride.
7) Great full-body workout: The stand –up position of elliptical bikes engages your core and upper body in addition to your legs.
8) Weight-bearing exercise: Gets your heart rate up, burns calories and help to improve bone density.
9) Portable: Can fit inside most vehicles and on a variety of roof, trunk and hitch racks

VIII. FUTURE SCOPE

1) No need of separate time for exercising.
2) No need of skilled operators to operate this machine.
3) The cost of the system is less.
4) Less maintenance is needed.
5) Easily portable.

IX. APPLICATIONS

1) Fitness and gym.
2) Those who are interested in evening walks.
3) Two wheeler Application.
4) Light vehicles.

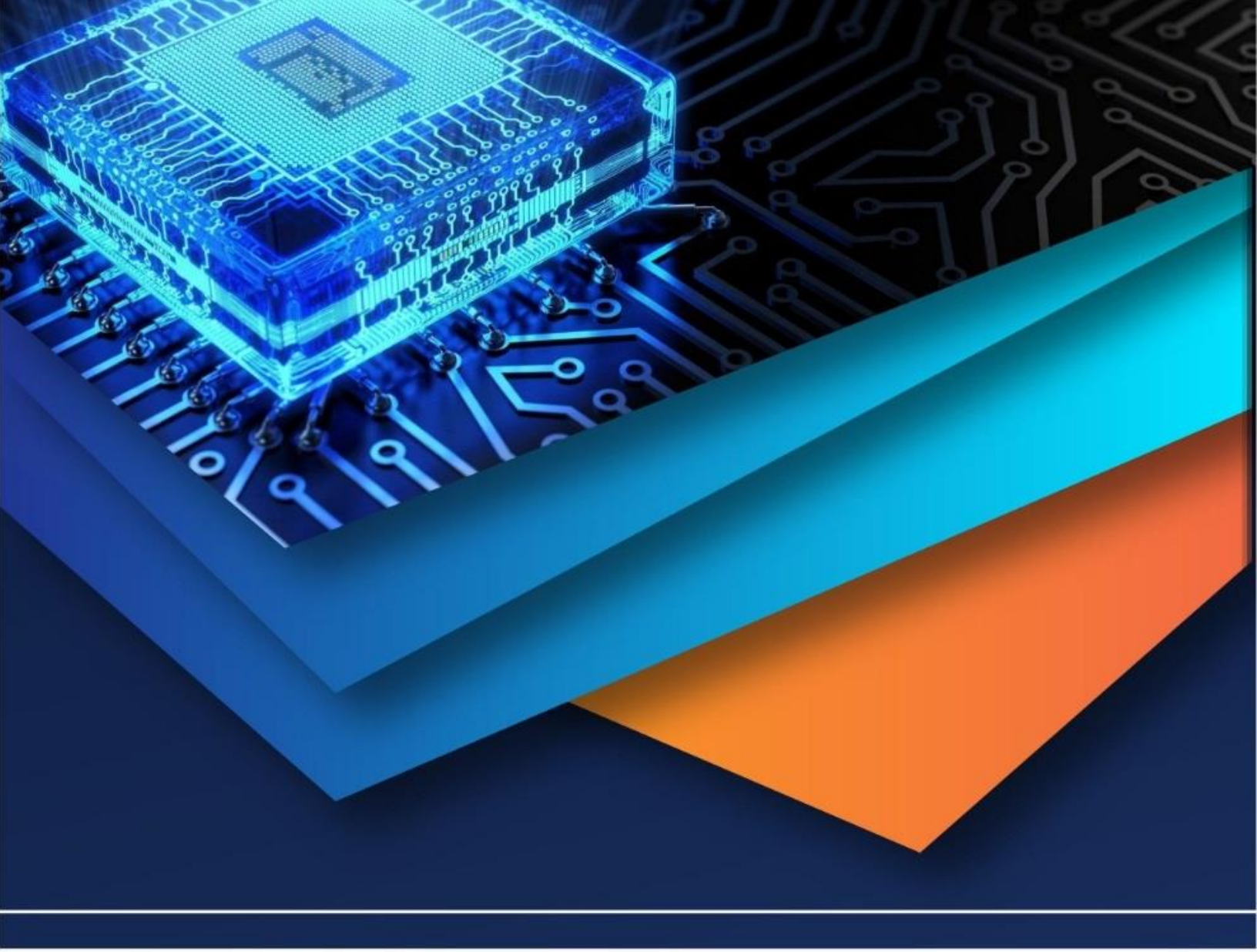
X. CONCLUSION

Elliptical bicycle can perform multi operation in minimum time. Elliptical bicycle is completely manual operated. Elliptical bicycle provide more exercise for human. Elliptical bicycle does not used any organic fuels so it is very eco-friendly. Elliptical bicycle does not promote any type of pollution. In This bicycle can be helpful for peoples to travel short distances as well as used for exercise. Using this elliptical bicycle, allotting a separate time for their exercise is not needed

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