

Nu Cycle: Revolutionizing Bicycles with Chainless Innovation

Sanjeev Kumar^{1*}, Rajveer Singh², Yuvika Agarwal³, Gourav Singh⁴, Sarthak Bisht⁵, Shivansh Agrawal⁶, Abhishek Singh⁷

Abstract

Introduced by Nu Cycle, a groundbreaking change in biking is facilitated through its chainless design. This research explores the enhancement of biking through reduced maintenance needs, improved efficiency, and an eco-friendlier option. The technical aspects, materials used, and user experiences are delved into. Unlike a standard bike where you pedal in a circular motion, the Nu Cycle utilizes vertical levers instead of cranks. This allows for a straighter leg movement, reducing stress on the knees, hips, and ankles. The Nu Cycle's levers are longer than traditional cranks, which translates to increased torque with each push. This translates to more power with less effort. The vertical pedaling motion also allows gravity to play a bigger role in propelling the bike forward. With a traditional pedal stroke, there's a point where you're pushing against gravity on the upstroke. The Nu Cycle's design eliminates this wasted effort Nu Cycle transforms the way we ride, contributing to a sustainable future with its environmental considerations. Through market analysis, keywords such as potential audience, standing among competitors, challenges faced, and recommendations for future development are identified. The findings provide valuable insights into the revolutionary bicycle technology presented by Nu Cycle. Invented as a transformative alternative to standard bicycle designs, the crankshaft mechanism introduces a novel approach to force and torque generation. By replacing the traditional pedal arrangement with a modified crankshaft system, cyclists can harness a broader spectrum of muscle groups, thereby optimizing power output and mitigating muscular fatigue. The crankshaft mechanism features a redesigned crankshaft configuration that facilitates a more ergonomic and effective pedaling motion. This innovative design redistributes the workload across multiple muscle groups, promoting a balanced and sustainable cycling technique. Through a combination of pushing and pulling motions, the mechanism engages key muscle groups such as the quadriceps, hamstrings, glutes, calves, and core, resulting in improved performance and reduced risk of overuse injuries. Torque generation refers to the production of rotational force around an axis, typically within a mechanical system. In the context of cycling and the crankshaft mechanism, torque generation occurs

when force is applied to the pedals, causing the crankshaft to rotate and propel the bicycle forward. The torque generated by the cyclist's pedaling efforts depends on various factors, including the force applied to the pedals, the length of the crank arms, and the mechanical advantage provided by the gearing system. The crankshaft mechanism is designed to optimize torque generation by efficiently transferring the cyclist's pedaling force into rotational motion. By maximizing torque generation, the crankshaft mechanism enhances the bicycle's performance, allowing cyclists to achieve higher speeds and overcome resistance more effectively. Additionally, the distribution of torque throughout the pedaling motion can influence muscle engagement and efficiency, contributing to a smoother and more balanced riding experience.

*Author for Correspondence

Rajveer Singh

E-mail: rajveersingh20211@gmail.com

^{1,3,5,6} Student, Computer Science and Engineering Department, Poomima College of Engineering, Rajasthan, India

² Student, Department of Mechanical Engineering, Poomima College of Engineering, Rajasthan, India

⁴ Student, Department of Cyber Security, Poomima College of Engineering, Rajasthan, India

⁷ Associate professor, department of electrical engineering, Poomima College of Engineering, Rajasthan, India

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INTRODUCTION

Bicycle is a means of transport. Since their invention, bicycles have been driven by a chain. To our understanding, the chain is paramount for a bicycle to be complete and should be in excellent condition to support its functioning. But it requires regular maintenance as sometimes the chain wears out.

Well in CHAINLESS BICYCLE or ADINUCYCLE, removal of chain will reduce the extra expenses used on maintenance of chain and to ride it we must put less effort as compared to the regular bicycle [13].

Have you ever wondered why riding cycle is so difficult? Do you know that cycling is one of the best physical exercises which helps in aesthetic body building?

Keeping many such thoughts in mind, our team decided to build a chainless bicycle with the concept of keeping the human input or power or energy consumed to the minimum extent with the same or optimal output. It is a type of bicycle that uses to and fro peddling instead of full rotation to move. It saves human effort and is an excellent demonstration of good /scientific technology. This is something which may work wonders for all age groups, and genders and is especially helpful for old people as they have less strength as compared to young bloods. Chainless bicycles are wonderfully comfortable and produce efficient transmission of power from the rider's foot to the rear wheel

Imagine a bicycle without a chain – that is what Nu Cycle is all about! It is not just any bike; it is a special kind that is changing the way we ride. In this introduction, we will Explore how Nu Cycle is making biking easier, more efficient, and better for our planet. No more worrying about fixing chains or struggling with gears – Nu Cycle is here to transform your biking experience. We will take a closer look at the cool features and why it matters for people who love cycling [4]. Get ready to discover the exciting world of Nu Cycle.

Issues in cycle with chain

- Chains necessitate regular cleaning, lubrication, and tension adjustments to operate smoothly and reliably. Neglecting these maintenance tasks can lead to increased wear, noise, and ultimately chain failure, potentially leaving cyclists stranded and requiring repairs.
- Chains are susceptible to breaking, particularly under high stress or if they become damaged or worn out over time. A broken chain not only disrupts the ride but also requires tools and expertise to repair, adding inconvenience and potential downtime for cyclists[5].
- Chains, sprockets, derailleurs, and chain rings together form a relatively complex mechanism[6]. This complexity increases the likelihood of mechanical issues and necessitates more frequent and specialized maintenance compared to simpler drivetrain alternative on with AISI 4130 crankshaft material (fig.1)

Design and Technology: The Inner Workings of Nu Cycle: Nu Cycle's innovative design and technology represent a significant leap forward in the world of bicycles. The heart of this transformation lies in its chainless mechanism and seamlessly integrated gear system.

Chainless Mechanism

Nu Cycle eliminates the need for a chain. Instead, it adopts a direct-drive system, where power is transferred directly from the pedals to the wheels. This not only reduces maintenance headaches but also enhances efficiency, providing a smoother and quieter ride [79].

Materials and Construction

The construction of Nu Cycle is equally noteworthy. Engineers have carefully chosen sustainable materials, emphasizing durability and environmental responsibility. The frame is designed for both strength and weight efficiency, contributing to an overall enjoyable and eco-friendly biking solution.

Smart Connectivity

Nu Cycle embraces the future with smart connectivity features. The bicycle can be paired with a mobile app, allowing users to monitor their ride, track performance metrics, and even customize settings. This integration not only adds a technological edge but also enhances the overall user experience.

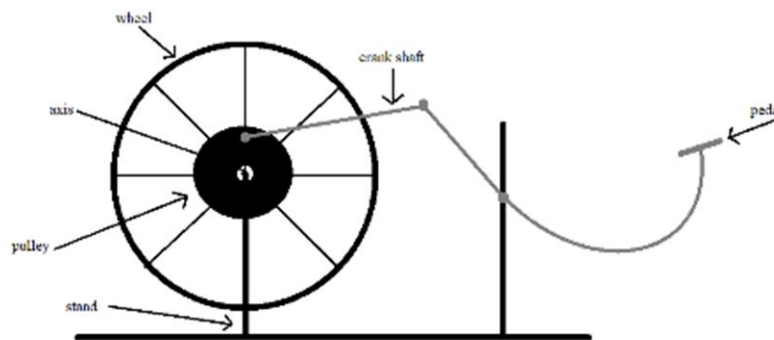


Figure 1: AISI 4130 crankshaft material

Advantages and Innovations of Nu Cycle

Nu Cycle stands at the forefront of cycling innovation, offering a host of advantages and groundbreaking features that redefine the biking experience.

Reduced Maintenance

One of the standout benefits of Nu Cycle is its chainless design, eliminating the need for traditional chain maintenance. This not only saves time and effort but also reduces the frequency of repairs and replacements, providing cyclists with a more reliable and low-maintenance riding experience.

Enhanced Efficiency

The direct-drive system in Nu Cycle ensures a more efficient power transfer from the pedals to the wheels. This results in a smoother ride, reduced energy loss, and an overall improvement in biking efficiency. Cyclists can enjoy a responsive and effortless pedaling experience across various terrains.

Environmental Sustainability

Nu Cycle takes a bold step towards sustainability by incorporating eco-friendly materials in its construction. The reduction in maintenance needs and the absence of a traditional chain contribute to a more environmentally conscious biking solution. Cyclists can enjoy their rides knowing they are making a positive impact on the planet.

Improved Riding Experience

The integration of smart connectivity features enhances the overall riding experience. Cyclists can connect Nu Cycle to a mobile app, allowing them to track performance metrics, customize settings, and analyze their rides. This technological innovation adds a layer of convenience and personalization to

the cycling journey

Market Analysis of Nu Cycle

Understanding the market dynamics is crucial for assessing Nu Cycle's position and potential impact in the cycling industry.

Target Audience

Nu Cycle caters to a diverse audience, ranging from urban commuters to recreational cyclists. Its chainless design and technological advancements appeal to individuals seeking a hassle-free and innovative biking experience. The target demographic includes eco-conscious consumers, tech-savvy riders, and those who prioritize low-maintenance solutions.

Competitor Comparison

In the competitive landscape of the cycling industry, Nu Cycle faces traditional bike manufacturers and emerging innovative designs[10]. A comparative analysis reveals Nu Cycle's unique selling points, such as its chainless mechanism, integrated gear system, and smart connectivity features, setting it apart from conventional bicycles and other modern competitors.

Pricing Strategy

Nu Cycle's pricing strategy positions it competitively within the market. While it reflects innovative features and sustainable materials, it remains accessible to a broader consumer base. The value proposition of reduced maintenance, enhanced efficiency, and environmental sustainability contributes to the perceived worth of the product.

Market Trends

Observing current trends in the cycling industry is essential for Nu Cycle's market strategy. The growing demand for eco-friendly transportation, coupled with an increased interest in smart and connected devices, aligns well with Nu Cycle's features. Analyzing these trends helps Nu Cycle capitalize on consumer preferences and stay ahead of evolving market dynamic.

Future Developments and Recommendations

Virtual Reality Cycling

Integration of the mechanism with virtual reality technology to create immersive cycling experiences where riders can explore virtual environments while feeling the terrain feedback through the pedals.

Biometric Feedback

Incorporation of biometric sensors into the system to provide real-time feedback on the rider's heart rate, muscle exertion, and other physiological parameters, allowing for personalized training programs and health monitoring.

Gaming Integration

Development of interactive gaming platforms where the system controls in-game actions, such as accelerating, braking, or steering, providing a fun and engaging way to exercise.

Smart City Infrastructure

Deployment of public bicycles equipped with the system in smart city initiatives, offering commuters efficient and eco-friendly transportation options while collecting data on traffic patterns and urban mobility for city planning purposes.

Rehabilitation Robotics

Incorporation of the system into robotic rehabilitation devices for physical therapy, allowing patients to engage in targeted lower limb exercises while receiving real-time feedback on their range of motion

and muscle strength.

Seed Planting

Accurate and controlled seeding of crops with adjustable spacing and depth.

Fertilizer Application

Precise distribution of fertilizers to ensure optimal nutrient levels for crops.

Pesticide Spraying

Targeted application of pesticides to minimize waste and environmental impact.

Harvesting Assistance

Integration with harvesting equipment for automated crop collection or sorting.

Micro-irrigation

Precision irrigation systems for water-efficient crop production.

CONCLUSION

In the realm of cycling, Nu Cycle emerges as a revolutionary force, reshaping traditional paradigms and ushering in a new era of innovation and sustainability. The culmination of its chainless design, integrated gear system, and smart connectivity features marks a change in basic assumptions in the cycling experience.

The advantages presented by Nu Cycle, including reduced maintenance, enhanced efficiency, and environmental sustainability, redefine the expectations of cyclists worldwide. The elimination of a traditional chain not only simplifies the rider's life but also contributes significantly to a more eco-conscious and low-maintenance mode of transportation.

Nu Cycle's foray into smart connectivity aligns seamlessly with contemporary technological trends. The ability to customize settings, track performance metrics, and enhance the overall riding experience through a mobile app positions Nu Cycle at the forefront of modern cycling solutions.

As we conclude, Nu Cycle's impact extends beyond the individual cyclist, reaching into the heart of the cycling industry. The market analysis demonstrates its strategic positioning, appealing to a broad spectrum of consumers while standing out amidst competitors. Nu Cycle not only offers a product but a vision for a future where cycling is not just a mode of transportation but an experience of seamless efficiency, environmental responsibility, and personalized connectivity.

In the grand tapestry of cycling innovation, Nu Cycle has woven a narrative that challenges conventions, embraces sustainability, and propels the industry towards a more promising and interconnected future. As we witness this cycling revolution, Nu Cycle stands as a testament to the power of forward-thinking design and technology in transforming the way we ride and perceive bicycles.

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