AUTOMATIC CHAIN LEVEL ADJUSTOR

IN BIKE

A PROJECT REPORT

PREM. M **(927622BME064)**
PRATHAP. PE **(927622BME062)**
MUKESHKUMAR.K **(927622BME313)**

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNAUNIVERSITY: CHENNAI 600025

MAY 2024

AUTOMATIC CHAIN LEVEL ADJUSTOR

IN BIKE

A MINOR PROJECT REPORT

PREM. M (927622BME064)
PRATHAP. PE (927622BME062)
MUKESHKUMAR.K (927622BME313)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNA UNIVERSITY: CHENNAI 600025

MAY 2024

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

BONAFIDE CERTIFICATE

Certified that this project report "**AUTOMATIC CHAIN LEVEL ADJUSTOR IN BIKE**" is the bonafide work of **"PREM M (927622BME064), PRATHAP PE (927622BME062), MUKESHKUMAR.K (927622BME313)"** who carried out the project work during the academic year 2023 – 2024 under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE
Dr. T. NITHYANANDAM, M.E., Ph.D.

SUPERVISOR

Department of Mechanical Engineering,

M. Kumarasamy College of Engineering,

Thalavapalayam, Karur - 639113.

SIGNATURE
Dr. M. Loganathan M.E., Ph.D.,

HEAD OF THE DEPARTMENT

Department of Mechanical Engineering,

M. Kumarasamy College of Engineering,

Thalavapalayam, Karur - 639113.

This project report has been submitted for the end semester project viva voce Examination held on _____

INTERNAL EXAMINER EXTERNAL EXAMINER

DECLARATION

We affirm that the Project titled **"AUTOMATIC CHAIN LEVEL ADJUSTOR IN BIKE"** being submitted in partial fulfillment off or the End Semester Examination of **B.E. MECHANICAL ENGINEERING**, is the original work carried out by us. It has not formed the part of any other project or dissertation on the basis of which a degree or award wasconferred on an earlier occasion on this or any other candidate.

Student Name	Signature
1. PREM M	----------
2. PRATHAP PE	----------
3. MUKESHKUMAR K	----------

Name and signature of the supervisor with date

ACKNOWLEDGEMENT

Our sincere thanks to **Thiru. M. Kumarasamy Founder, and Dr. K. Ramakrishnan B.E,Chairman** of **M. Kumarasamy College of Engineering** for providing extra ordinary infrastructure, which helped us to complete the Minor project in time.

It is a great privilege for us to express our gratitude to our esteemed **Principal Dr. B.S. Murugan M.Tech., Ph.D.,** for providing us right ambiance for carrying out the project work.

We would like to thank our **Head of the Department Dr. M. Loganathan M.E., Ph.D., Department of Mechanical Engineering,** for her unwavering moralsupport throughout the evolution of the project.

We would like to express my deep gratitude to our Minor Project Guide **Dr. T. Nithyanantham M.E., Ph.D., Assistant Professor, Department of Mechanical Engineering,** for his constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We offer our whole hearted thanks to our Minor project coordinator **Mr. S. Saravana Kumar M.Tech,(Ph.D), Assistant Professor, Department of Mechanical Engineering,** for his constant encouragement, kind co-operation and valuable suggestionsfor making our project a success.

We are glad to thank all the **Faculty Members** of **Department of Mechanical Engineering** for extending a warm helping hand and valuable suggestions throughout the project.

Words are boundless to thank **Our Parents and Friends** for their constant encouragement to complete this Minor project successfully.

INSTITUTIONVISION&MISSION

Vision

- To emerge as a leader among the top institutions in the field of technical education.

Mission

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT VISION, MISSION, PEO, PO & PSO

Vision

- To create globally recognized competent Mechanical engineers to work in multi-cultural environment.

Mission

- To impart quality education in the field of mechanical engineering and to enhance their skills, to pursue careers or enter into higher education in their area-of-interest.
- To establish a learner-centric atmosphere along with state-of-the-art research facility.
- To make collaboration with industries, distinguished research institution and to become a center of excellence

PROGRAMEDUCATIONALOBJECTIVES(PEOS)

The graduates of Mechanical Engineering will be able to

- PEO1: Graduates of the program will accommodate insightful information of engineering principles necessary for the applications of engineering.
- PEO2: Graduates of the program will acquire knowledge of recent trends in technology and solve problem in industry.
- PEO3: Graduates of the program will have practical experience and interpersonal skills to work both in local and international environments.
- PEO4: Graduates of the program will possess creative professionalism, understand their ethical responsibility and committed towards society.

PROGRAM OUTCOMES

The following are the Program Outcomes of Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life - long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life -long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The following are the Program Specific Outcomes of Engineering Graduates:
The students will demonstrate the abilities

1. **Real world application:** To comprehend, analyze, design and develop innovative products and provide solutions for the real-life problems.
2. **Multi-disciplinary areas:** To work collaboratively on multi-disciplinary areas and make quality projects.
3. **Research oriented innovative ideas and methods:** To adopt modern tools, mathematical, scientific and engineering fundamentals required to solve industrial and societal problems.

Course Outcomes	At the end of this course, learners will be able to:	**Knowledge Level**
CO – 1	Identify the issues and challenges related to industry, society and environment.	Apply
CO – 2	Describe the identified problem and formulate the possible solutions.	Apply
CO -3	Design / Fabricate new experimental set up/devices to provide solutions for the identified problems	Analyse
CO -4	Prepare a detailed report describing the project outcome	Apply
CO – 5	Communicate outcome of the project and defend by making an effective oral presentation.	Apply

MAPPING OF PO & PSO WITH THE PROJECT OUTCOME

Course Outcomes	**Program Outcomes**												**Program Specific Outcomes**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO - 1	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 2	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 3	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 4	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 5	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3

TABLE OF CONTENTS

ABSTRACT

The present invention discloses an automatic chain level adjustor in bike. The safety system comprises an adjusting of the chain level in bike. The camera is positioned at the vehicle for capturing visual information. An AI module is provided for acting as the decision-making system by analyzing the information to determine the optimum frequency and intensity. A micro-controller is provided for acting as the decision-making system by analyzing the information to determine the optimum. A spring controller is used to adjust and control the height of the chain tensioner. A chain tensioner is used to adjust the level of chain by the spring and spring controller which controlled by microcontroller and AI module. The safety system comprises an adjusting the chain level in bike. The safety system for adjusting the chain level in bike for automobile industry as, wherein the microcontroller executes the real time trained instructions for adjusting chain level. The system can be located at near of chain at vehicle, more specifically rear side of the Chain can be installation is providing the maximum safety ratio. To ensure the safety for driver by adjusting the level of chain.

CHAPTER –1

INTRODUCTION

The various embodiment of the present invention discloses an automatic chain level adjustor in bike. The safety system comprises an adjusting of the chain level in bike. According to an embodiment, the AI module is provided for acting as the decision-making sub system by analyzing the information to determine the level of the chain using camera. The camera is positioned at the vehicle for capturing visual information. The micro-controller system is configured to enable the optimum performance in various bikes and different conditions.

According to an embodiment, the micro-controller is providing for acting as the component to control the system by analyzing the information to control the spring controller and used as safety system. Adjust slackness in the chain to enable continuous and proper chain operation with the help of spring which is attached at the bottom and controlled by spring controller. Excessive chain sag can cause vibration and excessive noise and prevent the chain from properly engaging the sprocket, which prevents the chain from operating smoothly. Spring control is a controlling force that opposes the action of deflecting force, that opposes the action of deflecting force, and the pointer will rest in a position.

These and other aspects of the embodiments herein will be better appreciated and understood when considered in conjunction with the following description and the

accompanying drawings. It should be understood, however, that the following descriptions, while indicating preferred embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments herein without departing from the spirit thereof, and the embodiments herein include all such modifications.

1.1 DESCRIPTION

Camera

The camera (1) capturing visual information, the visual information may comprise the chain level of the bike. The system also comprises an AI module.

AI-Module

The integration of this system with an advanced AI module (2) forms a robust technological solution that leverages real-time data from the level of chain in bike. The real time analysis of chain level scenarios is a key feature, as it enables the AI module (2) to make informed decisions regarding adjusting the level of the chain.

Microcontroller

The micro-controller (3) serves as a dynamic decision-making entity, constantly analyzing the level of chain to adapt and respond in real time. The procedure approach to safety is a significant advancement in industry technology, moving beyond passive safety measures to actively prevent accidents by the level of chain. The data utilized by the micro-controller includes various parameters in the adjusting process.

Spring Controller

The Spring Controller (4) allows the rider to adjust the stiffness or softness of the suspension springs, which directly impacts how the bike absorbs shocks and vibrations. In motorcycles, this adjustment helps to tailor the suspension for different types of riding, such as off-roading, street riding, or racing. By adjusting the preload, compression, and

rebound of the springs, the rider can fine-tune the bike's handling and comfort.

Chain Tensioner

A chain tensioner (5) on a bike is a mechanical device used to maintain the correct tension in the bike chain with help of spring which is attached in the chain tensioner we can adjust the level of chain by analyzing and using the camera and AI module. It helps ensure that the chain remains properly tightened, preventing it from slipping, jumping, or coming off the gears during riding. Chain tensioners are especially common on single-speed bikes, fixed-gear bikes (fixies), and some bikes with internally geared hubs where there is no derailleur to adjust chain tension automatically.

1.2 PROBLEM STATEMENT

The Present invention relates to the field of commercial uses such as Automobile and its safety system. More specifically, the present invention related to safety system for preventing the chain level of the bike.

1.3 OBJECTIVES

The primary objective of the present invention is to introduce an automatic chain level adjustor in bike.

Another objective of the present invention is to adjust the chain level of the bike by the AI module.

Yet another objective of the present invention is to provide a safety system at an affordable price for controlling the accidents.

These and other objective and advantages of the present invention will become readily apparent from the following detailed description taken in conjunction with the accompanying drawings.

CHAPTER 2

PROJECT METHODOLOGY

2.1 EXISTING PROBLEM

There is a loss of life by failure of chain in the bike. The inaccuracy of uses and condition of chain in the bike. When the chain was Cutten during the drive it leads to cause accidents or it may loss of life of the people who drive the vehicle. For overcoming these issues few preventing systems have been introduced in the market. But, the reasons of implementation failures are creating more dangerous accidents again and again. Thus, there is a need to introduce a system for preventing to adjust the level of chain in the bike according to the need.

The present invention will overcome the aforementioned problems, limitations and disadvantages in an effective manner

2.2 PROPOSED SOLUTION

This device would use a spring-loaded mechanism to automatically maintain the optimal chain tension. AI-module and microcontroller could monitor the chain's tension in real-time and make adjustments as needed, ensuring smooth and safe operation without manual intervention. This would enhance the bike's performance, reduce wear and tear on the chain and sprockets, and improve overall riding comfort.

2.3 MAJOR COMPONENTS

1)Camera

2)AI-Module

3)Micro Controller

4)Spring Controller

5)Chain Tensioner

CAMERA

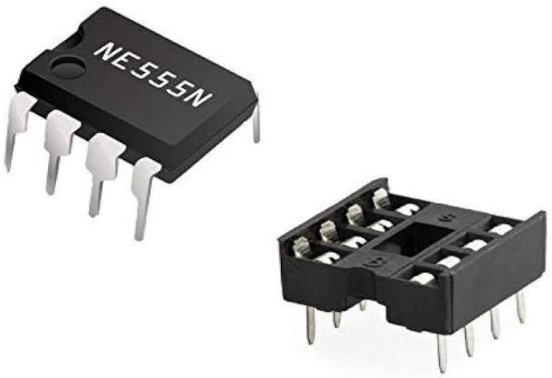
The camera (1) capturing visual information, the visual information may comprise the chain level of the bike. The system also comprises an AI module.

AI-MODULE

The AI system/module serves as a decision-making entity, constantly analyzing the level chain to adapt and respond in real time. The data utilized by the AI system/module includes various parameters critical to the level chain. By continuously monitoring and, the AI system can make precise decisions regarding the level of chain.

In an aspect, the distance is another pivotal parameter considered in the real-time analysis. The AI module/system (2) evaluates the distance between chain determine the appropriate strength and level of chain. This ensures that the safety mechanism is tailored to the specific conditions of chain level, providing a customized response for optimal safety.

MICRO CONTROLLER



The micro-controller (3) serves as a dynamic decision-making entity, constantly analysing the level of chain to adapt and respond in real time. The procedure approach to safety is a significant advancement in industry technology, moving beyond passive safety measures to actively prevent accidents by the level of chain. The data utilized by the micro-controller includes various parameters in the adjusting process. By continuously monitoring and analyzing the level of the chain, the micro-controller can make process decision regarding the adjusting the level of chain. The micro-controller is acting as the controller system by analyzing the information.

SPRING CONTROLLER

The Spring Controller (4) allows the rider to adjust the stiffness or softness of the suspension springs, which directly impacts how the bike absorbs shocks and vibrations. In motorcycles, this adjustment helps to tailor the suspension for different types of riding, such as off-roading, street riding, or racing. By adjusting the preload, compression, and rebound of the springs, the rider can fine-tune the bike's handling and comfort.

CHAIN TENSIONER

A chain tensioner (5) on a bike is a mechanical device used to maintain the correct tension in the bike chain with help of spring which is attached in the chain tensioner we can adjust the level of chain by analyzing and using the camera and AI module. It helps ensure that the chain remains properly tightened, preventing it from slipping, jumping, or coming off the gears during riding. Chain tensioners are especially common on single-speed bikes, fixed-gear bikes (fixies), and some bikes with internally geared hubs where there is no derailleur to adjust chain tension automatically.

CHAPTER 3

CONSTRUCTION AND WORKING

3.1 CONSTRUCTION

- The camera (1) capturing visual information, the visual information may comprise the chain level of the bike. The system also comprises an AI module.

- The AI system/module serves as a decision-making entity, constantly analyzing the level chain to adapt and respond in real time. The data utilized by the AI system/module includes various parameters critical to the level chain. By continuously monitoring and, the AI system can make precise decisions regarding the level of chain.
- The micro-controller (3) serves as a dynamic decision-making entity, constantly analysing the level of chain to adapt and respond in real time. The procedure approach to safety is a significant advancement in industry technology, moving beyond passive safety measures to actively prevent accidents by the level of chain.
- The Spring Controller (4) allows the rider to adjust the stiffness or softness of the suspension springs, which directly impacts how the bike absorbs shocks and vibrations. In motorcycles, this adjustment helps to tailor the suspension for different types of riding, such as off-roading, street riding, or racing.

3.2 WORKING

The automatic chain level adjuster (ACLA) in motorcycles is a highly innovative component designed to simplify the maintenance of the bike's chain drive system. The purpose of an automatic chain level adjuster is to maintain proper chain tension without the rider needing to manually adjust it. This system ensures that the chain remains at the correct tension for optimal performance, minimizing wear, preventing chain slippage, and prolonging the lifespan of both the chain and sprockets. To better understand how an automatic chain level adjuster functions, it's essential to explore the overall chain system, the types of adjusters used, their key components, and the benefits of such systems in motorcycles.

In a motorcycle, the chain drive system is responsible for transferring power from the engine to the rear wheel. The chain consists of interconnected metal links and is subjected to high forces, leading to stretching or elongation over time. This stretching can affect performance, cause uneven power transmission, or even damage the sprockets. Therefore, regular adjustment of the chain tension is crucial to the bike’s overall efficiency and longevity.

3.3 ADVANTAGES

Reduced Maintenance Effort: The primary advantage of an automatic chain level adjuster is the reduced need for manual maintenance. Riders no longer need to regularly check or adjust the chain tension themselves, saving time and effort.

Improved Chain and Sprocket Longevity: By maintaining the correct chain tension, the ACLA reduces the wear and tear on both the chain and the sprockets. This leads to longer component life, reducing the frequency and cost of replacements.

Optimal Performance: A properly tensioned chain ensures smooth power transmission from the engine to the rear wheel. This results in better acceleration, smoother rides, and improved overall performance.

Prevention of Over-Tensioning or Under-Tensioning: The automatic chain adjuster ensures that the chain is neither too loose nor too tight. This reduces the risk of damaging the chain or sprockets, which can occur from improper manual adjustments.

3.4 DISADVANTAGES

Complexity: Automatic systems are more complex than manual ones, making them harder to repair and maintain.

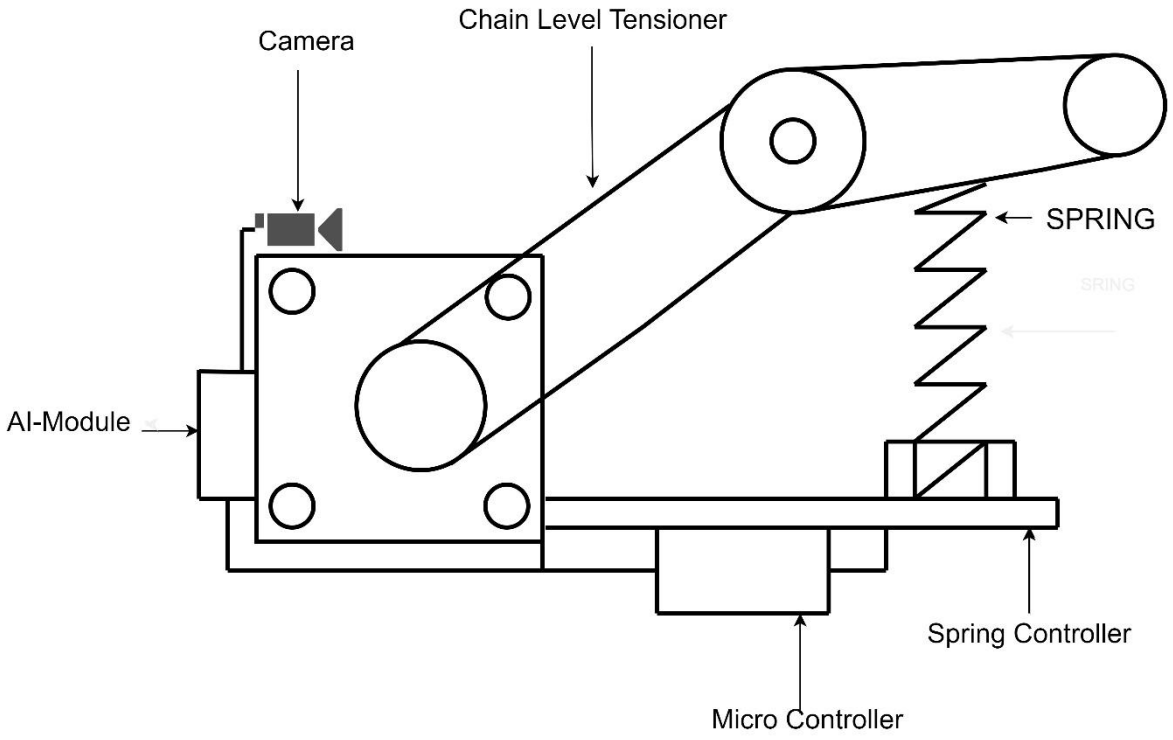
Cost: They tend to be more expensive due to the additional components and technology involved.

Weight: These systems can add extra weight to the bike, affecting performance and handling.

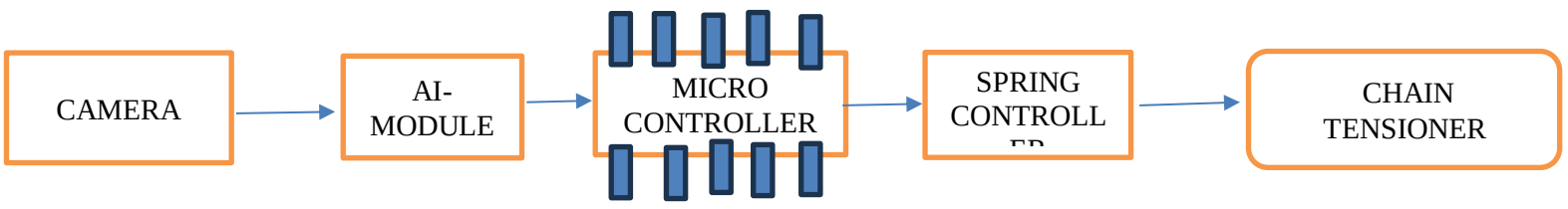
Battery Dependency: If the system is electronic, it relies on batteries, which need regular charging and can run out unexpectedly.

CHAPTER-4

4.1 PROJECT PHOTO



4.2 CIRCUIT DIAGRAM



CHAPTER 5

RESULT AND DISCUSSIONS

.

There is a loss of life by failure of chain in the bike. The inaccuracy of uses and condition of chain in the bike. When the chain was Cutten during the drive it leads to cause accidents or it may loss of life of the people who drive the vehicle. For overcoming these issues few preventing systems have been introduced in the market. But, the reasons of implementation failures are creating more dangerous accidents again and again. Thus, there is a need to introduce a system for preventing to adjust the level of chain in the bike according to the need.

The present invention will overcome the aforementioned problems, limitations and disadvantages in an effective manner

CHAPTER 6

CONCLUSION

An automatic chain level adjustor in bikes offers the benefit of maintaining optimal chain tension without manual intervention, leading to improved performance, reduced wear and tear, and enhanced riding comfort. However, this advanced system comes with challenges such as increased complexity, cost, potential for failure, added weight, and battery dependency. Despite these drawbacks, the innovation in automatic adjustors represents a significant step towards smarter and more efficient biking solutions.

CHAPTER 7

COST ESTIMATION

S.NO	COMPONENTDESCRIPTION	QUATITY	COST
1	CAMERA	1	3000
2	AI-MODULE	1	1000
3	MICRO CONTROLLER	1	1000
4	SPRING CONTROLLER	1	1000
5	CHAIN TENSIONER	1	1000
		TOTAL	7000