

Arduino Based Obstacle Avoiding Surface Cleaning Device

Prof. Durgesh Borse

Kalpesh Mandlik

Akshay Nilak

Saurabh wagh

Department of Mechanical Engineering ,School of Engineering & Technology,
Sandip University, Nashik

Abstract

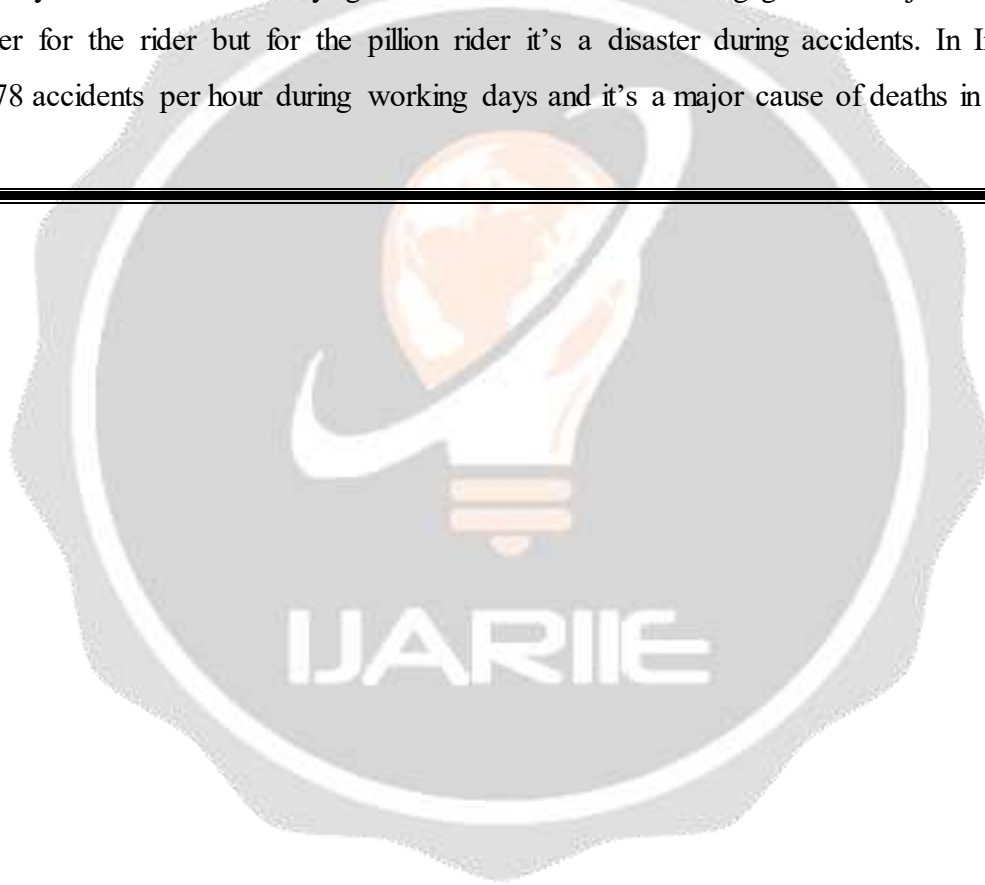
This paper is carried out to design and develop a footrest or the footboard for the pillion passenger. This footboard is designed especially for moped pillion passengers and children. The possibility of injury to the children's is high in this case during these accidents. In India many parents use the vehicle for sending and fetching their children to school every day. Accidents in two-wheeler vehicles can be fatal. The reason which increases the risk of accidents is people forgetting to lift up the side stand. Also it is very common for the pillion rider to forget to unlock the footrest before taking his seat and trying to do that while the vehicle is in motion is a risky affair as it disturbs the balance of the vehicle. If the pillion doesn't use the footrest the chances of accidents get increased due to unbalancing of the vehicle. The main objective of this paper is countering these problems. Footrest is very important part in mopeds as it helps to balance the vehicle during while the pillion passenger is also travelling on the vehicle.

Mechanically operated mechanism which will do the job of locking and unlocking of footrest This is mechanical link based paper which works on 4 bar chain mechanism which also include the cam profile for locking and opening of the footrest and the clutch wire which is used to engage and disengage the footrest. This paper is developed for safety of the pillion passenger on moped vehicles and safety of children's as the children's are vulnerable, To reduce or minimize human effort for opening the footboard, To reduce this risk and decrease this percentage of the accidents. And this paper is expected to reduce the risk of injury during riding the vehicles

Keywords: *obstacle, IOT, Sensors, Actuators, Arduino, Microcontroller*

Introduction

In India, the number of vehicles is too high. Which include two wheelers, four wheelers, eight wheelers and so on. In which the number of two wheelers user is huge. In India, bike manufacturers are keen to produce the best mileage and performance in lower cc engines. But for safety purposes they generally stick to old ways of pillion support and uncomfortable seating angles in semi-sports bike. Most of the people in India opt to buy lower cc engines because they are affordable with low maintenance and low service charges. But to keep the bike to best of its performance is still not the best quality in an automobile for people to buy. A comfortable ride with proper rider safety is the main quality what buyers search before buying a bike in India. The front leg guard is major safety feature on a two-wheeler for the rider but for the pillion rider it's a disaster during accidents. In India there are more than 278 accidents per hour during working days and it's a major cause of deaths in India.



According to the World Health Organization and the United Nations Children's Fund, children of age between 3-12 are rarely spotted on the backs of motorcycles in most of the developed countries, which is contrary to most Southeast Asian countries where children are often spotted on the backs of two-wheeler as pillion rider. There have been many discussions about safety of two-wheeler pillion riders. There have been many discussions about safety of two-wheeler pillion riders. In India hook extensions in many bikes has been seen for the support of the pillion rider, 'saree guard' for women for their safety purposes, 'rear axle ABS system' all are very important safety measures for the pillion rider and there are many advancements in those designs. But there are no advancement in footrest. Like the automation of footrest. Now a days there are many advance bikes are coming in the market but there is no advancement provided in the footrest. Which is also an important part of the bike which helps in stabilizing the vehicle, balancing the vehicle while there is a pillion passenger. Which can benefit the vehicle operator in balancing the vehicle. Two-wheeler with higher cc engine or even lower cc bikes and mopeds which has aerodynamic elevation for pillion section has many problems regarding safety as well vehicle's balance at high speed with pillion riders. Sudden braking, sudden acceleration or jumping of vehicle due to road variation can be dangerous for the pillion rider. Two-wheeler especially motorbikes and scooters have extra safety hook design extension for pillion rider to hold for safety. Sudden braking causes the bike to decelerate. the upper and the lower body of the rider riding the bike will also decelerate. For the pillion rider his/her upper body will not experience the same forces as experienced by the rider. Pillion rider lower body will decelerate with the bike as its contact with the foot of the pillion rider at footrest. To properly balance his/her upper body, the pillion rider has to hold the hook extension provided, or by holding a bike structure or by holding the bike rider. Similarly, in case of acceleration, pillion rider's upper body tends to lean backward. To balance the force again the pillion rider has to hold the hook extension or bike rider or any other bike structure for support. to solve this problem, we have designed this automated footrest.

This paper is related to accessories in the bikes and the moped. The title of the paper itself gives the idea of the paper "The Automated Footrest" for bikes and mopeds. So we are designing a mechanism for the bikes and the mopeds.

Problem Statement

on moped vehicle pillion rider need to bend to operate footrest, due to this action lot of accidents happen. To reduced accidents, we can find one solution. The main goal of our product is to reduced rate of accidents happen due to imbalance of vehicle and add one more safety feature in moped

The Main Objective of this paper is to reduce the stress of pillion rider while sitting on the moped.

Scope

For the footrest there is no automation given in any launched vehicle So there are many chances of giving different kind automations Like mechanically automated footrest, hydraulically operated footrest, pneumatically operated footrest Sensors and actuators operated footrest, etc. Right now it has many options available for modifications. It can be used in all kind of two wheelers who is having pillion passenger. footrest can be made telescopically retractable.

Objective

Primary object of present invention is to provide a device and methodology to provide easy access to opening and closing of foot-rest which is switch operated and the switch is mounted on the handle, which is easily accessible and convenient to use.

Further object of present invention is to avoid damage to the foot-rest when manually (by foot) impacted by unnecessary (high) load to open it. To do so it may also injure leg of people badly.

Objective the main objective is To ease the pillion passenger the footrest can be made automated. When there is a pillion passenger on moped or vehicle there is need of footrest for pillion comfort and the most important thing balance of vehicle.

When there will be no footrest it will be difficult for driver to balance the vehicle and this can cause the accidents and injuries. This is the main objective to decrease the chances of accidents and injuries and to decrease the efforts.

To decrease the accidents chances

To decrease the chances of getting injured

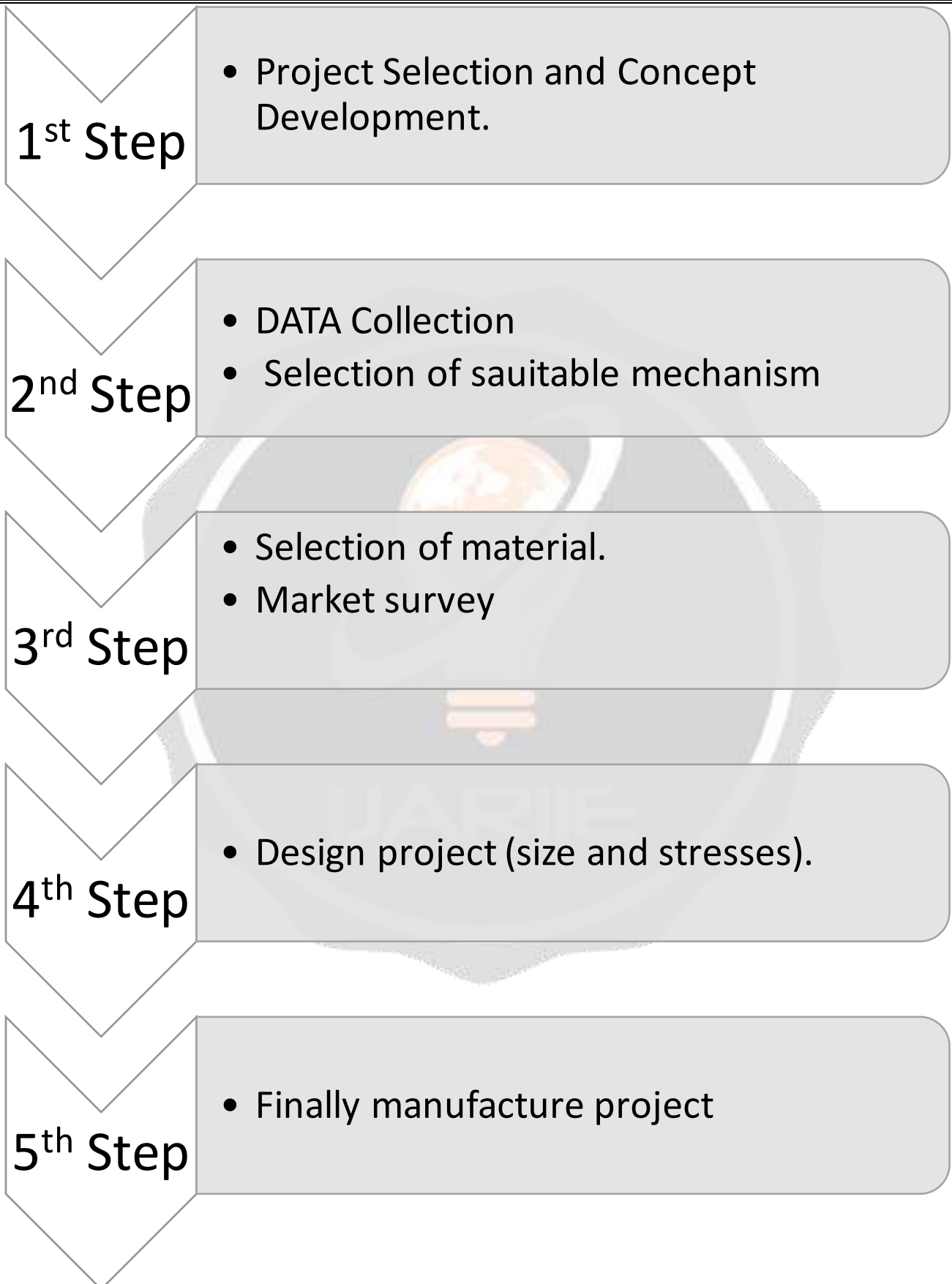
To decrease the intensity of injury during the serious accidents

To decrease the human efforts

To decrease the discomfort of vehicle operator

To give the advancement in vehicle footrest by automizing it.

Methodology of Manufacturing

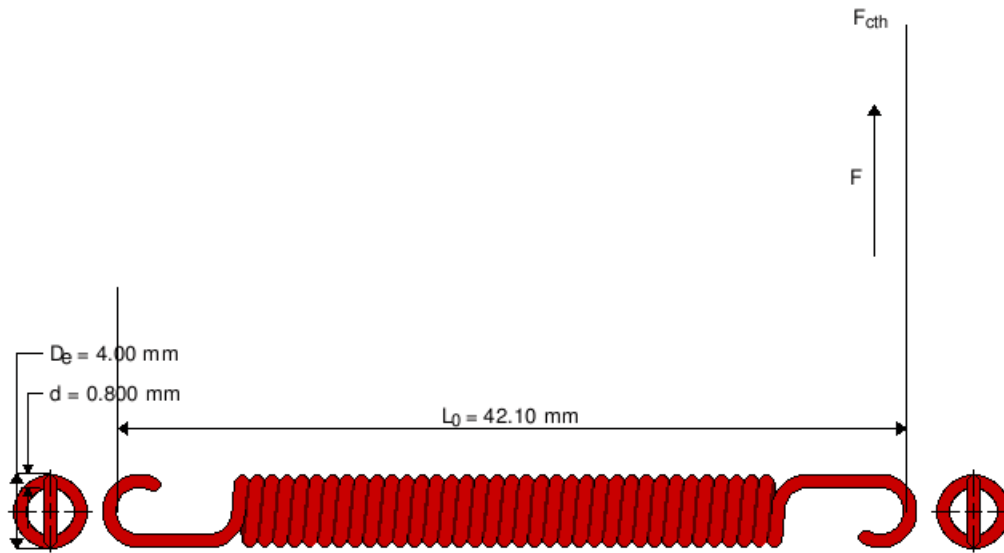


For the paper we started collecting data from internet ,collecting the data about previous research papers previous invention done on for the paper we were looking to do , recent modification done on the paper, the previous patents for the paper we are doing. We searched for the design what kind of design previously used in the patents how many patents are there.

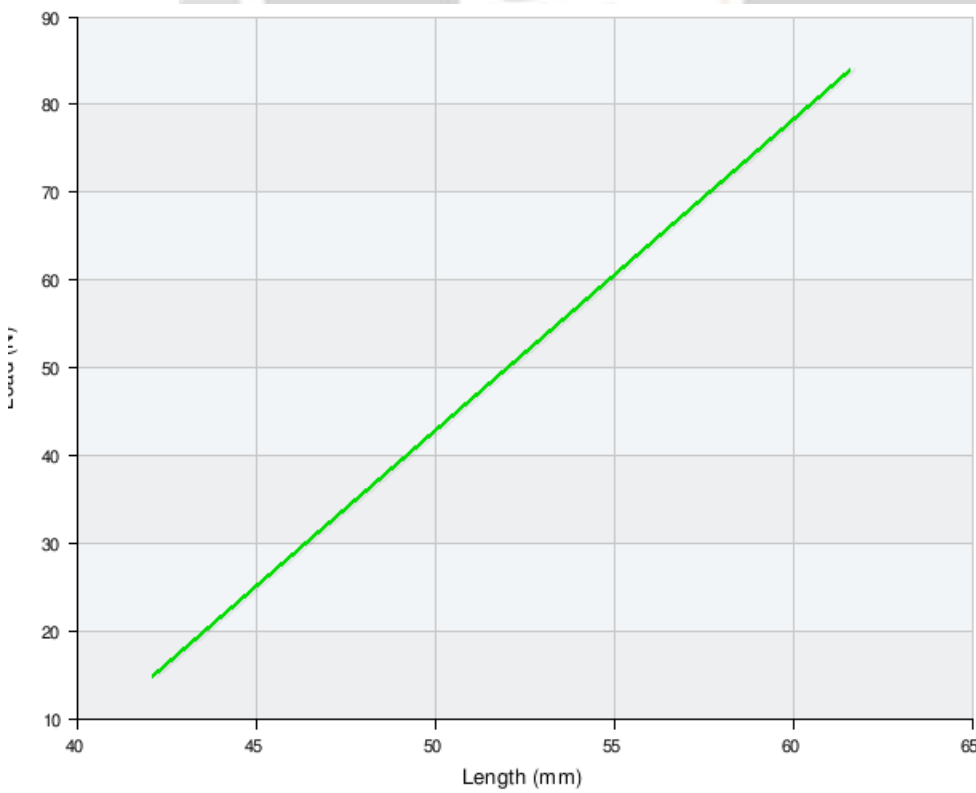
We collected the data designs literature review about the designs models and the paper. We did the literature review about the paper. We collected the designs of the previous paper. We did the research about the paper .There were many designs like sensor operated footrest some were design the footrest which can be telescopic extendable in nature . some use pneumatic cylinders for the extension of footrest but still some of them were needed to be operated manually to open and close the footrest

we got the result that there are not many designs and modifications done n the paper before us and there are many modification can be dine in the paper and can be made more useful than earlier and more useful . which can decrease the efforts of the traveller and can be made more easy ride. Decreasing the accidents chances and making the comfortable ride and easy to balance for the vehicle

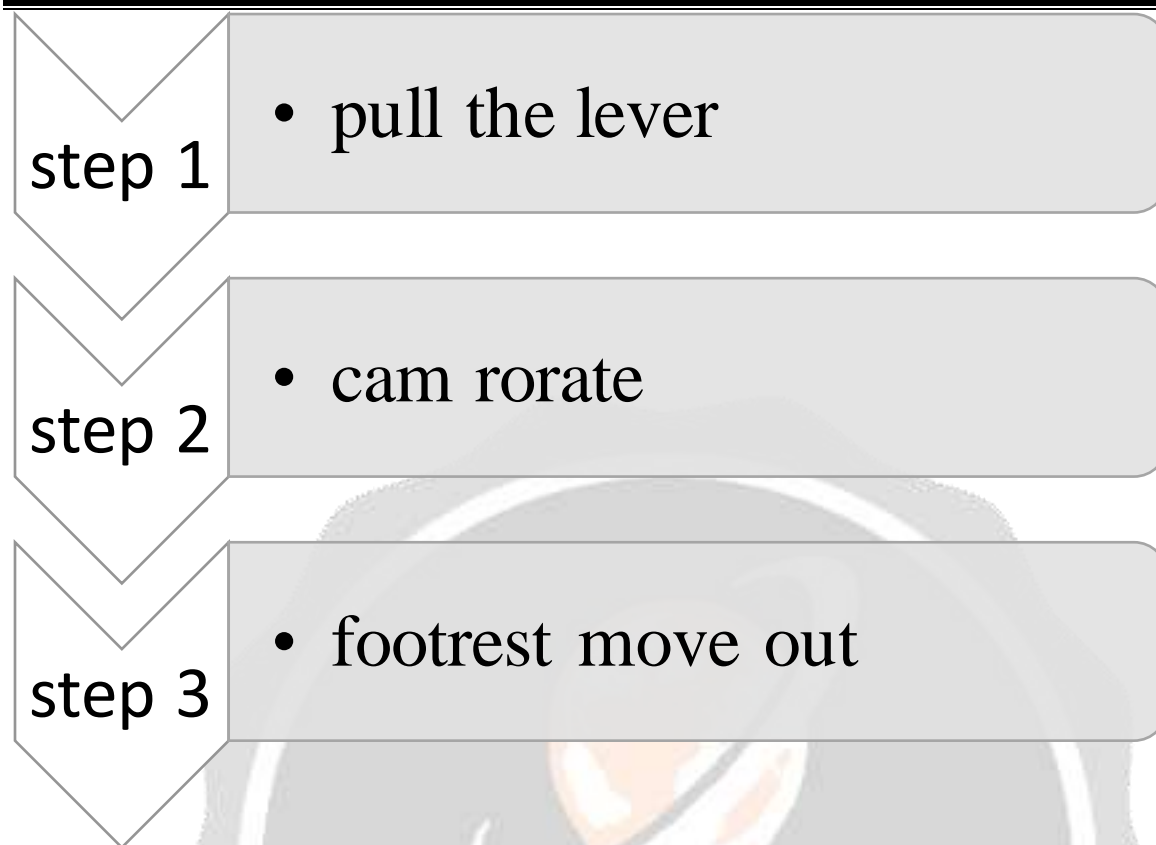




operator.



working paper



Automated footrest is basically inversion of four bar chain and it is developed from watt linkage mechanism, but in this we can fixed shortest link in watt linkage mechanism. In a mechanism we can pivoted cam eccentrically and one side of cam connected with extension spring and other side of cam is connected to brake wire. Extension spring should fix at one end and another free end attached with cam. Brake wire has attached with lever which help us to operate mechanism. Footrest pivoted at one end with the help of nut and bolt assembly and latched with cam as shown in figure.

When operator should pull handle at that time brake wire pull the cam clockwise direction, due to this action of cam footrest should be released because footrest has latched with cam with its initial tension. The initial tension to footrest provided by torsion spring and due to this spring footrest move out after movement of cam. Cam connect with extension spring due to this it retracted to its own position after removal of force from lever.

When pillion rider wants to move inside the footrest. He can directly rotate footrest in side and special design of cam footrest directly latched with cam and footrest lock in side.

CONCLUSION

The Present paper described the development of automated footrest for moped in minimum cost. Before this idea no one moped, manufacturer can manufacture moped with automated footrest. So, we can recognise the need of automated footrest and the proper guidance of paper head and the sincere efforts of our group have lead to the successfully accomplishment of our concerned paper. This is help us to reduced rate of accidents happen due to imbalance of vehicle and to reduce the stress of pillion rider while sitting on the moped dose not required to bend for move out footrest. Our aim is fulfilled to add one more safety feature in moped. The Main aim of this paper is to reduce the stress of pillion rider while sitting on the moped.

References

1. Vishal Srivastava, Tejasvi Gupta, Sourabh Kumar, Vinay Kumar, Javed Rafiq, Satish Kumar Dwivedi, (2014) "Automatic Side Stand", International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249-8958, Volume- 3, Issue-4.
2. Bharaneedharan Muralidharan, Ranjeet Pokharel, (2014) "Automatic Side Stand Retrieve System", Indian Journal of Research (IJR), ISSN: 2250-1991, Volume 3, Issue 2.
3. Suresh. K, Afrin Hewitt, Mohammed Salman (2016)" International Journal of Advanced Research in Management", Architecture, Technology and Engineering (IJARMATE) Vol. 2, Special Issue 6.
4. Majumdar D and Jash T 2015 Challenges of E-Rickshaw as An Alternative form of Public Road Transport System: A Case Study in the State of West Bengal in India. Energy Procedia 79 307-314.
5. Harding S E., Badami, M G., Reynolds, C. and Kandlikar, M 2016 Auto-rickshaws in Indian cities: Public perceptions and operational realities Transport policy 52 143-152.
6. Ejaz S., Iqbal A., Rahman, S.A., Bari F., Ashraf, M., Nawaz, M., Lim, C.W. and Kim, B 2009 Toxicological evaluation of the effects of 2-stroke auto-rickshaw smoke solutions on wound healing. Environmental Toxicology and Pharmacology 27(3) 373-383.
7. Kudryavtsev, Y. and Gavrilenko, A 2020. Modeling of Internal Efforts in a Cargo Beam of the Gantry Crane from the Cargo Cart MS&E 753(4) 042076.
8. E N Da C Andrade. 1930 The viscosity of liquids Nature 125 (3148) 309–310.
9. II Angle, M Gerald, et al 2002 Aerodynamic drag reduction of a racing motorcycle through vortex generation 58 1105-1108
10. Palanivendhan, M., Wadhawan, M. and Selvagandhi, R 2015. Upper-limb shape memory alloy orthosis for restoration or improvement of basic hand functions Indian J. Sci. and Tech 8 795-799
11. Federico Cheli et al 2011 Driver's movements influence on the lateral dynamic of a sport motorbike 19th Mediterranean Conference on Control & Automation 916–921.

12. Mohan D Rao. 2003 Recent applications of viscoelastic damping for noise control in automobiles and commercial airplanes” Journal of Sound and Vibration 262 457–474.
13. N Shroff et al. 2014 Safety concerns and design challenges of side-saddle pillion riders of motorized two-wheelers in India: A case study designing a saree guard and footrest Journal of 1– 13.

