Design and Fabrication of Electric Bicycle

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Abstract
The bicycle has gone from being an unfashionable amusing creation to a less adulterating means of transport and a compact, ultra-light individual movement contrivance. This is how electrical bicycles will be used as the column that could livelihood specific public carriage in large municipalities worldwide.The dispassionate of this document is to detect how worldwide examination on the electric bicycle is being established, and, especially, around which systematic provinces is it bunched, to finally categorize the main trends in the pitches. This study has been carried out constructed on the Scopus catalogue, where all the journals related to the topic of the electric bicycle have been analyzed up to the year 2017.Consequently, exploration on the global research trends of this topic was conducted. Its evolution over time shows that since 2008 the growth of publications is much higher than in the former historical. The main nations are China and the USA, and it can be conditional that there are two chief development countries with high environmental responsiveness, which also have a large populace and that the electric bicycle is a suitable and workable form of transportation. The keyword examination shows that the fundamental theme is electrical, then battery and motor opinion out. A communal uncovering was applied to detect the six foremost collections of this research, mostly committed to the following topics: Transportation–Environment, Electrical Engineering, Safety, Batteries, Sporting Goods–Urban Planning, and Mechanical Engineering. This document shows that universal research movements about the electric bicycle are increasing, and that it should be well-thought-out a means of workable urban devolution and will subsequently contribute to energy good and workable energy.

Introduction

An electric bicycle is a type of electric vehicle based on a traditional bicycle to which an electric motor has been added to run the bicycle. Bicycle is an ecological and urban means of transport and its source of energy is a battery, which is a Li-Ion Battery. As per current situation Electric bicycles began to play a more important role because they are economical and simple option for urban transportation problems and had environmental advantages too.

The main advantages of an electric bicycle is that it is economical and environmental. Among the economic recompenses we can find the total cost per kilometer travelled by an electric bicycle (including the energy, purchasing and maintenance).

The batteries of the electric bicycles can be recharged by connecting them to a electric power source or by pedaling with some gears arrangement to recharge the battery. A typical electric bicycle takes almost 6–8 h to charge the battery fully. And has a range of travel of 35 to 50 km at a speed of about 20 km/hr to 25km/hr depends upon the rider weight.

This means that, with a single battery charge, it would be enough to go to work, visit friends, and return home as per person normal living life, since statistics show that about half of the journeys and procedures of a ordinary urban person are conceded out within a distance of 15 km from his/her house, therefore within the reach of these bicycles .

An environmental point of opinion, for petrol car consumption in urban areas, the productions are: HC (Hydrocarbons) 3.57 g/km, CO 3.15 g/km, CO2 1.82 g/km, and NOx 2.29 g/km. Therefore, the electric bicycle, as an unconventional means of transport to the car, shows that for every 100 km an usual average of 8.5 L of gasoline is saved, and this pollution would be avoided. The electric bicycle as a new form of transport

has led to a new approach to mobility, especially in cities. Countries with large populations and countries that are concerned about the environment.
The research on the electric bicycle is comparatively new, but today, not one person clearly knows where the efforts are being concentrated, nor what the main points of interest of the scientific community are. The objective of this manuscript is to detect how the worldwide research of the electric bicycle is being developed, and, especially around which scientific domains it is clustered.
Like many other countries where agriculture is the main activity, biomass and other non – commercial fuels constitute around 40% of energy requirements in India. Around 85.49% of Indian villages are electrified. People use bicycles as the main intermediate of transportation in villages. In totaling in cities, where maximum people use workout bikes, the energy can be effectively used to power electronic gadgets, which require fewer power.

Literature review

The higher price of EVs could contain EV embracing. Other barriers for embracing of EVs initiate were the non-availability of EVs and lack of EV models. Literature shows that the lack of knowledge and unqualified car dealership may discourage EV adoption .And here come the idea that how the availability of Electric vehicles get available in large scale, So in case of Electric bicycle the normal conventional Bicycle is get converted in to the Electric Bicycle which directly reduce the cost of the Electric Bicycle and cost reduction will result in the adoption of the electric vehicles technology in a larger scale. As in most of the cases people have old bicycle which may get converted into electric Bicycle with certain changes.

As electric Bicycle uses battery which help to run the motor of the bicycle which give range of 30 to 50 Km on a single charge with a speed of 20km/h to 25km/h and to full charge the battery takes 6 to 8 hours and if we compare it with Fuel powered vehicles like Bike, Car, Etc the electric bicycle directly reduce the fuel cost and result in big saving of fuels and money also.

	Cycle(inRupees)	Motorbike	car
cost	20,000	50,000	5,00,000
20-25 km daily running cost	2	40	150
Monthly running cost	60	1200	4500
Yearly running cost	720		60,000
Maintenance cost every 3 month	150	3000	5000
Maintenance cost Yearly	600	8000	2000
Insurance renewal cost	0	2000	12000
Yearly Expenses	1320	28,400	85,000

Table.:Expenses

Objective Of Research Work

The project aim are directed towards E-bicycles market uptake and promotion of policies that stimulate the usage of E-bicycles in urban transport. Therefore, E-bicycles aims for a change in behavior of target groups in urban areas manifested in their decision to replace their conventionally fuelled vehicles with E- bicycles. Pilots amongst aim groups will not only help the project to achieve its objectives, but as well, enable the demonstration of measurable effects in terms of CO2 emission reduction and energy savings by inclusion of E-bicycles in urban transport.

Overall, by the actions predicted by E-bicycles we hope to shift urban delivery transport from fossil fuel delivery vehicles toward E-bicycles vehicles, and in that way not only to reduce noise and pollution in urban ranges, but as well to reduce crowding, save energy and to create new market openings for local expensive.

Experimental/Project work Methodology:

Main focus of the project is to develop a low cost Electric bicycle as compared to Electric Bicycle available in the market and to achieve this, The cycle is fabricated as simple as possible.

Firstly the old cycle frame is used, And a metal box is fabricated inside the frame of the cycle body, The metal box is made to keep the battery, Controller and the other wiring safe from mechanical damage which will increase the safety of the cycle and increase the life of the Electric and Electronic components used to make Electric Bicycle.

The main power source of the electric Bicycle is battery which is a lithium ion battery made by using a numbers of lithium ion cells by connecting cells in series and parallel combination to achieve the targeted voltage and current ratting which is used to power up the components of the cycle like controller, Motor, Light, Horn, etc.

Components

1.Electric hub motor

2. Li-ion Battery

3.Bms(battery management system)

4.Charger

5. Controller

6.Wired cyclocomputer

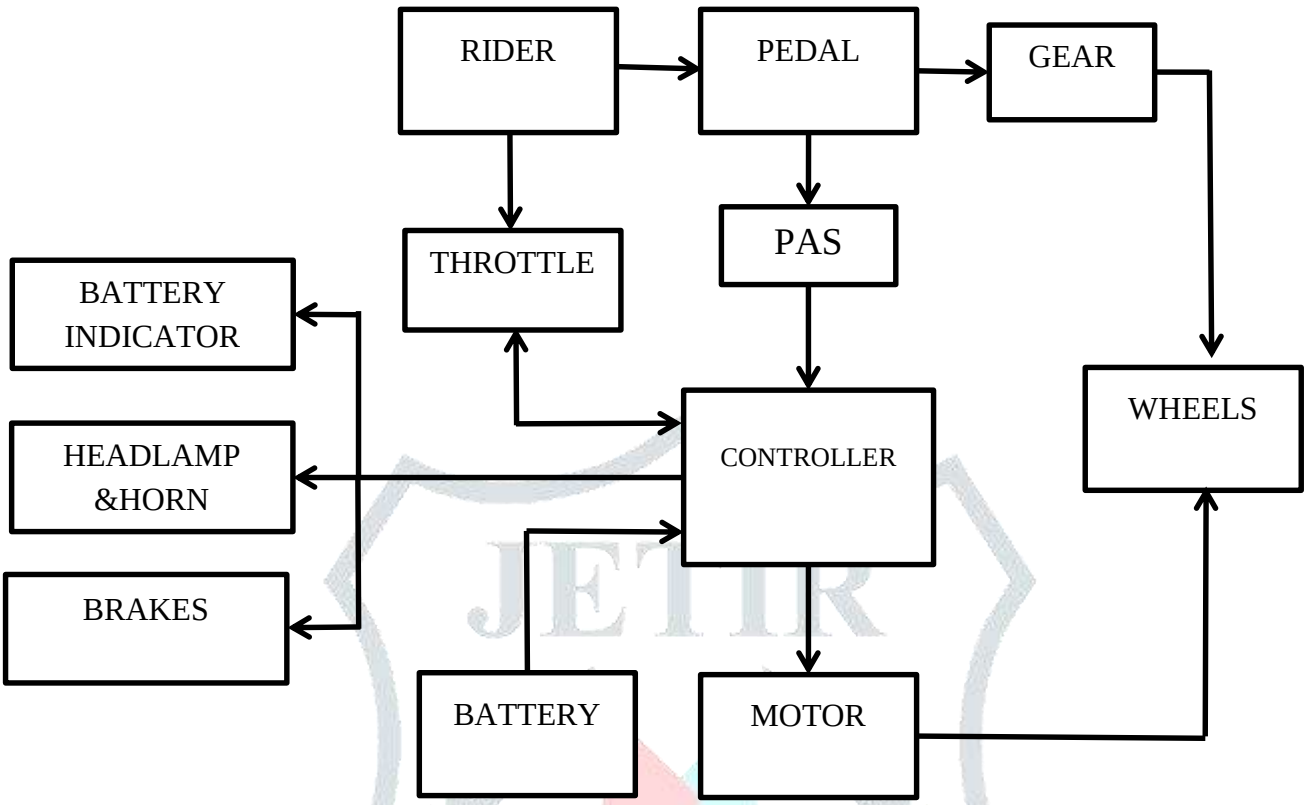
7.PAS(paddle assist sensor)

8.Throttle,Battery Indicator And Lock

9.Headlight and horn

10.Braking system

Working :-



Block diagram

Starting of system of e-bicycle:

As per working concerned the e-bicycle is working on the dc electrical supply,which is supplied by the highly powered 36 v lithium ion battery which is very easy to use and provide long lasting supply without any interruption of power, when the key is applied at the throttle point,the electrical system of the e-bicycle gets activated.After the operation of the keys the controller reacts and control's the supply of the battery as per requirement of the components of e-bicycle.

Future Scope

Calorie measurement: Based on the readings of the accelerometer placed on the cycle, gyroscope and user profile, the calorie measurements will help can measure the amount of calories burned and displayed to the user's mobile phone mounted and connected to the system of calorie measurement device on the handle. The rifer can set the target amount of calories that he/she wants to burn by riding the Bi-cycle by using a pedal . After achieving the target amount of the calorie burned now if rider want then can shift to the Electric riding mode.

Biometric (Fingerprint lock detection system):
Rider can lock/unlock his bicycle using his fingerprints which is feeded in the system. The lock will operate by a separate mini rechargeable battery, such that even if the core battery is discharged, the bike can be locked/unlocked. Multiple bikes with such a feature can be used for bicycle rental based on credentials from select rental stations by using certain card system or ID proof.

GPS tracking:
A GPS/Location tracking system can be placed to get the live location of the Bicycle. The small chip based GPS can be used or a SIM based system for batter accuracy and other use like SMS alert is case of accident or any other emergency situation will give exact location of the the bicycle to found it easily and reach to the rider easily.

Result and discussion

Result :
E-bikes provided new chances for people who would not else consider conventional cycling. Observations of travel behaviour change revealed that e-biking was replacing conventional cycling but was also replacing journeys that would have been made by car. There was also a perception that e-biking has increased, or at least allowed members to maintain, some form of physical activity and had benefited personal well-being. Technological, social and environmental barricades to e-biking were identified. These included weight of bicycle, battery life, purchase price, social stigma and limitations of cycle infrastructure establishment.

Additional research is essential to quantify actual levels of mode changeover and new trip generation among new e-bike owners and the impact of e-biking on sponsoring physical health and mental well being.

Discussion:,

It has been proposed that the greatest opportunities are in rural and sub-urban area of city As per current situation the costing of the fuel is increasing day by day and if we compare fuel combustion to power up the vehicles to Electric Bi-Cycle/Electric Vehicle the source of power to run it is battery the charging cost is very less and also give low running cost.

In low populated area it is very easy to use it in a wide range can can easily adopted will result in awareness towards the electric vehicle and there use.

Conclusion

During this semester the electric bicycle project has provided an opportunity of understanding the full possibility of what it means to Strategy a creation. This chance allowed an primary idea/goal to be understood in a team atmosphere.

The idea developed as examination and several other information on the topic was acquired.

The project evolved and changed as the team restrictions and financial constraints were realized. Due to a lack of funding.

The initial design, of the electric supported bicycle, conceded along with it restrictions that had to be operated around. The limitations were mainly economic in nature. They characterize pieces of apparatus in the design that had to be passed over from other semesters. The restrictions on the apparatus comprised of the battery, motor, and the bicycle frame. The motor bicycle association could not be altered, mostly due to the type of growing on the motor. These limitations unsatisfactory, but did not totally limit the team's competency to proposal a "new" preparation.

Once all restrictions were known, the goals for the design were clearly acknowledged. The goals were divided among the team members. In order to meet the deadline for the ending project, development was supervised weekly and different goals were get used to as needed. With communication between the group, and inflexible effort, the final objective was attained. The proposal project provided the team with valuable involvement in design and teamwork. It allowed the team members to develop skills that will be useful in future goings-on.

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