International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE)

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

Design of Smart Electric Bike Using ATMEGA256

Geeta Panale[1], Priyanka Karad[2], Vaishnavi Mohite[3], Mahesh Waybhat[4]

UG Student, Department of Electrical Engineering, SKN Sinhgad Institute of Technology & Science, Lonavala, Maharashtra, India[1,2,3]

Assistant Professor, Department of Electrical Engineering, SKN Sinhgad Institute of Technology & Science, Lonavala, Maharashtra, India[4]

ABSTRACT: Electric Vehicles (EVs) represent one of the most promising solutions toward sustainable transportation systems. However, some aspects of EV-based mobility pose challenges for a larger market uptake. Biometric systems serves as robust security mechanisms in various domains. Vehicle security is an important issue these days due to the rising number of vehicle thefts. Another issue with vehicles is handling its keys. Here we propose a solution to this problem by using a fingerprint authenticated vehicle starter system. This ignition system is designed using Arduino UNO. The biometric system provides a secure and hassle free way to start/stop the vehicle engine and the system only allows authorized users to start the vehicle. Users must enrol into the system by uploading their fingerprints. It allows multiple users to register as authorized personnel. During the monitoring mode, the system scans for the user's biometrics and the engine gets ignited through authentication

KEYWORDS: BLDC Motor, Controller, Fuel Economy.

I.INTRODUCTION

Like any transformative new technology, electric vehicles create a variety of potent economic development challenges and opportunities. While the electric vehicle market is still at a relatively early stage of development, it is poised to reshape industries and communities the world over. This section provides a quick overview of the potential benefits of electric vehicles so that economic developers can better assess what the evolution of this market will mean to their specific local communities This type of demand represents both a challenge and an opportunity to capitalize on new vehicle technologies, and in the process, reap substantial economic development benefits. In a world where oil is a limited resource, an alternate source of transportation fuel – electricity – is not only a smart investment, but as some would say, it is an inevitable one. Further, the switch to electric vehicles will generate demand for existing jobs and create new jobs as well. As study after study confirms, job growth in electric vehicle industries will outweigh any reduction of jobs in traditional fuel industries, resulting in net job growth. Electric vehicles create additional economic development opportunities by improving quality of life, reducing energy spending, and decreasing reliance on foreign oil. Moreover, electric vehicles are much cheaper to operate than conventional vehicles. Drivers who switch to electric vehicles will have more disposable income to spend in other sectors of the economy, such as housing and services. Spending in these sectors keeps more wealth moving within local economies and will drive job creation in sectors not immediately connected to producing electric vehicles.

Differentiation of electric vehicle:

1. Hybrid Electric Vehicles: Electric vehicles that employ both electric and gas power. The on board battery helps gas to be used more efficiently, while gas recharges the battery.
2. Battery Electric Vehicles (BEVs): Electric vehicles that are solely electricity-powered and have no backup fuel source.
3.Extended-Range Electric Vehicles (EREVs): A vehicle that is powered by battery for a certain number of miles. Gasoline then powers an electric generator for the next several hundred miles of extended-range driving.
4.Plug-In Hybrids (PHEVs): A subset of hybrids that allows batteries to be recharged by plugging into an external electricity source. PEVs can operate on a combination of electricity and gasoline, depending on the vehicle's configuration and power needs.

Impact on job creation & industrial sector:

Greater adoption of PEVs will create rising demand for existing jobs and produce opportunities for new types of jobs as well. Among PEV industries, battery and charging infrastructure will likely generate the most new jobs, while the manufacturing of the PEVs themselves will help strengthen the U.S. Automotive industry. Although there may be

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

some job losses in the oil and conventional car industries, study after study confirms that the result will be net job growth. Table 1 summarizes the findings of various studies on the impact of higher PEV deployment on employment growth. Each study uses a different modelling methodology, and the job creation estimates hinge on different assumptions of future oil prices, policy packages, and PEV costs. Thus, there is a wide range of estimates across these studies.

II.SYSTEM DESIGN

In system design we mainly concentrated on the following parameters:-

1) System selection based on physical constraints

While selecting any machine it must be checked whether it is going to be used in a large-scale industry or a small-scale industry. In our case it is to be used by a small- scale industry. So space is a major constrain. The system is to be very compact so that it can be adjusted to corner of a room. The mechanical design has direct norms with the system design. Hence the foremost job is to control the physical parameters, so that the distinctions obtained after mechanical design can be well fitted into that.

2) Arrangement of Various Components:

Keeping into view the space restrictions the components should be laid such that their easy removal or servicing is possible. Moreover every component should be easily seen none should be hidden. Every possible space is utilized in component arrangements.

3) Components of System:

As already stated the system should be compact enough so that it can be accommodate data corner of a room. All the moving parts should be well closed & compact. A compact system design gives a high weighted structure which is desired.

4) Man Machine Interaction:

The friendliness of a machine with the operator that is operating is an important criterion of design .It is the application of anatomical & psychological principles to solve problems arising from Man–Machine relationship.

5) Chances of Failure

The losses incurred by owner in case of any failure are important criteria of design. Factor safety while doing mechanical design is kept high so that there are less chances of failure. Moreover periodic maintenance is required to keep unit healthy.

6) Servicing Facility

The layout of components should be such that easy servicing is possible. Especially those components which require frequents servicing can be easily disassembled.

7) Scope of Future Improvement

Arrangement should be provided to expand the scope of work in future. Such as to convert the machine motor operated; the system can be easily configured to required one.

8) Height of Machine from Ground

For ease and comfort of operator the height of machine should be properly decided so that he may not get tired during operation.

9) Weight of Machine

The total weight depends upon the selection of material components as well as the dimension of components. A higher weighted machine is difficult in transportation& in case of major break down; it is difficult to take it to workshop because of more weight.

Their

An electric Bike is powered by an electric motor instead of a petrol engine. The electric motor gets energy from a controller, which regulates the amount of power based on the driver's use of an accelerator pedal. The electric car (also known as electric vehicle or EV) uses energy stored in its rechargeable batteries, which are recharged by common household electricity.

Thus an electric vehicle will have three basic components

1. Bike Chassis.
2. Battery
3. 1000 Watt Hub Motor.
4. Biometric Diver Reorganization System.
5. Auto Side stand Retrieval system.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

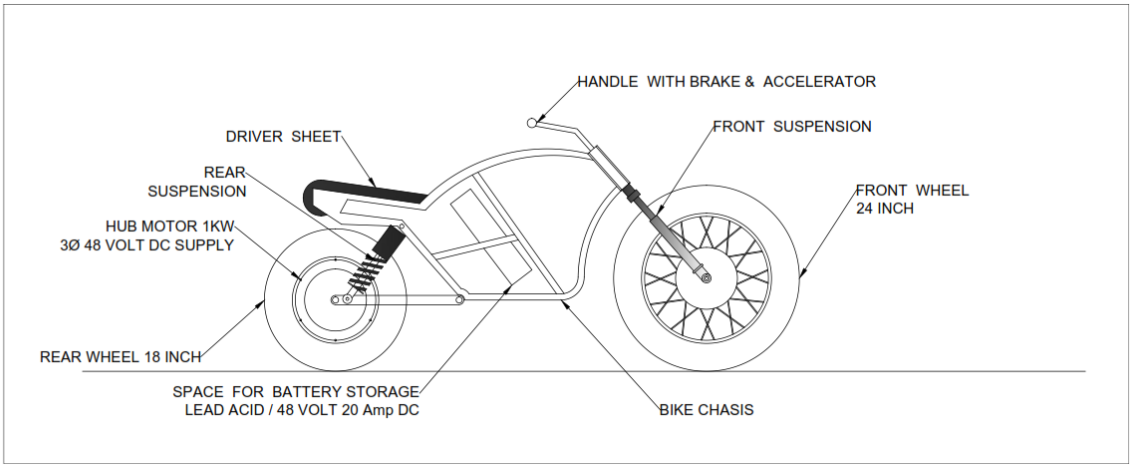

Figure no. 1 : Design of Electric Bike

CAD Design CATIA VR5R20

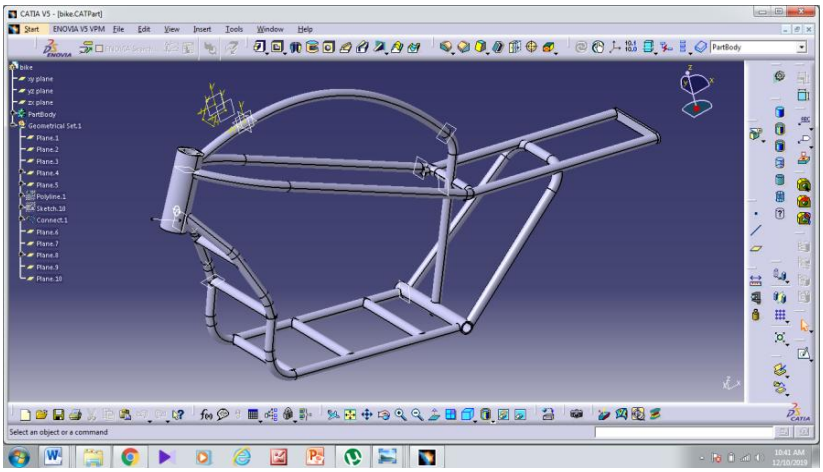

Figure no.2: Basic design of electric bike in CATIA software

Working of biometric system:

The starter circuit of the vehicle is controlled using the Arduino UNO. A fingerprint sensor is coupled with the Arduino UNO for biometric authentication. The MOSFET is the switch which is controlled by the Arduino UNO. The current operation is displayed in the 16x2 LCD display. The starter circuit is initially open. When the user places his finger on the fingerprint sensor, his fingerprint is authenticated. After successful authentication, the Arduino UNO sends a trigger to the MOSFET which closes the starter circuit to start the engine. After successful drive the engine and the Arduino UNO are simultaneously turned off which resets the program in the microcontroller.

III. PROPOSED WORK AND METHODOLOGY

BLOCK DIAGRAM

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus, it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 9, Issue 5, May 2020||

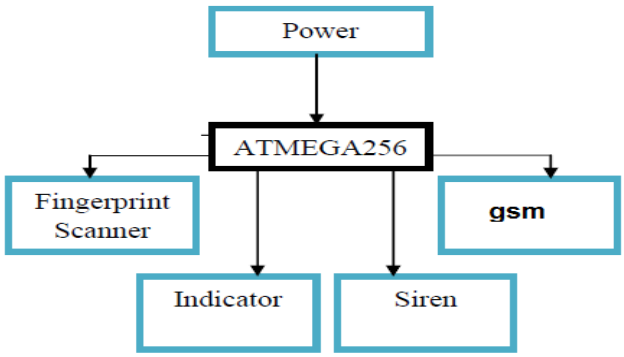

Figure no.3 : Block diagram

PHASE 1: DATA COLLECTION

Data collection phase involves the collection of reference material for project concept.

PHASE 2: SYSTEM DESIGN

The system design comprises of development of the mechanism so that the given concept can perform the desired operation.

PHASE 3: MECHANICAL DESIGN.

The parts in the part list will be designed for stress and strain under the given system of forces, and appropriate dimensions will be derived.

PHASE 4: DRAWING.

Production drawings of the parts are prepared using CATIA, with appropriate dimensional and geometric tolerances. Raw material sizes for parts are also determined.

PHASE 5: MATERIAL PROCUREMENT AND PROCESS PLANNING

Material is procured as per raw material specification and part quantity. Part process planning is done to decide the process of manufacture and appropriate machine for the same.

PHASE 6: MANUFACTURING

Parts are machined as per the requirement and standard parts and electronic components are to be purchased.

PHASE 7: ASSEMBLY TEST AND TRIAL

Assembly of device is done as per assembly drawing and test and trial is conducted on device for evaluating performance.

PHASE 8: REPORTING AND REPRESENTATION

V.CONCLUSION

The biometric ignition system is developed in such a way to provide high security and safety to the vehicle. The ignition circuit can only be controlled by providing an authorized users fingerprint. The system verifies and unlocks the ignition circuit in 0.3 seconds which makes the system robust

REFERENCES

[1] Omidiora E. O. “A Prototype of a Fingerprint Based Ignition Systems in Vehicles” European Journal of Scientific Research ISSN1450 -16X Vol.62 No.2 (2016), pp. 164 - 171.

[2] Pingat S, Rakhecha S, Agrawal R, Mhetre S, Raushan P. Real Time Smart Car Security System by Using Biometrics. InternationalJournal of Innovative Technology and Exploring Engineering (IJITEE).2015, 2.

[3] AmitSaxena, “Ignition Based On Fingerprint Recognition” Published in International Journal of Scientific Research and Management Studies (IJSRMS) Volume 2, Issue 1, 2014.