



---

# A Systematic survey on Estimation of Electrical Vehicle

---

Jayshri Prakash Patale<sup>1\*</sup>, A. B. Jagadale<sup>2</sup>, A. O. Mulani<sup>3</sup>, Anjali Pise<sup>4</sup>

<sup>1\*</sup>Student, Department of Electronics and Telecommunication, SKN Sinhgad College of Engineering Korti, Pandharpur (MS), India

<sup>2,3</sup>Associate Professor, Department of Electronics and Telecommunication, SKN Sinhgad College of Engineering Korti, Pandharpur (MS), India

<sup>4</sup>Assistant Professor, Department of Electronics and Telecommunication, SKN Sinhgad College of Engineering Korti, Pandharpur (MS), India

Corresponding Email: <sup>1\*</sup>[jayshripatale945@gmail.com](mailto:jayshripatale945@gmail.com)

**Received:** 15 October 2022 **Accepted:** 10 November 2022 **Published:** 05 December 2022

**Abstract:** *Due to the gasoline crisis, electric vehicles are growing in popularity. The usage of electric and battery-powered automobiles is being encouraged worldwide. This campaign also heavily relies on the usage of renewable energy sources to provide electricity. In order to build electric vehicles, engineers use static and dynamic equations. Around the world, competitions are being held to design high-performance electric vehicles. The automotive industry and businesses are transitioning a portion of their fleet from gasoline-powered vehicles to battery-operated electric vehicles. Most vehicles today offer good performance at slightly increased costs to the consumer. The battery technology is improving and hence enhancing the range of vehicles. The movement of use of electrical vehicle will strengthen as more people are getting involved in the design and use of electric vehicle.*

**Keywords:** *Electric Vehicle, Power, Resistance, Python,*

## 1. INTRODUCTION

Today's globe has seen a rise in the technology industry. In order to meet the demands of the modern world, it is developing quickly. Technology has been a trustworthy and devoted ally to people. New inventions never cease to astound and surprise us. The world is experiencing a gasoline crisis. Fuel is relatively expensive and not always readily available. The electric car system is environmentally friendly. It can be run on electric power produced by energy sources



that can be rented. If the system is inexpensive to use, design, and maintain, it will be popular with the average person. For a given battery specification, a properly constructed vehicle will run and provide more mileage. The designer will be assisted by this portal in making static parameter estimates. It gives vehicle range before fabrication of electric vehicle. The appropriate parameters can be selected to improve the range and performance of vehicle. The vehicle designers can select the desired parameters and starts his experimentation in electric vehicle. When a vehicle is properly designed, it performs well for a slightly higher price for the consumer. The range of automobiles is expanding as a result of advances in battery technology. More people are getting involved in the design and use of electric vehicles, which strengthens the movement toward their widespread adoption.

### **Literature Review**

Yongjie Lu et al used multi body dynamics to create a virtual prototype model of a heavy duty truck (DFL1250A9). Shock absorbers and leaf springs' geometric structural parameters and nonlinear properties were properly specified. By contrasting the test results, the dynamic model was proven to be accurate. The research shows that the testing results and the virtual prototype vehicle model were extremely similar, and that increasing running speed may be harmful.

K. Chinnaraj, among others, have decided to optimise the chassis frame assembly weight of a big vehicle utilised for long-distance cargo hauling. Experimental measurements and reports on the component's dynamic stress-strain response as a result of braking and cornering motions were made. The numerical simulation used to represent the dynamic behaviour of the frame rail assembly during cornering and braking used a quasi-static technique, which breaks down the dynamic manoeuvres into a number of tiny processes with static equilibrium. The quasi-static numerical simulations were run using the for-profit finite element tool ANSYS and the findings were compared with those from the experiments.

The 4.5 Ton truck chassis against road roughness and excitations has been researched by Teo Han Fui et al. Road roughness-induced vibration and excitation by vibrating components installed on the chassis were investigated. By examining stress distribution and displacements, chassis reactions were investigated. The positions where components like engine and suspension systems should be mounted are determined by mode shape results.

Using Ansys software, N. V. Dhandapani et al. studied the effects of different stress distributions using finite element methods. They installed gussets in the failure location to better understand the field failure of the 100-ton dumper. After alteration, the chassis structure underwent linear static analysis to confirm its safety, which was successful.

The chassis of the Hyundai Cruz minibus was analysed and examined by Alireza Arab Solghar et al. Modeling and simulation were done using ABAQUS software. Static analysis of the chassis took into account its own weight, while dynamic analysis took acceleration, braking, and road roughness into account. Stresses on the chassis have been noticed. The key factors



influencing the price of electric vehicles will be economies of scale, research, and development of efficient technologies. In the long run, owning and maintaining electric cars is cost-effective. Higher beginning costs are a significant barrier to EV adoption. Public charging infrastructure is also concerned about high initial costs and low turnover. The energy storage technologies are still not profitable. Limited driving range has been found to deter buyers from purchasing electric automobiles. M. Faizal et al. found that braking was more frequently used than acceleration.

Contributions made by M. Zackrisson et al. in the paper on lithium-ion batteries: the author organised and carried out the LCA and wrote the entire publication's text. The coauthors and research associates at IVF contributed to the definition of the objective and scope, data gathering, modelling, interpretation, and manuscript comments.

Saurabh Chauhan, Rolling resistance is the force that prevents a vehicle's wheels from rolling, which is brought on by non-elastic phenomena at the tire-road surface. The Simulink model serves as the foundation for the model created in this study. Furthermore, the reference articles are suggested with regard to the vehicle models created in Matlab/Simulink.

The effects of road roughness on the stress distribution of large vehicle chassis were examined by Ojo Kurdi et al. To cut costs and get the best design, they had used finite element analysis software to examine static and dynamic conditions. The maximum loaded weight divided by the total area of goods in contact with the upper surface of the chassis was used to calculate the load. Locally finer meshing was used in the area that was thought to have the highest stress in order to improve the outcome. Study has shown that cargo and its contents serve as the primary source of static loading on the truck's chassis. The component's stress has not been significantly impacted by the road's roughness.

By using static structural analysis, Vijaykumar V et al. evaluated the Ladder chassis frame of the Eicher E2. In this study, the chassis was envisioned as a straightforwardly supported beam with an overhang. Software from Ansys and Pro-E were used in this project. The analytical computation of chassis was also a part of the investigation. Both software analysis and analytical calculation results were compared and found that the stress value obtained from software analysis is 10% more and also displacement was 5.92% more.

## **2. DISCUSSIONS**

The Followings are the objectives of the work:

1. Reduces fuel consumption and time delay. Spare time can be used for other work.
2. Manpower is reduced by this automation
3. Reduces cost for users by notifying the time wise cost.
4. To interface LCD display for showing fuel readings.



5. To interface LED and Buzzer for low fuel indication.

Objectives of proposed system are as listed below.

1. Study of factor influencing design of electric vehicle.
2. Design of software architecture for software portal.
3. Design of front end graphical user interface for acquiring of vehicle parameters
4. Design of database and link
5. Integration, validation and testing of developed system

### **3. CONCLUSION**

The scope of electric vehicle and problem statement also objective of the project. The system is helpful for electrical vehicle designers. The analytical computation of chassis was also a part of the investigation. Results from analytical calculations and software analysis were compared, and it was discovered that displacement and the stress value from the software analysis were both accurate. In proposed system the web portal designed will assist the designer in design of electric vehicle. It will take vehicle and power plant parameters as input. It will return the range of proposed vehicle for selected parameters. Also it will suggest the motor parameters for drive train. Python is used for implementation with Django framework. MySQL is used for database management. This may initiate the EV movement.

### **4. REFERENCES**

1. Ratti C and Claudel M 2016 *The city of tomorrow: Sensors, networks, hackers, and the future of urban life* (Yale University Press) Offenhuber D and Ratti C 2014. *Decoding the City: How Big Data Can Change Urbanism* (Birkhäuser Verlag GmbH)
2. Yong J Y, Ramchandaramurthy V K, Tan K M and Mithulananthan N 2015 review on the state-of- the-art technologies of electric vehicle, its impacts and prospects. *Renew. Sust. Energ. Rev.* 49 365- 85
3. Santucci M, Pieve M, and Pierini M 2016 Electric category vehicles for smart urban mobility *Transp. Res. Proc.* 14 3651-60
4. Guiggiani M 2014 *The science of vehicle dynamics* (Pisa, Italy: Springer Netherlands)
5. Cao J T, Liu H H, Li P, Brown D J and Dimirovski, G 2007 A study of electric vehicle suspension control system based on an improved half-vehicle model. *Int. J. Automat. Comp.* 4(3), 236-42
6. Brown D J, and Dimirovski G 2007 A study of electric vehicle suspension control system based on an improved half-vehicle model *Int. J. Automat. Comp.* 7 561
6. Yongjie Lu, Shaopu Yang, Shao Hua Li, Liqun Chen, “Numerical and experimental investigation on stochastic dynamic load of a heavy duty vehicle”, *Applied Mathematical Modelling*, Vol.34, PP 2698– 2710, 2010.



7. K. Chinnaraj, M. Sathya Prasad, C. Lakshmana Rao, “Experimental Analysis and Quasi-Static Numerical Idealization of Dynamic Stresses on a Heavy Truck Chassis Frame Assembly”, *Applied Mechanics and Materials*, Vol.13-14, PP 271–280, 2008.
8. Teo Han Fui, Roslan Abd. Rahman, “Statics and Dynamics structural analysis of a 4.5 Truck chassis”, *Journal Mekanikal*, Vol.24, PP 56-67, 2007.
9. Miss. Priyanka M Tadlgi, et al, “Depression Detection”, *Journal of Mental Health Issues and Behavior (JHMIB)*, 2022, Vol 2, Issue 6, pp. 1-7
10. N V Dhandapani, G Mohan kumar, K K Debnath, “Static analysis of Off-High way vehicle Chassis structure for the effect of various stress distributions”, *Journal of Mechanical Science and Technology*, Vol.1, No 6, 2012.
11. Alireza Arab Solghar, Zeinab Arsalanloo (2013) studied and analyzed the chass Hyundai Cruz Minibus. ABAQUS Software was used for modeling and simulation Self weight of the chassis is considered for static analysis and Acceleration. It’s observed that the stresses on chassis caused by braking were more compared with acceleration
12. M. Faizal, S. Y. Feng, M. F. Zureel , B.E. Sinidol, D.Wong, G.K. Jian, A Review on Challenges and Opportunities of Electric Vehicles (EVS)*Journal of Mechanical Engineering Research and Developments (JMERE)* 42(4) (2019) 130-137.
13. Wale Anjali D., Rokade Dipali, et al, “Smart Agriculture System using IoT”, *International Journal of Innovative Research In Technology*, 2019, Vol 5, Issue 10, pp.493-497.
14. Pankaj R Hotkar, Vishal Kulkarni, et al, “Implementation of Low Power and area efficient carry select Adder”,*International Journal of Research in Engineering, Science and Management*, 2019, Vol 2, Issue 4, pp. 183-184.
15. Karale Nikita, Jadhav Supriya, et al, “Design of Vehicle system using CAN Protocol”, *International Journal of Research in Applied science and Engineering Technology*, 2020, Vol 8, issue V, pp. 1978-1983, <http://doi.org/10.22214/ijraset.2020.5321>.
16. Kutubuddin Kazi, “Lassar Methodology for Network Intrusion Detection”, *Scholarly Research Journal for Humanity science and English Language*, 2017, Vol 4, Issue 24, pp.6853-6861.
17. Rahul S. Pole, Amar Deshmukh, Makarand Jadhav, et al, “ iButton Based Physical access Authorization and security system”, *Journal of Algebraic Statistics*, 2022, Vol 13, issue 3, pp. 3822-3829.
18. Ravi Aavula, Amar Deshmukh, V A Mane, et al, “Design and Implementation of sensor and IoT based Remembrance system for closed one”, *Telematique*, 2022, Vol 21, Issue 1, pp. 2769- 2778.
19. Rahul S. Pole, Amar Deshmukh, Makarand Jadhav, et al, “ iButton Based Physical access Authorization and security system”, *Journal of Algebraic Statistics*, 2022, Vol 13, issue 3, pp. 3822-3829.
20. Dr. B. D. Kadam et al, “Implementation of Carry Select Adder (CSLA) for Area, Delay and Power Minimization”, *Telematique*, 2022, Vol 21, Issue 1, pp. 5461 – 5474



21. Salunke Nikita, et al, “Announcement system in Bus”, Journal of Image Processing and Intelligent remote sensing, 2022, Vol 2, issue 6
22. Madhupriya Sagar Kamuni, et al, “Fruit Quality Detection using Thermometer”, Journal of Image Processing and Intelligent remote sensing, 2022, Vol 2, issue 5.
23. Shweta Kumtore, et al, “ Automatic wall painting robot Automatic wall painting robot”, Journal of Image Processing and Intelligent remote sensing, 2022, Vol 2, issue 6
24. Kadam Akansha, et al, “Email Security”, Journal of Image Processing and Intelligent remote sensing, 2022, Vol 2, issue 6
25. Mrunal M Kapse, et al, “Smart Grid Technology”, International Journal of Information Technology and Computer Engineering, Vol 2, Issue 6
26. Satpute Pratishka Vaijnath, Mali Prajakta et al. “Smart safty Device for Women”, International Journal of Aquatic Science, 2022, Vol 13, Issue 1, pp. 556- 560
27. Dr. Kazi Kutubuddin Sayyad Liyakat, et al, “Voltage Sag mitigation in DVR based on Ultra capacitor”, Lambert Publications. 2022, ISBN – 978-93-91265-41-0
28. Waghmare Maithili, et al, “Smart watch system”, International journal of information Technology and computer engineering (IJITC), 2022, Vol 2, issue 6, pp. 1- 9.
29. Divya Swami, et al, “Sending notification to someone missing you through smart watch”, International journal of information Technology and computer engineering (IJITC), 2022, Vol 2, issue 8, pp. 19-24
30. Available at <https://it.mathworks.com/help/physmod/sps/examples/electric-vehicleconfigured-for-hil.html>
31. Rahul S. Pole, Amar Deshmukh, Makarand Jadhav, et al, “ iButton Based Physical access Authorization and security system”, Journal of Algebraic Statistics, 2022, Vol 13, issue 3, pp. 3822-3829.
32. Nilima S. Warhade, Rahul S. Pol, Hemlata M. Jadhav, Altaf O. Mulani, “ Yarn Quality detection for Textile Industries using Image Processing”, Journal Of Algebraic Statistics, July 2022, Vol 13, Issue 3, pp. 3465-3472.
33. U. P. Nagane and A. O. Mulani, “Moving Object Detection and Tracking Using Matlab”, Journal of Science and Technology, Vol.6, Special Issue 1, 2021 DOI: <https://doi.org/10.46243/jst.2021.v6.i04.pp63-66>
34. Mulani, A.O.; Mane, P.B. High-Speed Area-Efficient Implementation of AES Algorithm on Reconfigurable Platform, 2019. In Computer and Network Security; IntechOpen: London, UK, 2019. Available online: <https://www.intechopen.com/chapters/67728>.