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# Digital Cluster Evtronics Mobility and Products Innovation LLP

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**ABSTRACT:** This project focuses on developing an innovative, user-friendly digital speedometer for automotive use. It aims to combine technical sophistication, safety, and aesthetic appeal. The process began with setting goals, and scope, and assembling a skilled team – comprehensive requirements for integrating technical features and user experience.

Design and planning were critical to ensuring detailed hardware and software plans and strategic integration with existing vehicle systems. The prototyping and testing stages involve developing a functional prototype, collecting user feedback, and making necessary improvements. The final phase involves developing and integrating hardware and software components, thorough testing, and quality assurance to meet security standards.

The system was designed to seamlessly integrate with the vehicle's engine control unit (ECU) and other major systems. Post-launch activities include continuous tracking, support, user feedback collection, and maintenance to ensure positive user experiences throughout the product's lifetime.

## I. INTRODUCTION

The development of digital speedometers for electric bikes marks a significant advancement in the field of personal transportation. The project aims to create a smart, user-friendly speedometer that enhances the riding experience by combining cutting-edge technology with safety and aesthetic appeal. This initiative begins with setting clear objectives, defining the scope of the project, and assembling a team of skilled professionals. A comprehensive requirements-gathering process focuses on both technical specifications and user experience. Comprehensive design and planning ensure seamless integration with bike systems. The prototyping phase involves creating a functional prototype, testing it rigorously, and refining it based on user feedback. The final development involves intensive testing and quality assurance to meet high safety and reliability standards. The digital speedometer is designed to seamlessly integrate with the electric bike's control systems, providing real-time data and increasing overall efficiency. Post-launch support ensures continued user satisfaction and product excellence

## II. PROBLEM STATEMENT

Traditional speedometers are outdated due to evolving technology, safety standards, and design aesthetics. This project aims to create a digital speedometer that ensures high accuracy, reliability, and seamless integration with modern electric bikes. The process involves setting clear objectives, gathering technical and user experience requirements, and assembling a skilled team. Detailed design and planning ensure system compatibility, followed by prototyping, rigorous testing, and user feedback-based refinements. Final development includes extensive testing and quality assurance to meet safety standards. The digital speedometer enhances functionality by providing real-time data and integrates smoothly with bike control systems, with ongoing post-launch support ensuring user satisfaction.

## III. OBJECTIVE

The specific objectives of the proposed work are:

- Come up with a digital speedometer system that gives the exact and trustworthy speed measurements in every moment.
- Make the connection between the speedometer system and the up-to-date vehicle designs and the on-board systems

smooth.

- Integrate safety elements into the speedometer system that would in turn increase the driver's awareness and thus, the driver will be more careful and will drive safely.
- Design a clear and easy-to-use interface for the speedometer, placing the user's needs as the priority, and making the interface intuitive.
- Do a thorough testing and checking of the speedometer system to see if it works, is precise and is dependable.
- Follow which regulatory standards and requirements that are governing the automotive instrumentation and making sure that they are obeying which are the safety and environmental guidelines. 2
- Get the users opinion through the development of the speedometer system and if they suggest improvements for the process try to implement the changes accordingly.
- The speedometer system should be optimized in such a way that it would increase the efficiency, drastically reducing the power consumption and at the same time it would be more effective.
- Type in the description of the stakeholders that you need to collaborate with, which are the automotive manufacturers and the end-users, to understand their needs and then, together, choose the speedometer system that will best fit their requirements.
- The provision of post-launch support and maintenance mechanisms that will enable the smooth resolution of any issues that may occur and thus ensuring a positive user experience over the product life cycle is at the same time the promotion of the product life cycle.

#### IV. AIM OF PROJECT

The aim of this project is to develop a cutting-edge digital speedometer for electric bikes that addresses the limitations of traditional systems in terms of technology, safety, and design aesthetics. The primary objective is to create a speedometer that offers high accuracy and reliability, meeting modern safety standards and user expectations. This involves integrating advanced technological features and ensuring seamless compatibility with the bike's existing systems. The project focuses on gathering comprehensive technical specifications and user experience insights to inform the design process. A functional prototype will be developed and rigorously tested, with refinements based on user feedback to enhance performance and usability. Thorough testing and quality assurance will ensure the speedometer meets stringent safety and reliability standards. Post-launch, the project aims to provide continuous support, gather ongoing user feedback, and offer maintenance services to ensure a consistently excellent user experience throughout the product's lifecycle.

#### V. LITERATURE SURVEY

The literature survey delves into the realm of digital instrumentation and speedometer systems within automotive applications, offering a comprehensive synthesis of existing knowledge and research findings. Zhang et al. present an in-depth examination of the creation process, encompassing design, implementation, and integration aspects. While their insights are technically illuminating, the absence of comparative analyses with current systems and detailed discussions regarding creation challenges, cost-effectiveness, and scalability represent notable gaps. Wang et al. contribute valuable insights into the practical application of the CAN protocol, crucial for contemporary vehicles, yet their work could benefit from a comparative exploration of alternative approaches and more elaborate technical elucidations to bolster reproducibility and applicability. Li et al. focus on the integration challenges and solutions concerning digital speedometers with CAN networks, offering pragmatic insights derived from real-world implementations. However, their narrow focus on CAN networks might limit broader applicability to other protocols or systems. Finally, Johnson et al. provide a thorough examination of digital instrumentation's multifaceted role in enhancing vehicle performance, safety, and user experience, covering design principles, integration techniques, and emerging technologies. Despite this, their study lacks depth in discussing implementation challenges and future development trajectories. Together, these seminal works constitute essential groundwork for advancing digital speedometer technology within automotive contexts.

#### VI. SYSTEM ARCHITECTURE

A system architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. A system architecture can consist of system components and the sub-systems developed, that will work together to implement the overall system. It is represented in the above Fig.. Systems models are synthesized from simple, modular building blocks The systems model is a process-oriented

representation that emphasizes the influences, or flow, of information between modules. A systems model describes how processes interact and what operations these processes perform, but it does not go into details as to how these processes are implemented. The basic element of the systems model in this text is a block enclosing a transfer function. Some very general systems-type models use only descriptive boxes as elements i.e., boxes without even transfer functions. The purpose of such models is to show the general relationship and flow of influence between processes; no effort is made to develop them for mathematical analysis. A system's model elements are sometimes referred to as black boxes because they are defined only by the transfer function, which is not concerned with, and does not reveal, the inner working of the box. Both the greatest strength and the greatest weakness of systems model are found in their capacity to ignore the details of mechanism and emphasize the interactions between the elements.

## VII. DATA FLOW DIAGRAMS

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyze an existing system or model a new one. Like all the best diagrams and charts, a DFD can often visually "say" things that would be hard to explain in words, and they work for both technical and non-technical audiences, from developer to CEO. That's why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems. It is represented in the below Fig.

## VIII. ENTITY RELATIONSHIP DIAGRAMS

An entity relationship diagram shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties. By defining the entities, their attributes, and showing the relationships between them, an ER diagram illustrates the logical structure of databases. ER diagrams are used to sketch out the design of a database. ER Model stands for Entity Relationship Model is a high-level conceptual data model diagram. ER model helps to systematically analyze data requirements to produce a well-designed database. The ER Model represents real-world entities and the relationships between them. Creating an ER Model in DBMS is considered as a best practice before implementing your database. ER Modeling helps you to analyze data requirements systematically to produce a well-designed database. So, it is considered a best practice to complete ER modeling before implementing your database.

## IX. UML DIAGRAMS

### Activity Diagram:

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system. Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. It is represented in the Fig.4.3. The purpose of an activity diagram can be described as:

1. Draw the activity flow of a system.
2. Describe the sequence from one activity to another.
3. Describe the parallel, branched and concurrent flow of the system.

### Class Diagram:

Class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages. Class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages. The purpose of class diagram is to model the static view of an application. Class diagrams are the only diagrams which can be directly mapped with object-oriented languages and thus widely used at the time of construction. UML diagrams like activity diagram, sequence diagram can only give the sequence flow of the application, however class diagram is a bit different. It is the most popular UML diagram in the coder community. It is represented in the below Fig.

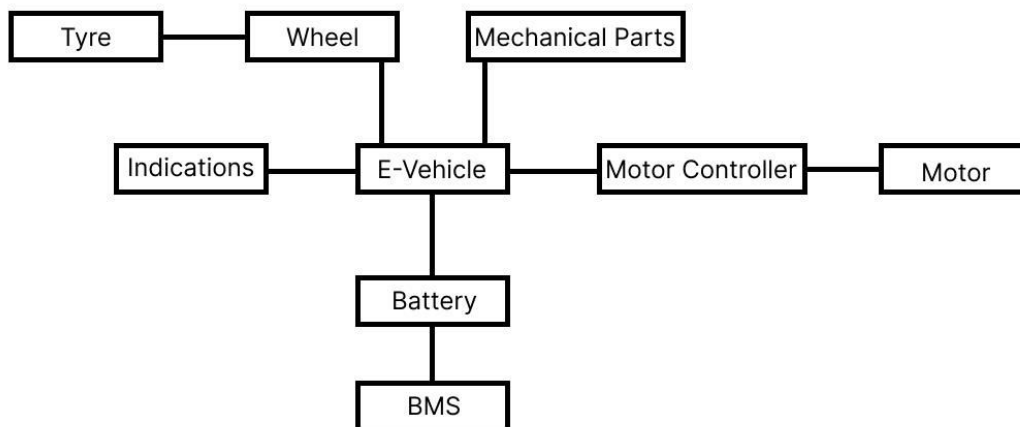


Fig.1. Class Diagram

Data Flow Diagrams

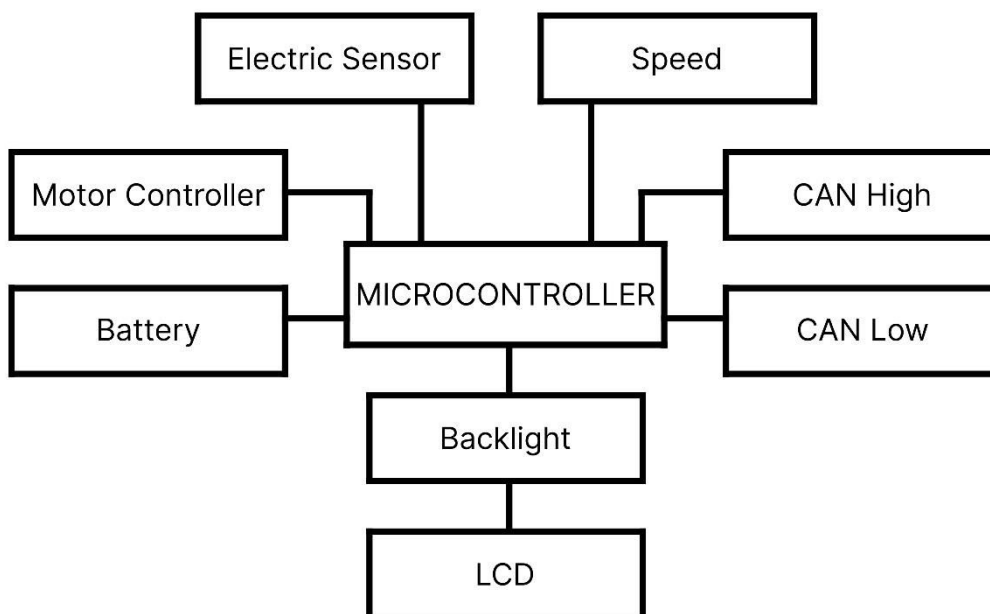


Fig.2. Data Flow Diagram

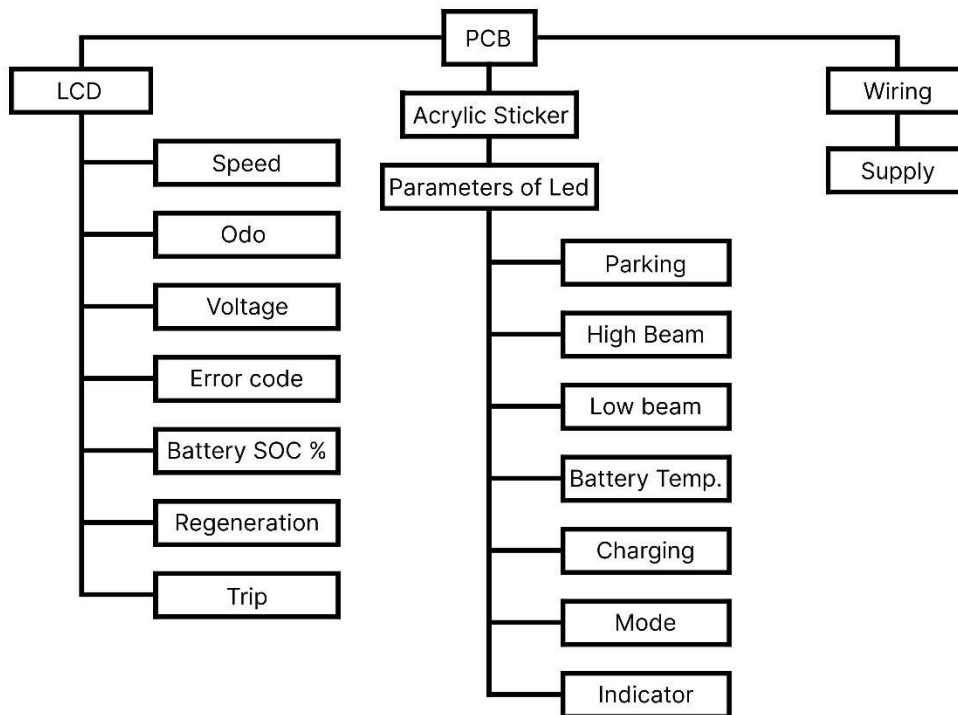


Fig.3. Activity Diagram

X. RESULTS AND DISCUSSION

esting part were done at this stage. For validating many circumstances. And for better results. Somewhere we failed there we over came with the particular solution and mostly project executed with expected outcome. We tried to enhance that result. And made it more user friendly and more accurate.

RESULTS

In this chapter the Outcomes, results and the working of project of help of Screen shots of System are discussed. Outcomes

The out comes of our system are:

Developed a webapp which can create 3D models online.

Developed a webapp using which individual can do sculpting.

Developed a webapp where animation can be performed.

Developed a webapp from which anyone can download their artwork in suitable format.

Developed Website where Person can generate NFT's.

Developed a webapp from where you can download art work and sell them on crypto marke

CONCLUSION

Our Web application is user friendly, efficient and an economical system, which allows individual to use tools in this application easily. It involves the development and implementation of any art work. We have planned to develop a system that could facilitate maximum tools for more creative and attractive art work creations.

Our application can help in overcoming some of the drawbacks of the existing expensive software. In this system, the installation of any file has been eliminated completely thus the system is completely the web application where maximum useful tools are already available to the user. The user only requires to visit the website, need to perform appropriate steps in order to get the desired outputs. User can create the required object using multiple tools which are present on the web app. Then just selecting the required extension format option you can export the artwork in desired format.

3D Modeling and Animation web application gives a platform to everyone where they can enhance their creativity. It is open source platform. From this site user can create the art work, he can download it and then sell or upload over any platform user want to.

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