

This thesis is a study and development of an instrument cluster that can improve the driving experience of the driver or owner of the vehicle by providing onboard navigation features, customization of the user interface, etc. Chapter 1 summarises the present state of the instrument clusters in the market, market trends in this segment, and features on the instrument clusters of a two-wheeler that captures consumers' interest. This chapter also discusses market surveys, user surveys, and product survey results.

High-level requirements for the development of an instrument cluster are discussed in Chapter 2. Various stimuli of the instrument cluster are discussed, and a block-level understanding of the instrument clusters is presented. As a result of studying the features and internal design of various instrument clusters, the target specifications of the product are finalized.

The detailed design of the product is discussed in Chapter 3. It describes various modules used for developing the instrument cluster along with their specifications. Power design for the instrument cluster is discussed, and simulation results are presented. Schematic diagrams for the PCB development are included, giving a circuit-level understanding of sensors and modules used onboard.

Chapter 4 describes the engineering phase of the product. It discusses the dimensions of the PCB, PCB design, routing details, assembly, mounting details, and drilling details of the PCB. The embodiment design of the product and complete part assembly of the product is also described in detail.

The end goal is to start a venture using the product developed. The plan of creating a venture in the instrument cluster business is discussed in Chapter 5. It discusses various surveys, market research, financial plan, financing methods, operation plan, product development plans, risk mitigation plans, and estimated timelines for the venture to start and grow. Finally, chapter 6 discusses the user instructions for product installation and its operation.