This thesis is about the “Digital Twin Network for Batteries”. It is a product that helps to make battery IoTfied and make virtual replica of it. It allows to sense battery parameters and make it available to remote users using OPC UA architecture and the data can be used for modeling the battery remotely. Developing a virtual battery model will be helpful in predicting ’state of charge (SOC)’ and health of the battery.

Chapter 1 summarizes the need of the product, functionality of the product, literature survey, product, market survey and user survey. From these surveys the gap analysis is made and a wish specification of the product is laid down.

In chapter 2, Functional concept of overall product is explained with modules and sub-module working description. A detailed description of electronic load and load profile generation of EV is discussed. Finally it ends with target scope.

In chapter 3, Detailed design of the product is discussed. This covers hardware and software design. Modeling of battery using OPC UA for IoTficiation of the battery and its implementation is covered. The Kalman filter algorithm used for SOC prediction is explained.

Chapter 4 summarizes the product design. The hardware design aspects including the PCB layout designs, guidelines to assembly are discussed. Algorithms for running voltage and current sensing, integrating PCB with RPi system are covered. OPC UA implantation algorithms and DC electronic load programming algorithms are explained in this section.

In Chapter 5, the entrepreneurial plan of the product covering overview of the venture, market analysis, competitive analysis, business model, operational and financial plan, risk analysis, and mitigation strategies is discussed.

Chapter 6 includes concluding remarks. User instructions to operate the system, procedure for data collection, data processing, and the future scope are covered.