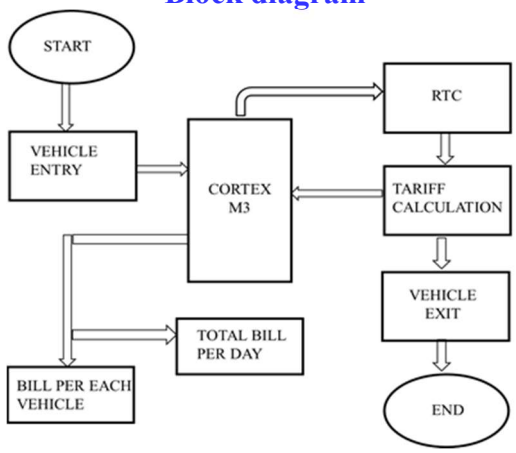
RNS INSTITUTE OF TECHNOLOGY
Channasandra, Dr. Vishnuvardhan Road, Bengaluru - 560 098
Ph:(080)28611880,28611881 URL: www.rnsit.ac.in
Department of Electronics & Communication Engg.

SILICONS 2024 - NATIONAL LEVEL PROJECT EXPO

DATE: 15-04-2024 **DAY: MONDAY**

Please submit your project synopsis in the format given below. Note that information provided about the project will be scrutinized by our committee. We request you to fill in the fields with accurate & correct information. This file should not exceed more than 3 pages.

1.	Name of the College: KLE TECHNOLOGICAL UNIVERSITY, HUBLI
2.	Project Title: RTOS based Real-time Tariff Management System for standalone solar powered EV Charging Stations using Cortex M3
3.	Branch: Electrical & Electronics Engineering
4.	Course (B.E/B-Tech/MTech): B.E Year:2023-24
5.	Project Category (choose only from the listed 4 categories given in the poster): Embedded systems

6.	**Objectives of the project:** **1. To build a prototype for smart tariff management system for a solar-powered Electric Vehicle (EV) charging station using a Cortex M3 processor with an RTOS (Real-Time Operating System) kernel working in a Real-Time Operating System.** **2. To calculate dynamic charging rates based on solar energy availability.** **3. To apply an optimization technique to ensure efficient programming of the Cortex M3.** **4. To build a prototype demonstrating the smart management of various activities in an EV charging station for smooth operation.**
7.	**Problem Statement: Develop a prototype for RTOS based Real-time Tariff Management System for standalone solar powered EV charging station using Cortex M3.**
8.	**Block diagram**  **Fig 1: Proposed Block Diagram** **Fig 1 This block diagram illustrates a simplified version of the charging station's operations, highlighting the key stages involved, such as vehicle entry and exit. The tariff is based on the availability of solar energy. At the heart of this system lies a powerful Cortex M3 processor, running an RTOS like the RTX Kernel. The central charger may utilize sensors and an RTC for smart management of various processes in the EV charging station.**

9.	**Methodology:** 1. **Programming Cortex M3 with the Real-Time RTX kernel, select the appropriate kernel objectives for managing various activities like vehicle entry and exit, calculating and displaying customer bills, and tallying the total daily collections for the owner.** 2. **Interface IR sensor for tracking vehicle entry & exit and to utilize RTC (Real Time Clock) for accurate determination of charging time of EV.** 3. **Study and apply the appropriate optimization techniques to compare their effects on memory and execution time.** 4. **Develop a prototype demonstrating smart management of various activities at an EV charging station**
10.	**Socio-Economic Importance:** 1. **Renewable Energy Integration: This system integrates solar power, promoting sustainability and supporting widespread EV adoption to reduce carbon emissions. It mitigates the environmental impact of transportation.** 2. **Energy Optimization through Dynamic Pricing: Dynamic tariff pricing based on real-time solar availability enables efficient energy management. It optimizes utilization and distribution for a sustainable and cost-effective charging experience.** 3. **Economic Growth and Job Creation: Driving renewable energy and sustainable transportation infrastructure development stimulates economic growth. It fosters new businesses, job prospects, and overall economic development in these evolving sectors.** 4. **Enhanced User Experience and EV Adoption: Real-time occupancy information and transparent billing enhance user convenience and trust. This user-centric approach encourages wider EV adoption and sustainable transportation transition.** 5. **Technological Innovation and Advancement: Leveraging Cortex M3 processor, RTOS, and advanced sensor technologies contributes to smart management-based systems advancement. It drives innovation for efficient and environmentally friendly solutions in sustainable transportation infrastructure.**

11.	**Expected Outcome of the project:** 1. **Use of sensors to record the number of vehicle entries and exits at an EV charging station.** 2. **Accurate measurement of EV charging using an RTC (Real-Time Clock).** 3. **Calculation and display of the customer's bill.** 4. **Display of the total amount collected per day by the owner.**