EVSE Monitor

Group J

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Sponsored by: Florida Solar Energy Center (FSCE)

Description

Electric vehicles are becoming a more prevalent force in the automotive industry. Public gas stations and college campuses are adapting to the change by building electric vehicle (EV) chargers for EV owners to use. At UCF, there is a total of eight EV chargers around the main campus: two in parking garage A, one in from of the Visitor and Parking, and four in parking lot D1. With over 60,000 students attending Central Florida each year, the accessibility of EV charger stations becomes difficult. The lack of security around the chargers allows people who aren't attending UCF to use them as well and the cost of each station makes it tough for the University to maintain and increase the number of EV stations. There is currently a system in place where EV owners who are SemaConnect members can be notified via a phone alert when their vehicle is done charging but this luxury is not available to all students.

All of these setbacks are our motivation for designing a new EV charging station. We propose that to fix the lack of security problem, there is a new way for every UCF student/faculty member to energize an EV outlet for use through identification technology. This will allow non-UCF students from charging their vehicles. A way to show the percentage of charge, similar to a phone, will help students track when their vehicle is ready and tracking power consumption can be used by the UCF Parking Services. To improve accessibility, the cost of the EV charger must be more reasonable so more stations can be built.

Discussion of goals and objectives

The primary goal associated with this project is to increase the availability of secure charging stations at UCF. The intent is to develop an application that collects data and monitors electric vehicle use specific to UCF staff and students. To maintain that the use of the charging stations remains within the UCF family, coded information specific to your UCF identity will be used (NID,PID..). The objective is to have usable information to justify increasing the amount of charging stations available on site. Ideally, the charging station will be able to communicate with your vehicle at a low cost while simultaneously performing initial charging properties. With use of polled research, the station will be equipped with either 120Volt or 220Volt charging capabilities. The communication system already installed within the Electronic Vehicle will be synchronized with the charging station so that data can be easily stored. An LCD screen, touch pad, or magnetic strip are being considered for the security options adjacent to the charger. To eliminate public access in accordance to use of UCF identity codes the chosen hardware will be coupled with a simple program that tracks member use. The goal is to take an already existing

dummy charger model and upgrade it to have smart features, Such as, Security, accessibility, and monitoring.

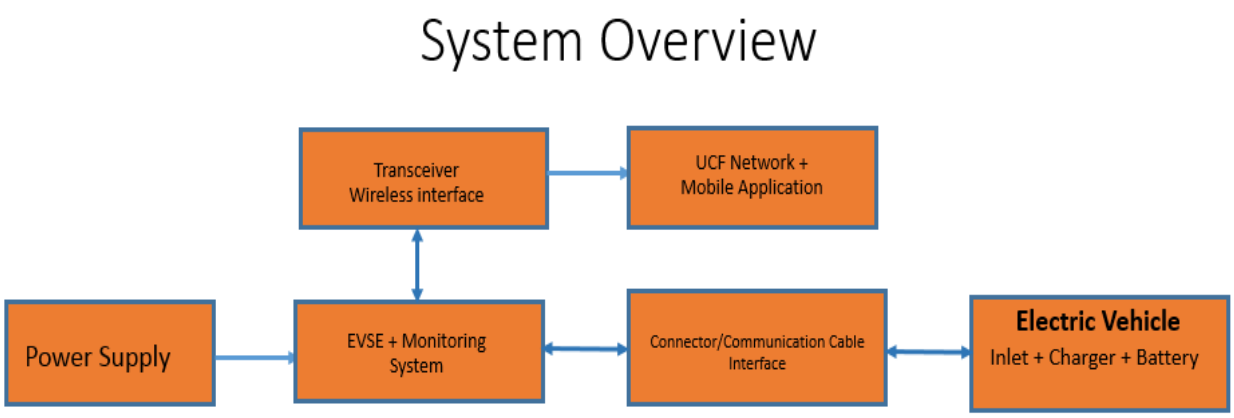
Function of Project

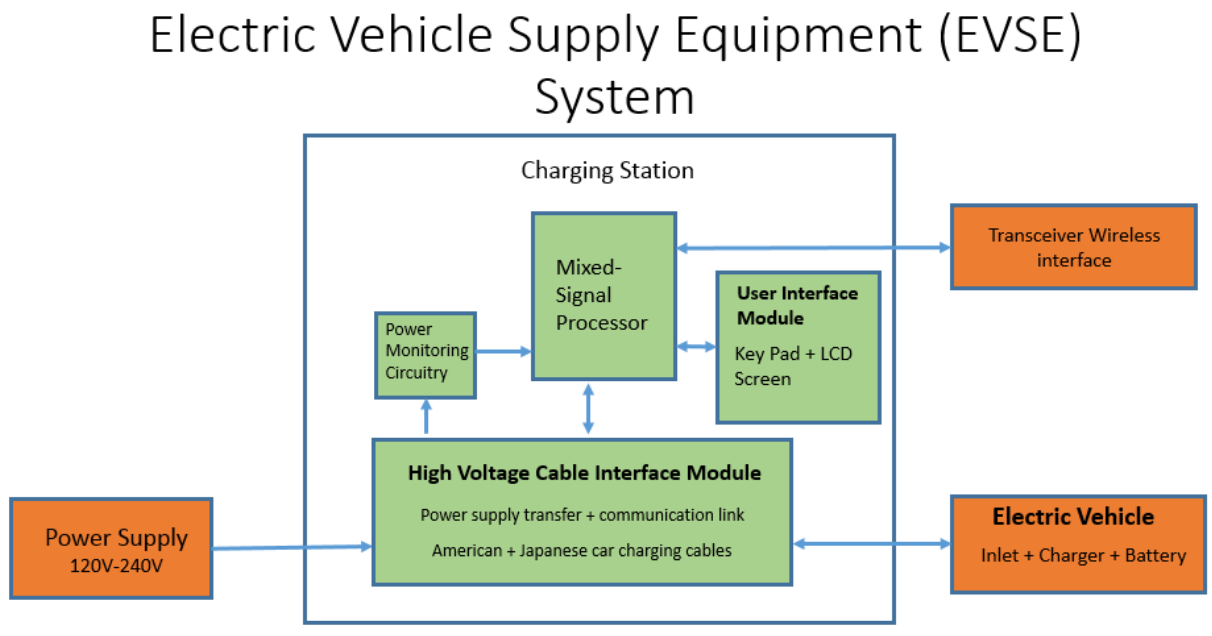
The function of this project is to provide efficient charging stations for UCF electric vehicle owners. By modifying existing charging stations, our design will add smarter technology to make charging your vehicle more accessible and secure. The application developed will also help UCF parking services monitor the power consumption of the EV chargers. With this information, the University can decide how many new chargers to add and whether more students are satisfied with the product.

List of Requirements and Specifications

- Charging station must be compatible with every electric vehicle
- Must withstand the range of Florida temperatures; 40-90 degrees.
- Have an Electric vehicle connector that's compatible with every vehicle. At least 25 feet.
- EV station with AC level 1 or 2 charging:
    - AC level 1: 120-volt AC outlet. Compatible with most cars. Adds 4 mi/hr.
    - AC level 2: 220-volt AC outlet. Fewer cars have this type of cable. Adds 15 mi/hr.
- Communications between EV station and EV meet the SAE Recommended Practice requirements and specifications.
- Must meet the American National Standards Institute
- Safety codes and standards must be met by the National Electric Code (NEC) and the Occupational Health and Safety Administration (OHSA).
- A power consumption tracker.
- Phone application for Parking Services that collects data from the EV station.
- Identification technology that recognizes UCF students/faculty and communicates with the EV station to: energize outlet and track battery life percentage.

Block Diagram





Budget

- PCB layout and printing: $50
- MicroController MSB430: $10
- Mini LCD screen: $40
- Cables/Cords : $125
- Transceiver: $15

Financing:

As per a conversation with the project sponsor all of cost are covered within a range of $200-$600 dollars. Ideas that may increase the budget can be discussed at future dates and are tentative for approval. All remaining cost not covered by the Sponsor FSEC will be incurred by group J members.

Semester Scheduling

Senior Design 1: Spring 2016

Tasks	**Dates**
Research	1/28/16 - 3/07/16
Design	3/14/16 - 5/04/16

Senior Design 2: Fall 2016

Tasks	**Dates**
Prototype	8/24/16 - 9/21/16
Building	9/28/16 - 11/02/16
Testing	11/09/16 - 12/07/16
Final Presentation	December 2016

Decision Matrix

a. Sponsorship: Our project is being sponsored by the FSEC. Their mission is to develop energy saving technology for Florida residents and economy. The budget given was $200-$600.
b. Familiarity: As Electrical Engineering majors, we have knowledge dealing with electronics and microcontrollers, specifically the MSP430. We are also familiar with power consumption management electrical components like transceivers, AC to DC converters, etc… We will have to do more research when planning the application for a smart phone.