Florida International University

Spring 2023 Senior Design Project

EV Wireless Charging Alignment System

Students: Christopher Prasad, Andy Alvarez, Rodolfo Ramos, Ivan Mendoza, Maximiliano Mauna
Mentor: Dr. Arif Sarwat, Milad Behnamfar, Energy, Power, and Sustainability
Instructor/Faculty: Dr. Wilmer Arellano, Florida International University

Problem Statement

Inductive Power Transfer (IPT) is a technology that enables the transfer of power from one system to another across a relatively large air gap between two loosely coupled coils with no physical contact. IPT provides a clean and safe way of transferring power. However, the current issue associated with this technology is the misalignment between the coils, resulting in inefficient power transfer. It is a huge obstacle when it comes to electric vehicle wireless charging. Our project is about designing an electric vehicle alignment mechanism that will detect a charging coil under the electric vehicle. It will then align the transmitter coil directly below the charging coil allowing maximum power transfer and improving the wireless charging efficiency.

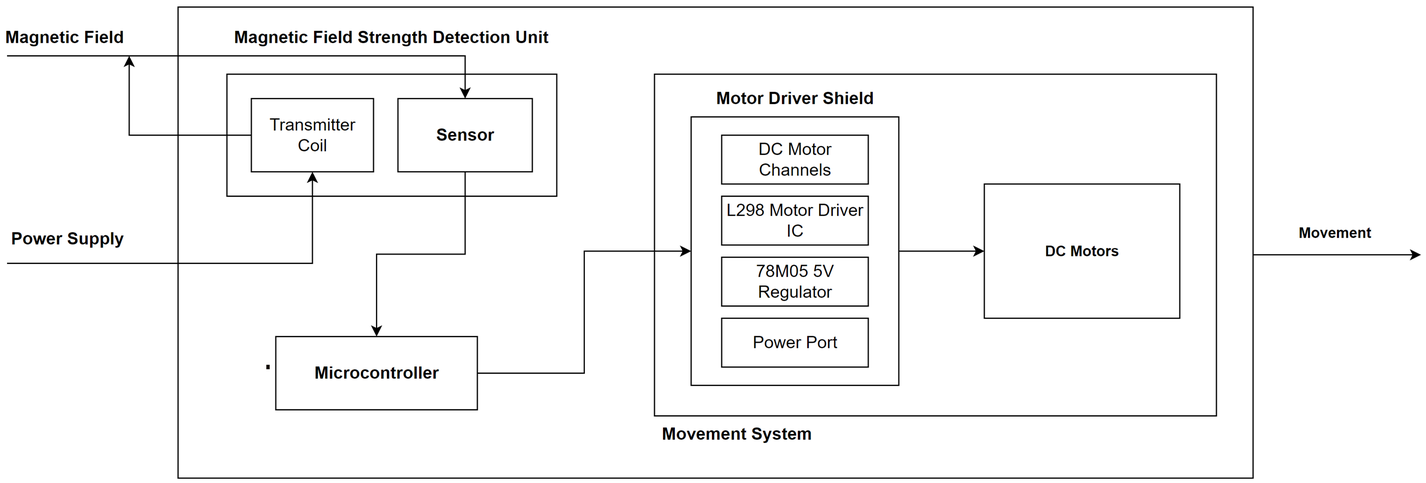
Robotic Design

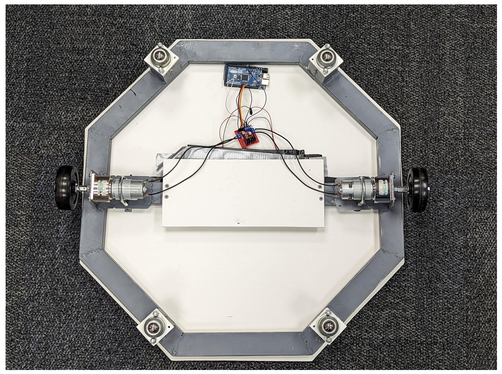
Hardware	Chassis
• Arduino Mega 2560 • 3A Motor Shield • 2 – 12V Motors • Hall Effect Sensor • 24V Battery Pack	• Galvanized Steel Frame • PVC Platform • 4 – Caster Wheels • 2 – Wheels

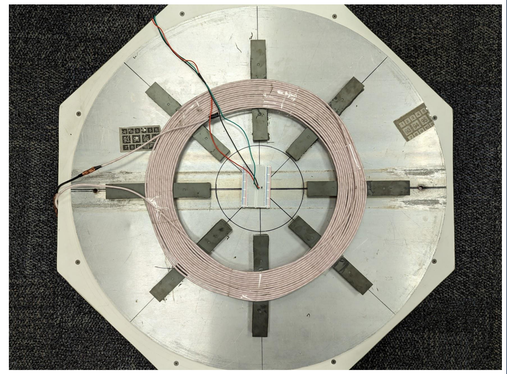
Capabilities

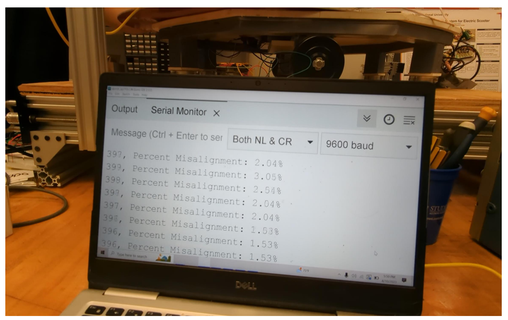
- The alignment mechanism enables wireless power transfer to charge an electric vehicle.
- Capable of partially aligning a receiver coil to the transmitter coil
- The alignment mechanism fits under a standard vehicle chassis.
- The alignment mechanism shows the user the amount of misalignment as a percentage

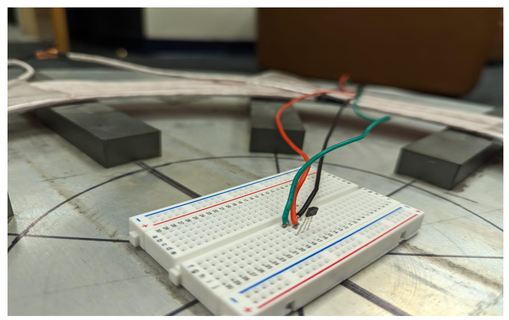
System Design











Acknowledgement

We thank Dr.Arif Sarwat and Milad Behnamfar for their assistance, cooperation and mentorship that we received throughout the senior design project.