PURDUE INNOVATES | Office of Technology Commercialization

Straightforward Detection of Misalignment in a 3-Phase Wireless Power Transfer System

A new misalignment detection method for wireless electric vehicle charging systems uses only receiver voltage and current to ensure efficient power transfer without requiring additional sensors or communication between the vehicle and roadway.

Dynamic Wireless Power Transfer (DWPT) systems offer a solution to both electric vehicle "range anxiety" and the need for expanded charging infrastructure, as vehicles could be wirelessly charged while driving on a roadway. However, alignment of the receiver significantly impacts the amount of power transfer that can be achieved. To address this challenge, researchers at Purdue University have developed a method for misalignment detection based on voltage and current on the receiver. Purdue's approach does not require any additional vehicle sensors hardware beyond what is needed for its role as a receiver. In addition, there is no need for communication between the vehicle system and the roadway. This technology has applications for in-road wireless charging systems for electric vehicles and automated driver assistance systems (ADAS).

Advantages

-Detection of misalignment when wireless charging

-In-road wireless charging for EVs

-No additional sensors or communications required

Applications

-Electric vehicle & charging infrastructure

-Roadway modernization

-Green technology

Technology Validation:

Technology ID
2024-PEKA-70402

Category
Automotive & Mobility
Tech/Battery Management & Charging Technologies
Buildings, Infrastructure, & Construction/Infrastructure
Modeling & Digital Twins

Authors
Dionysios Aliprantis
Aaron Dean Brovont
Vatan Mehar
Steven D Pekarek

Further information
Matt Halladay
MRHalladay@prf.org

Erinn Frank
EEFrank@prf.org

View online

This technology has been validated through simulations and design of a small-scale prototype system.

TRL: 4

Intellectual Property:

Provisional-Gov. Funding, 2023-09-20, United States

Provisional-Gov. Funding, 2024-09-19, United States

Utility-Gov. Funding, 2025-09-19, United States

Keywords: Dynamic Wireless Power Transfer, DWPT, in-road wireless charging, electric vehicle charging infrastructure, EV charging, misalignment detection, Advanced Driver Assistance Systems, ADAS, roadway modernization, green technology, inductive charging, adas, Automotive, driver assist, Electrical Engineering, electrification, Green Technology, in-road, Infrastructure, lane keeping, roads, wireless charging