

USU Technology Highlight:

VEHICLE MISALIGNMENT MEASUREMENT SYSTEM

This technology improves the efficiency of dynamic wireless power transfer (WPT) to electric vehicles by implementing a misalignment detection system. Because WPT is sensitive to the alignment between the transmitter in the ground and the receiver in the vehicle, a misalignment detection system capable of adjusting the power transfer can ensure uniform power transmission and increased efficacy of the WPT system.

PROBLEM

A significant drawback to electric vehicles is their range limitation. Dynamic wireless charging (that is, charging the vehicle while it's on the move over a roadway) is a solution to such range limitations, but it is sensitive to the alignment of the transmitter coils and receiver coils. Longitudinal and/or lateral misalignment of the coils in the WPT system leads to increased magnetic leakage and inefficiencies. If the efficiency of dynamic wireless charging can be increased, the range limitations of electric vehicles can be mitigated.

SOLUTION

USU's vehicle-misalignment measurement technology uses a novel detection algorithm which calculates any misalignment between the transmitter and receiver coils. A microcontroller running the algorithm generates a resulting signal and sends it to the main WPT controller, which interprets the signal and adjusts the WPT accordingly, allowing the vehicle to receive uniform power regardless of any misalignment (so long as it is inside an acceptable range) and increase charging efficiency. The detection system also incorporates image processing to detect foreign objects which may be on top of the transmitting coil pad (which could interfere with the WPT or even damage the system), enabling suspension of WPT should any such objects be detected.

BENEFITS

By reducing magnetic leakage that occurs during dynamic wireless power transfer when the transmitter and receiver are misaligned, the technology mitigates unnecessary power consumption and loss, increasing efficiency, lowering costs, and increasing practicality and feasibility of dynamic wireless charging of electric vehicles. When used in an intelligent transportation system, the technology can also assist in general vehicle detection, helping measure real-time traffic flow and constraints.

APPLICATIONS

This technology is intended for dynamic WPT systems, but can also be applied in stationary wireless charging systems.

CONTACT

Questions about this technology including licensing availability can be directed to:

ALAN EDWARDS

Manager

Technology Transfer Services

(435) 797-2328

alan.edwards@usu.edu

INVENTORS

ZELJKO PANTIC, PH.D.

Electrical and Computer Engineering Dept.

DEVELOPMENT STAGE

TRL 2

PATENT STATUS

In development

WEBSITE

rgs.usu.edu/techtransfer/resonant-switch-power-converter

RESEARCH *and*
GRADUATE STUDIES
UtahStateUniversity