

Research Title:

Autonomous Refueling System

Primary Investigator:

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As some of the researchers suggest that Covid19 probably will stay with us in the next few years. We must learn and adapt and live with that. Our research focuses on the development of an autonomous robotic charging system for electric vehicles. These days the world is moving towards fully autonomous vehicles, while more and more car companies are developing electric vehicles. In order to achieve full autonomy of vehicles and eliminate the interactions and possibilities that someone may get infected, a technology of autonomous charging must also be provided. The research includes developing a snake-like robot and special end-effector in a way that allows charging without any human involvement. This research is based on previous research performed in our lab, in which the robotic system was developed (for other uses). The robotic system has a novel design that includes a hyper redundant articulated robot where the electric cable is passed through the hollow robot links. Each link is separately controlled so there is no coupling so ever between them. The joints are controlled by pulling/releasing strings from the motion unit at the base. A specially designed end-effector for connecting to the charging socket. In addition to mechanical development, we also develop an AI algorithm for detecting the vehicle, charging cover, and socket using computer vision. This will include the control algorithm for directing the robotic snake and the end-effector to the vehicle socket, open it, and charge. All done autonomously without human involvement to reduce the possibility of infection.