

Omkar Shrikant Gawade - 1001967237

Innovation in Electric Car

Preamble

All over the world, people are converting to electric vehicles to preserve the environment, in addition to the long-term hope of saving money on fuel. The environmental benefits surrounding electric cars are one of the most significant factors in switching from a fuel-powered engine to an electrical one. EVs produce no direct emissions, in contrast to gasoline-powered vehicles, which emit combustion pollutants from the tailpipe as well as evaporated hydrocarbons from the fuel system. Moreover, EVs are cleaner than internal-combustion engine vehicles throughout their useful vehicle life. But to achieve that we require significant expansion of the electric cars charging infrastructure, supporting multiple charging scenarios. In addition, technology innovation would be at the core of this transition.

Project author View

Following are a few ongoing innovations in electric vehicles field

Wireless charging

Wireless charging for cars works similarly to wireless phone chargers, using inductive charging technology. Electricity is transferred through an air gap from one magnetic coil in the charger – hidden underneath the road surface – to a second magnetic coil fitted to the underside of a car. But rather than being able to lift a few millimeters off the charging station like with phones be positioned several inches away and still charge.

Pop-up pavement chargers

Another innovation that could reduce street clutter is pop-up EV chargers, which rise out of the pavement when activated remotely using a smartphone app. London-based EV charging company Urban Electric Networks has developed the UEone on-street devices, which retract into the ground when not in use like bollards. It claims they will be zero cost to councils for supply, installation, operation, and maintenance. Installations will be in clusters rather than individual charge points to limit the number of pavements that need to be dug up to fit them.

Electrified roads

While many electric vehicle charging innovations require cars to be parked, a pilot in Sweden has explored the possibility of charging on the go with electrified roads. The team behind the state-funded eRoadArlanda project in Sweden installed electric rails embedded within the tarmac of a 1.25-mile road network near Stockholm. A moveable arm attached to a vehicle detects the electrical rail's location in the road and is automatically charged while traveling above it. It works in an equivalent way to trams,

which are powered by an overhead line, but instead via conductive feeds from the road below.

Potential generalized View

Electric cars have good and bad parts, like gasoline cars. However, the good parts currently outweigh the bad ones. Environment protection and energy conservation have urged the development of EVs. However, the commercialization of EVs is still facing challenges. The main reason is that they could not satisfy the consumers' needs due to high cost and short range. Consequently, HEV and FCEV are recently rapidly emerging and seizing the chance to go to market. The paper analyzed challenges and opportunities for FCEV, which will have long-term potential to be the mainstream vehicle in the future because it is almost zero-emission and comparable driving range to ICEV. Also, an innovative solution to optimize multiple energy sources to obtain the best performance at a lower cost was proposed. Further research will be performed on system components, such as the proposed experimental electrolyte or the nano-carbon prototype electrode.

The integration of EVs is an inevitable trend in the development of distribution networks. A large deployment of EVs is expected to lead to potential problems for distribution networks. The traditional criteria of the distribution network may not be suitable for large-scale EVs integration. However, the distribution grid load impacts could be reduced effectively through the appropriate configuration of EVs proportion with different charging methods. And the energy storage characteristics of EVs will also provide new opportunities for the safe and economic operation of the system. In the future, the rapid development of EVs and their wide application will trigger a revolutionary change in the modern transportation industry and have a profound impact on the electric power industry.

Position Your Viewpoint

Apart from different drawbacks which could be overcome later electric vehicles are evolving and increasingly innovative ideas are making electric vehicles economical as well as easy to use.