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Inventor

Name	Address	Country	Nationality
Dr. RAJEEV KUMAR CHAUHAN	Village-Alinagar, Post- Girora, Distt.- Bulandshahr, U.P.-203405, India	India	India
Dr. KALPANA CHAUHAN	Village-Alinagar, Post- Girora, Distt.- Bulandshahr, U.P.-203405, India	India	India

Applicant

Name	Address	Country	Nationality
Dr. RAJEEV KUMAR CHAUHAN	Village-Alinagar, Post- Girora, Distt.- Bulandshahr, U.P.-203405, India	India	India
Dr. KALPANA CHAUHAN	Village-Alinagar, Post- Girora, Distt.- Bulandshahr, U.P.-203405, India	India	India

Abstract:

Present invention deals with the design of a universal charging port for electric vehicles with four different charging levels. This invention offers the fast charging and slow charging option at different electricity prices for the electric vehicle consumers. The universal charging port interleaved multi-stage buck converter topology is implemented with proper control techniques to achieve charging rate as per the EV consumers. This system is act as a universal charger for all the EVs. The EV consumer provides the input to the model then control strategy generates the control pulse based on digital logic circuit. As per the EV consumer choice, the control pulse activates the level-1 to level-4 of multiphase buck converter to charge the EV at different charging rates with the charging stages in a single charging port to fulfil the objective of universal charging port. This system can provide optimal charging time and per unit energy prices for EV. This system can also adjust the amount of power drawn from the grid during peak and off-peak hours. The invention can provide the ancillary services to the public utility during off peak hours by increasing power consumption from the public utility by selecting the ultra-fast charging priority. Moreover, the universal charging port can also provide the ancillary services to the public utility during peak hours by decreasing power consumption from the public utility by selecting the low charging priority. The universal charging port can also optimize the per unit electricity price of EV consumer by varying the charging priorities for example low charging priority during peak price hours and high charging priority during the regular hours.