

(54) Title of the invention : OPTIMIZATION OF ELECTRICAL VEHICLE CHARGING IN THE PRESENCE IN THE PRESENCE OF SOLAR POWER USING DEEP REINFORCEMENT LEARNING

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(57) Abstract :

ABSTRACT OPTIMIZATION OF ELECTRICAL VEHICLE CHARGING IN THE PRESENCE IN THE PRESENCE OF SOLAR POWER USING DEEP REINFORCEMENT LEARNING The introduction of electric vehicles has greatly improved energy efficiency and reduced air pollution. However, the availability of sufficient charging source and optimized charging schemes is a major concern. Thus, for an effective management of electric vehicle charging system, an efficient optimization approach is needed. Deep reinforcement learning (DRL) is an effective approach to solve complex optimization problems. This technique combines the concepts of reinforcement learning and deep learning. This technique involves training models with artificial intelligence to learn through trial and error, thereby optimizing a given environment based on the feedback from the environment. In this research, deep reinforcement learning has been applied to optimize the charging of electric vehicles in the presence of solar power. A two-layer deep Q-network with 64 neurons has been developed to obtain the optimal charging policies. The model learns the optimal charging policies over a corresponding charging criterion while taking into account the availability of solar power. To test the performance of the model, simulated charging of electric vehicles with solar power has been carried out. Simulation results indicate that the proposed approach is able to provide an optimal charging scheme in the presence of solar power. The results of this research demonstrate that deep reinforcement learning can be successfully used to optimize electric vehicle charging in the presence of solar power. The proposed approach has the potential to reduce the environmental impact of electric vehicle charging and to optimize energy utilization.

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