Improving Viability of Electric Taxis by Taxi Service Strategy Optimization: A Big Data Study of New York City

Abstract—Electrification of transportation is critical for a lowcarbon society. In particular, public vehicles (e.g., taxis) provide a crucial opportunity for electrification. Despite the benefits of eco-friendliness and energy efficiency, adoption of electric taxis faces several obstacles, including constrained driving range, long recharging duration, limited charging stations and low gas price, all of which impede taxi drivers’ decisions to switch to electric taxis. On the other hand, the popularity of ride-hailing mobile apps facilitates the computerization and optimization of taxi service strategies, which can provide computer-assisted decisions of navigation and roaming for taxi drivers to locate potential customers. This paper examines the viability of electric taxis with the assistance of taxi service strategy optimization, in comparison with conventional taxis with internal combustion engines. A big data study is provided using a large dataset of real-world taxi trips in New York City. Our methodology is to first model the computerized taxi service strategy by Markov Decision Process MDP), and then obtain the optimized taxi service strategy based on NYC taxi trip dataset. The profitability of electric taxi drivers is studied empirically under various battery capacity and charging conditions. Consequently, we shed light on the solutions that can improve viability of electric taxis.

CONCLUSION
In this paper, we employ Markov Decision Process to model computerized taxi service strategy and optimize the strategy for taxi drivers considering electric taxi operational constraints. We evaluate the effectiveness of the optimal policy of Markov Decision Process using a big data study of realworld taxi trips in New York City. The optimal policy can be implemented in an intelligent recommender.
system for taxi drivers. This becomes more viable especially due to the advent of autonomous vehicles. Our evaluation shows that computerized service strategy optimization allows electric taxi drivers to earn comparable net revenues as ICE drivers, who also employ computerized service strategy optimization, with at least 50 kWh battery capacity. Hence, this sheds light on the viability of electric taxis.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 Mb.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 512 Mb

**SOFTWARE REQUIREMENTS:**

- Operating system : Windows 7/UBUNTU.
- Coding Language : Java 1.7 , Hadoop 0.8.1
- IDE : Eclipse
- Database : MYSQL

**REFERENCES**
