**Obsah obrázku text

Popis byl vytvořen automaticky**

Analýza a klasifikace nabíjecích dat pro mikro sítě  
Charging Data Analysis and Clasification for Microgrids

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Diploma Thesis

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Abstract

Electric vehicles are becoming part of a large company fleets. More often, charging stations are installed into their facilities. This bachelor thesis deals with historical fleet data usage to make decisions about the sizing of the charging stations. In our thesis, we research related publications. On their basis, we predict an optimization of the sizing of charging stations in company’s facility. The optimization method is tested for a different number of available chargers. Last, we predict two possible scenarios of fleet transition from vehicles with combustion engines to electric vehicles. We test the sizing of stations on unknown charging demand. Results show approximately a 10% higher success rate of optimized setup in comparison with uniform setup. The optimized setup handles unknown demand well, and its performance is onl

# Introduction

Electromobility, specifically electric vehicles (EVs) have been on the rise during recent years because they are one of the possible alternatives to vehicles with combustion engines. Although it is not the goal of this thesis to decide which alternative to combustion engines is the right one, EVs have the potential to decrease our dependency on non-renewable resources and create a more sustainable environment. As part of the transformation from combustion engines to electrical engines, changes in infrastructure are inevitable. With an increasing number of EVs, charging stations will have to increase the number of available chargers. If the charging station wants to be operated efficiently, the number of chargers should not be random. Using traffic data, we can estimate charging demand and offer a sizing solution for multiple charging stations with respect to budget limitation.

Despite having a promising future, electric vehicles still have some disadvantages over combustion engines. EVs have a significantly lower range in comparison with combustion engines. With 450 kilometers vs. 700 kilometers [2], and their range is more volatile to external influences, such as freeze or high temperatures [3]. Low range combined with infrequent charging infrastructure can lead to range-anxiety [4], fear that the vehicle has insufficient range to reach its destination. Range-anxiety and high price are considered to be one of the major barriers to large-scale adoption of EVs. While it takes approximately 5 minutes to fuel tank with petrol, even the fastest chargers will need at least 30 minutes [5] to charge a battery up to 80%. If a vehicle is charged from standard electricity output at home, charging time increases up to approximately 5 hours. With different recharging habits and increased numbers of EVs emerges a problem with infrastructure. In places with available space, positioning of charging stations can be tailored to the needs of EVs. The situation will be far more complicated in cities and industrial facilities where almost every bit of free space is taken by existing infrastructure. In those places charging infrastructure will have to adapt to existing parking lots and fuel stations. In the case of industrial areas, the problem is slightly different. The owner or property manager is responsible for the placement of charging stations in those areas. They provide recharging services available for their in-house vehicles only. To achieve effective and economical service, optimization of charging stations capacity will be needed. Most scenarios of charging demand do not have linear traffic at charging stations. In cases with irregular traffic, charging demand distinctly differs during the day. Full coverage of such demand would require a large number of charging stations and thus become economically unbearable. Planners of recharging infrastructure have to find the optimal trade-off between charging demand satisfaction during rush hours and expenses on charging stations.

# Experiment:

# Summary:

# Conclusion:

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