

Chapter 4

Machine Learning for Optimal Matching Management Techniques With Vehicular Network Communication Models

N. Anitha

 <https://orcid.org/0000-0003-0381-2437>

*Periyar University Centre for
Postgraduate and Research Studies,
India*


A. Manshath

*B.S. Abdur Rahman Institute of Science
and Technology, India*

Shaik Moinuddin Imran

*Sri Venkateswara Institute of
Technology, India*

B. Ranjitha

 <https://orcid.org/0000-0003-2138-8430>

Mohan Babu University, India

Manish Kumar Thakur

Acharya Institute of Technology, India

Mohit Tiwari

 <https://orcid.org/0000-0003-1836-3451>

*Bharat Vidyapeeth's College of
Engineering, India*

ABSTRACT

The varied types of Vehicular Networks Communication models (VNCM) circumscribe the decision-makers into a chaotic decision-making environment. The choice-making of VNCM is purely dependent on the attributes of traffic volume, vehicle density, road type, weather conditions, and application demands. However, the attribute of management techniques with the attribute values of dynamic routing, load balancing, and congestion control is more significant in choosing the desirable communication model. This challenging decision-making problem shall be resolved by applying the

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machine learning approach. This chapter proposes a matching model with supervised data that associates VNCM with management techniques and other core attributes. Supervised machine learning algorithms are applied to develop a matching model that best associates the VNCM with the management techniques considering vehicular efficiency. The performance metrics are computed to determine the most promising algorithm and to validate the consistency of the model. The results of the decision model facilitate the choice-making of the VNCM and also serve as the foundation for the construction of a predictive model.

1. INTRODUCTION

The transportation systems are getting modernized and intelligent with the integration of vehicular networks. Intelligent system of transportation is indeed a great revolution as it transforms the transportation infrastructure with the features of safety, efficacy and sustainability. These advanced systems optimize traffic collisions, congestions within ideal time (Sharma & Khanna, 2018). This smart communication networks between the vehicles and road side units ensures effective and smarter transportation systems and they are termed as vehicular network communications. There exist different kinds of networks, to be more precise, vehicle to vehicles, vehicle to pedestrians, vehicle to infrastructure, vehicle to grid and many others. Each of the vehicular networks has the efficiency of staging effective communications with network connectivity, reliability and safety. The transportation remains smarter only with the right choice of the vehicular network. These networks are turned to be more competent by the exchange of data between the vehicles and other entities. The flaws causing traffic chaos are treated well with the intervention of such modern transportation systems.

The proliferating vehicular networks are made competent by augmenting with the entities of management techniques and other required features. These techniques are highly potent in resource optimizations, effective communications and reliable connections. The techniques shall also be grouped into several categories based on channel access techniques, routing protocols, quality service, standardization, security and privacy. The efficiency of the vehicular networks is highly influenced by the channels used, routing protocols, quality service management, security features, self-organization, recovery standards, interoperability and network performance. The choice making of the vehicular networks is also dependent over the afore mentioned aspects. The deeper investigation on the factors contributing to the vehicular reliability has delve into other factors pertaining to both intrinsic and extrinsic (Eziama et al., 2018). One has to take into considerations of the environmental conditions

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