Effective Analysis for Automating Fleet Management Based on Vehicle Performance Factors

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Declaration

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text, and a list of references is given.

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Dedication

I dedicate my dissertation work to my family and friends who have supported and encouraged me throughout this project.

Acknowledgement

I am using this opportunity to express my gratitude to everyone who supported me throughout this research. I am thankful for their aspiring guidance, invaluable constructive criticism, and friendly advice during the project work. I am sincerely grateful to my lecturer Mr. Chaman Wijesiriwardhana for sharing truthful and illuminating views on several issues related to the project. I would like to express my sincere gratitude to Dr. M. Firdhous for feeding me knowledge and guidance when doing my research. Special thanks to my sister Jayani Gurusinghe and best friends Thaveesha Gamage, Amasha Perera, and all the batch mates of the M.Sc. in IT degree program who have supported me in every possible way.

Abstract

Various fleet management systems are used by companies where transportation is the main business function. Fleet management applications are used for vehicle tracking purposes and mechanic diagnostic purposes to troubleshoot problems related to vehicles. Fleet management (FM) is used in vehicle maintenance as well as improving vehicle and driver performance, speed control, fuel management, and many other different areas to improve the business operation in different aspects. The usage of FM systems improves fleet productivity and efficiency, reduces transportation costs, and minimizes vehicle investment risk. For businesses like cash in transit, fleet systems are used to monitor operations and to ensure security. This research proposes a systematic procedure to the Cash-In-Transit (CIT) division of the AB Securitas (Private) Limited. The CIT division receives job requests from customer locations of different geographical areas. Based on daily job requirements, routes for vehicle operations are identified, and resources for each route are allocated by considering different factors such as productivity, cost reduction, secure transport, vehicle condition, the distance between customer locations, vehicle availability, and profit. Since the CIT operating unit uses both company-owned and hired vehicles for their operations, there should be a scientific process to assign both vehicles profitably. However, in order to allocate the vehicles to the daily jobs effectively and cost efficiently, several factors need to be considered. When it comes to allocating vehicles to daily jobs, vehicle performance is a key factor to be considered. It is obvious that vehicles with higher performance need to be allocated to the most appropriate jobs and routes to gain a considerable profit. The proposed solution aims to overcome the issues and unjustified matters identified in the current manual process and reduce the complexity of the allocation method. Further, this solution provides a detailed analysis of the impact of vehicle breakdowns on vehicle performance since it is a key factor that needs to be considered in order to allocate the right vehicle to the most appropriate job accurately. Keywords: Fleet management, Transport productivity, Vehicle performance, Vehicle breakdowns

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