Valuation of Used Vehicles: A Computational Intelligence Approach

Amjadh Ifthikar
Department of Software Engineering
Informatics Institute of Technology
Colombo, Sri Lanka
amjadh.2014262@iit.ac.lk

Kaneeka Vidanage
Department of Software Engineering
Informatics Institute of Technology
Colombo, Sri Lanka
kaneeka.v@iit.ac.lk

Abstract — **In most of the countries in the world, the number of vehicles has increased exponentially in the past decade. As a result, the used vehicle trade has flourished. In order to determine the resale value of a vehicle or for financial requirements such as vehicle leasing services, used vehicle valuation is paramount. In order to meet the future demand, a proper mechanism using computational intelligence is needed for vehicle valuation in order to overcome the inefficiencies of conventional and subjective valuation mechanisms. This paper focuses on discussing aspects regarding used vehicle valuation, previous work related to the domain as well as the proposed solution. The proposed solution intends to use real-time web scraping and machine learning in order to determine the value of a given vehicle.**

Keywords — vehicle; valuation; computational intelligence; web scraping; machine learning

I. INTRODUCTION

Valuation, in general, is the mechanism of finding the present market value of a future income flow. In automobile valuation, the value presented in a valuation report should represent the correct resale value of a vehicle.

When people seek the assistance of a financial institution in order to find the necessary financing for a vehicle, they focus on obtaining the real value of the vehicle. In order to get it, a valuation report is requested. Hence, a proper mechanism to obtain a value for a vehicle is paramount in such a scenario.

Due to the competition in the vehicle leasing industry, it is vital for a leasing company to give a reasonable as well as profitable price to remain a profitable company. A manual mechanism is used in Germany when calculating the second-hand vehicles and mentions that the system in place consists of major limitations in the attributes considered and also there is no proper mechanism to capture the attributes correctly [1].

Valuation of vehicles is important to leasing companies in order to avoid losses as well as for people who have bought new vehicles and are willing to sell the vehicle at an appropriate price [2].

Valuation is an appraiser's opinion - judgment from the gathered information - it depends on the appraiser's skills, knowledge, and experience; furthermore, proper data analysis methods are very significant to make a decision in an appraisal of a property [3].

With the number of vehicles increasing exponentially, the current process of manual valuation will become a difficult, time consuming and ineffective process. Therefore there is a clear research gap where a technological solution can be provided to appraise vehicles faster and much more accurately.

Hence, this paper proposes a computational intelligence approach to automate the process of vehicle valuation by dynamically scraping data from second-hand vehicle selling websites and using machine learning to determine the value of a vehicle. Using the system proposed, the vehicle valuation process will be able to become more scientific and objective.

Once the proposed system is developed, apart from formal vehicle valuation processes, a tool of this nature can also support various other use cases as well. They are listed below.

- For accounting purposes in situations such as creating final accounts at the end of the financial year, the residual value of the assets is calculated.
- In order to decide insured amount in a vehicle insurance so that when an accident occurs, you get a correct value.
- To decide the amount received by the insurance holder in case of a condemned accident.
- To assist vehicle sellers to decide an appropriate selling price.
- To help used vehicle dealers when buying and selling.
- To help someone who is going to buy a vehicle to decide whether the price he/she is paying is correct.

In this paper, an analysis of the theoretical background and related work regarding the domain of vehicle valuation have been conducted. Subsequently, the proposed solution is explained in detail.

II. THEORETICAL BACKGROUND

Valuation is a process of finding the present value of a future income stream of a return to a property based on past and current information. Valuation, in its simplest form, is the determination of amount for which the property will transact on a particular date.

Further as per the Royal Institute of Chartered Surveyors, valuation is a hypothetical transaction. The very act of asking for a valuation is equivalent to putting the