RECOMENDATION OF ELECTRIC SCOOTER USING FUZZY LOGIC*

BY

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ABSTRACT

Today's the world is moving towards electrification and with the revolution, there is even a revolution in the field of automobiles with the launch of various electric vehicles. As the market has various electrical vehicles of different companies, the customer is always confused about which one to buy as different brands have different functions of a vehicle such as power, speed, battery capacity. The project will help a customer to select the right vehicle using fuzzy logic. The project uses fuzzy logic to show the output when input is selected as ride range the output will show top speed, battery capacity, and max power. Fuzzy Logic is used with Neural Networks as it mimics how a person would make decisions, only much faster.

The project uses the fuzzy logic toolbox available in MATLAB in fuzzy logic toolbox Mamdani method is used to execute the output. The fuzzy logic designer layout displaying one input and three output. The fuzzy logic uses the Mamdani system.

KEYWORDS

Fuzzy Logic, Prediction, Electric Scooter, Fuzzy Toolbox.

I.INTRODUCTION

Fuzzy logic is a kind of valued logic wherein the truth value of independent variable can be any real value between 0 and 1.It is being used to cope with partial truth, in which the truth value will be between true and false.Variable truth values in Boolean logic, on the other hand, can only be 0 or 1. In 1965, Lotfi Zadeh introduced fuzzy set theory, giving rise to the term fuzzy logic.

Fuzzy logic is based on the idea that humans make decisions based on imprecise and non-numerical data. Mathematical representations of uncertainty and imprecise data are regarded as fuzzy models or sets (hence the term fuzzy). These models can identify, portray, modify, analyse, and exploit data and information that is confusing and untrustworthy.

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From control theory to artificial intelligence, fuzzy logic has been tested in a number of domains. Only true or false conclusions are permissible in classical logic. There are a few exceptions to this rule. queries with a wide range of outcomes, such as soliciting category of of people to name a colour. In such instances, the truth arises via reasoning based on partial or inaccurate information, with sample answers depicted on a spectrum.

The process of assigning integral input from a system to fuzzy sets with some degree of membership is known as fuzzification. This level of membership can range from 0 to 1. If the value is 0, it does not belong in the fuzzy set; if it is 1, it does. We can reason with the system in a linguistically acceptable manner by assigning the system input to fuzzy sets.

Fuzzy logic functions as membership values which is manner similar to Boolean logic. The goal is to convert a continuous variable from a set of fuzzy truth values. This would be simple if the output truth values were identical to those retrieved by fuzzification of a specific integer. However, because each output truth value is computed separately, they rarely represent a group of numbers. Then, for various truth values of fan speed, one must pick a number that best reflects the truth value's "intention," such as an actual speed that best fits the calculated truth values of the variables'slow,' moderate,' and so on. For this, there is no one algorithm that may be utilised.

II.METHODOLOGY

Soft computing has various techniques in it and one of them is the fuzzy logic which uses the logic of AND logic and OR logic in it. Mamdani and Sugeno systems. The implantation of prediction of the electric bike uses the Mamdani system with the help of the MATLAB tool. Mamdani system was introduced to create a control system by providing linguistic control rules.

The rules used in the project are logical AND gate in the Mamdani system with various linguistic variables for the prediction of the electric bike such as power, speed, battery capacity. The user selects the riding range as input from various companies available in the system and with the help of the Mamdani system and AND logic gate it helps the user to select the right electric bike with output parameters such as top speed in km/hr, battery capacity kWh and max power in watt.

The fuzzy logic designer layout displaying one input and three output. The fuzzy logic of theses Mamdani system

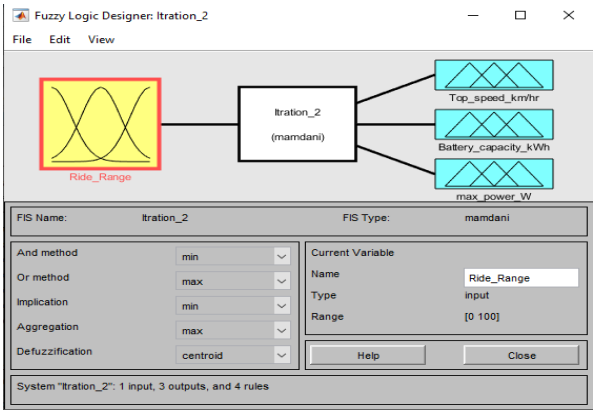

Figure 1. The below the is membership function showing variables pre-defined with the values set between the defined range of data.

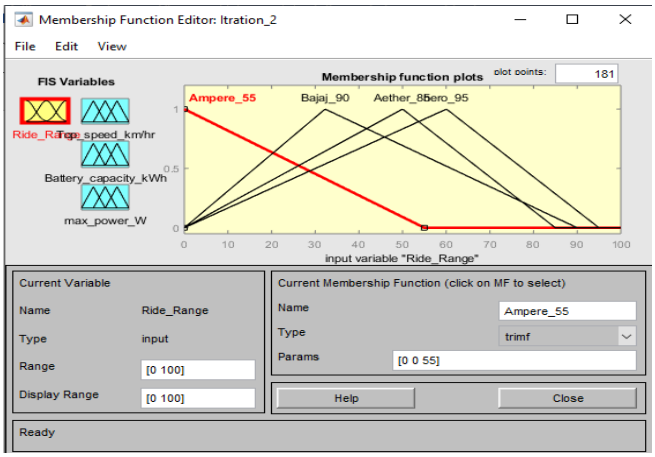

Figure 2. The below display shows the rules defined for fuzzy logic using ‘AND’ logic

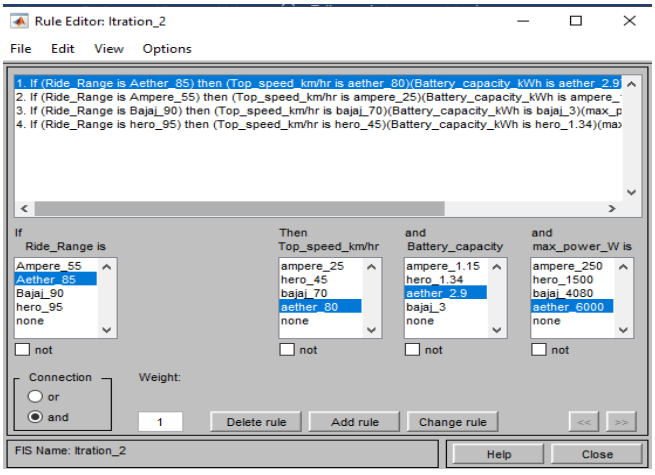

Figure 3.

The image shows the ‘Rule viewer’ which is the output. When a user moves the bar in the input range which is Ride range the output is displayed such as Top speed, battery capacity, and max power. Below are two titrations shown

III.RESULT

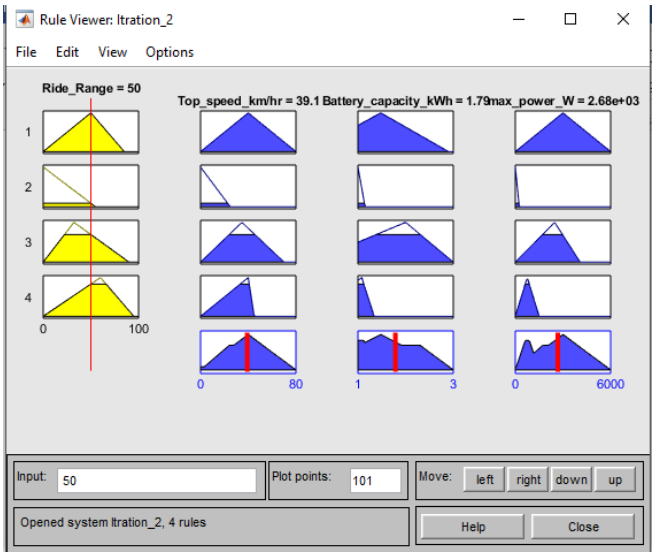

Figure 4. The riding range is adjustable that suggest a type of electric scooter when randomly adjusted

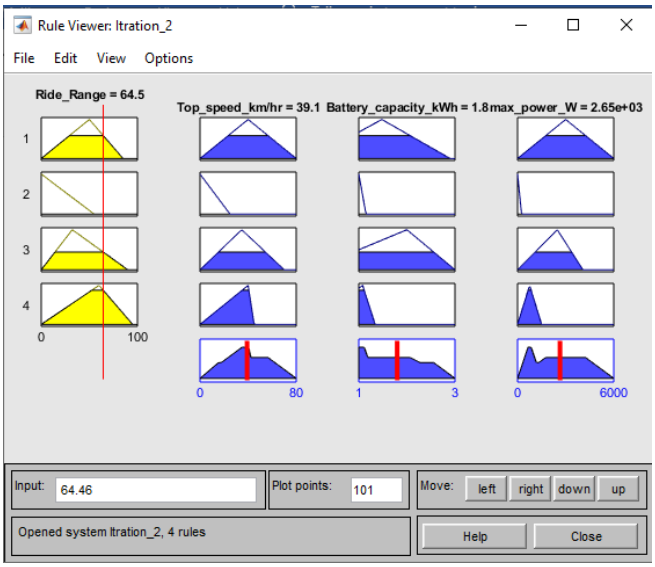

Figure 5: Rule Viewer

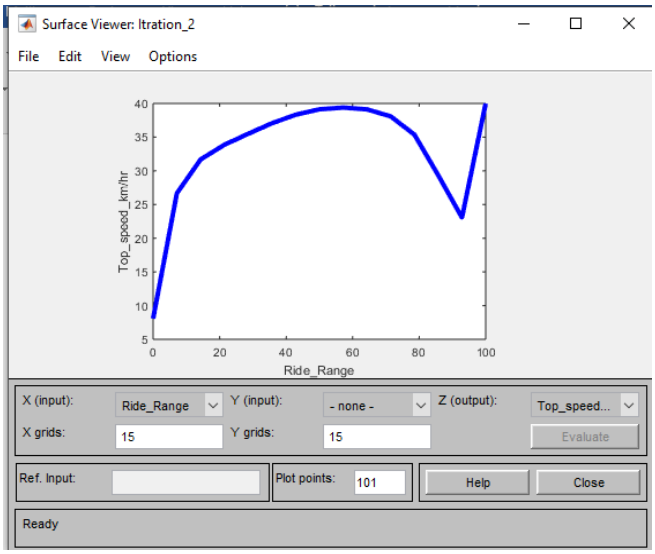

Figure 6 : Surface Viewer

IV.CONCLUSION

Through this project, we observed the prediction of Electric scooters for people based on different criteria. Based upon top speed, battery capacity, ride range, power. This project can help with clearing confusion and dilemma of people on what scooter they what to pick. The project still has some defects in it and is not yet ready for commercial use but with proper and advanced use of artificial intelligence, the project can be improved.

V.REFERENCES

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