

Electric Bikes Over Fuel Bikes with the Help of ANFIS Model in India

Priya Mishra, Karthiga Pandi, P. Srinivasan, M. Moovendan

Abstract--- India is fairly a big country among all Asian countries, so as huge amount of population. And in upcoming era pollution will also grow proportionally. Concerning about pollution caused by bikes will also increase. A survey claimed that in upcoming years 80% of fuel vehicles will be replaced by electric vehicles. The use of electrical vehicles to make India "pollution free". There are many electrical bikes now on road to implement an idea claimed as pollution free. Pollution free is not only the term comes under consideration but also the consumption of power. Increasing rate of electric vehicles are having directly proportional relationship with more amount of power generation. The study of rate of power consumption will help to have a big picture of how much amount of power should be more generated.

Keywords--- Electric Bikes, Effect on Nature, Energy Consumption.

I. INTRODUCTION

Petrol prices are unpredictable, the price will increase or decrease will totally depend on the demand rate and production rate.

And countries like India every second person's choice for vehicle is bike because it reduce the time consumption and as well less maintenance.

In India glut of bikes consume petrol and so the price of petrol will increase rapidly depending upon the production demand. The problem related with can be supplanted by introduction of e-bikes in India. Some companies already introduced e-bikes on road and advantage of it is, they don't need petrol, instead of that as the name suggest it needs electricity for charging and by one time charging it can go almost 500km.

The introduction of e-bikes is revolutionary as increment on the prices of petrol can be observed in the graph given below.

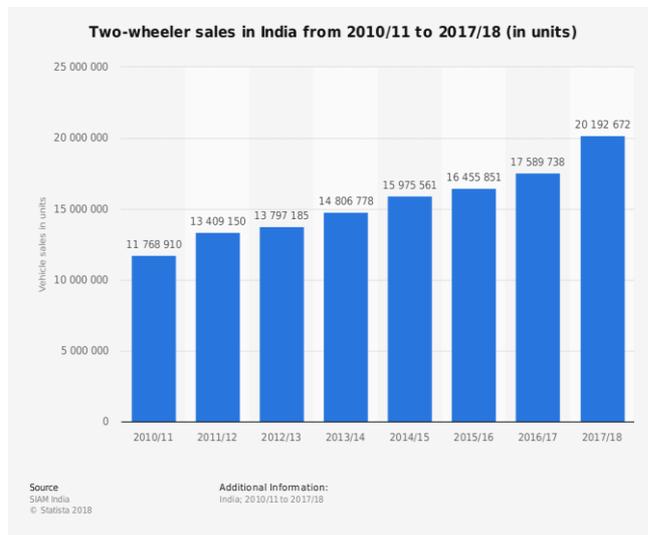


Fig. 1: Statistic report of petrol prices in India

The above graph (fig. 1) shows the sale of two wheelers in India from 2011 to 2018 under reference SIAM India statistics, the sale of two wheelers is blatantly increasing.

The energy consumption in different sector is also considered before approaching towards e-bikes, as production of electricity comes under the observation.

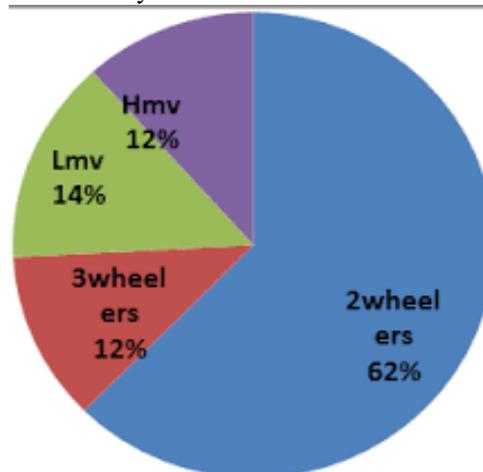


Fig. 2: Energy consumption by vehicles in India

Energy is consumed by all types of vehicles, and according to pie chart (fig. 2) demonstrated above shows the large area for 2 wheelers vehicles.

Whereas e-bikes are purposely proposed for pollution free environment. According to department of transportation e-bikes can go around 500+ miles and total charging time can vary from 2- 12 hours.

Manuscript received June 10, 2019.

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II. METHODOLOGY

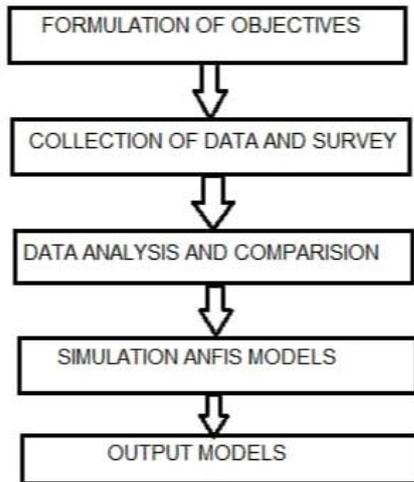


Fig. 3: Overall of methodology

In this section the overall data is taken and all the data are from official site of the companies, analysis is done and with the help of FIS system the simulation is performed.(fig. 3)

Input data

Energy consumed by bikes of different companies are taken under consideration(less than 8 companies), the most commonly sold bikes all over India of each companies. All data are compared by the factors including size of engine, capacity for fuel, servicing time, distance and average speed. The data are used in ANFIS simulation model, the collation is done for each input. Numbers of sample are collected by Taro Yamane theory with confidential level of 95%, the number of population is considered as 10,000 and the number of sample is observed through the simulation. The collection of data is from various companies' official sites.

ANFIS modelling

System based on the comparison of the values, consists of rules, input membership functions, output membership functions, multiple inputs and an output (fig. 4). A type of artificial neural system based on Takagi-Sugeno fuzzy inference system. Adaptive neuro fuzzy inference system(ANFIS) is used for many hybrid based data, it combines intelligent technologies to get data and produce an output.

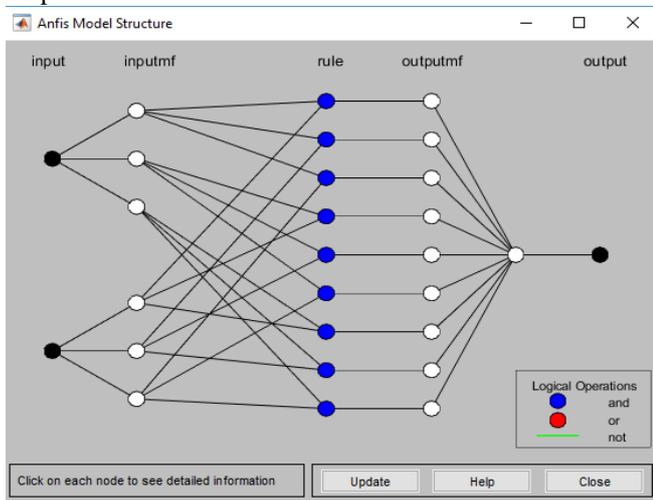


Fig. 4: Operation of ANFIS model

III. SUMMARY RESULT

Information is collected from various company's official sites, the data are for the average bikes running on the road in India, they are compared with various factors. The data is statistically compared with help of FIS modeling. The factor conducts energy consumption detail as well as developing of model.

The survey and data collection

The samples are deliberately taken for bikes as the highest percent of transportation are bikes, the data are considered as the bikes which are recurrently seen and lie under financial blueprint.

As 6 companies lie under the survey detail and all the companies are well known.

The factors will be compared among them for their energy consumption, the factors which can be taken under consideration are size of engine, capacity of fuel, distance, average speed and servicing time.

The survey with help of fuzzy inference system will produce output using substructure of adaptive neuro fuzzy networks.

Simulation of ANFIS models

The simulation result consists of disperse graph between the energy consumption and the number of samples used (fig. 5).

The ANFIS models are developed and gblmf type of generating FIS is selected as the membership function. The fuzzy methodology is used for the 6 data given for energy consumption.(fig.6)

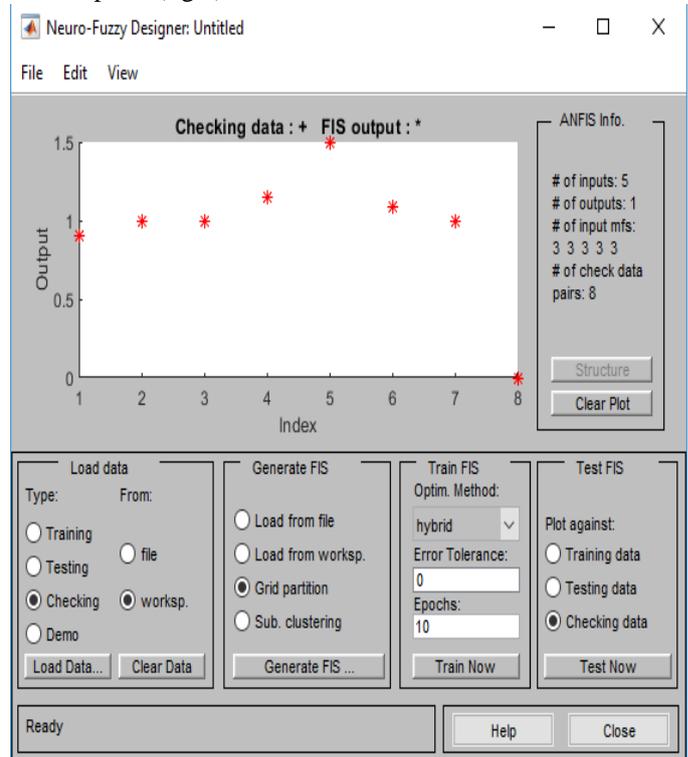


Fig. 5: Scattering of input data

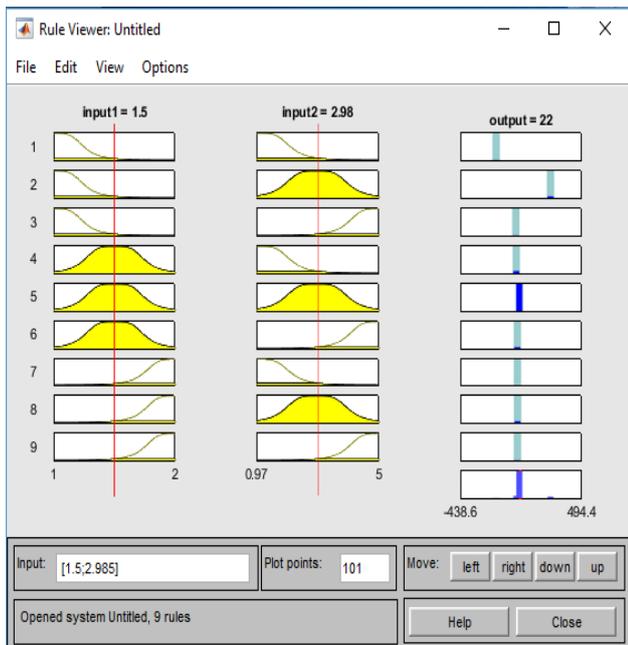


Fig. 6: Fuzzy methodology

IV. SIMULATION RESULT

The result shows the surfaces from ANFIS models of the factors taken under consideration. The main factor taken under consideration was petrol consumption and electricity consumption by e- bikes. The below tabulation shows the

Fuel cars surface model

The fuel consumption is simulated under the factors to describe the fuel consumption as well as pollution increase in India.

The graph (fig. 7) shows when all the factors are compared with each other and the graph.

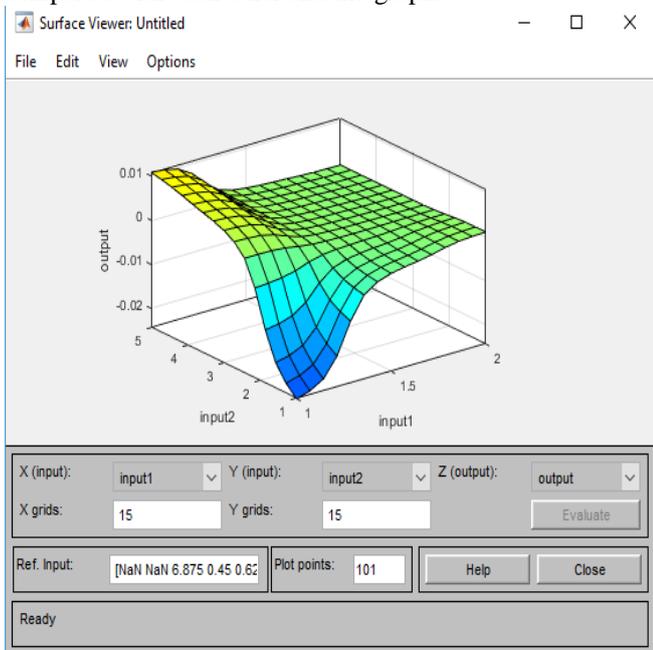


Fig. 7: Surface result of all factors

The second graph (fig. 8) shows the relation between the servicing time and the distance travelled by the fuel car, it is basically considered for the personal purpose excluding the racing bikes.

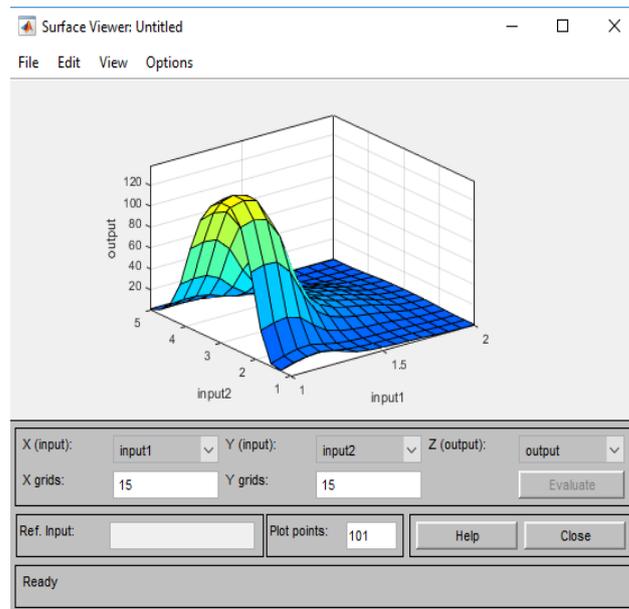


Fig. 8: Comparison of servicing time and average distance

This graph shows the relation between size of engines and capacity of fuel (fig. 9). This is taken under the consideration of all the average bikes on road.

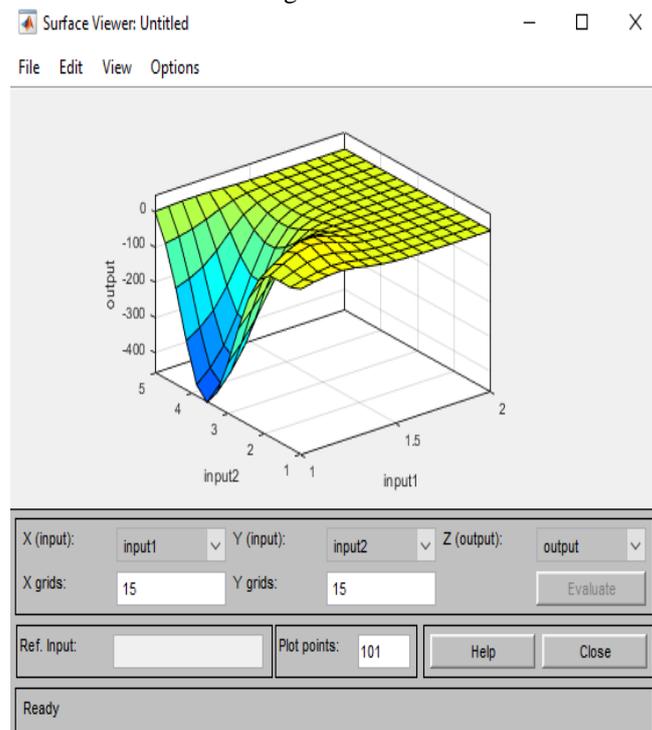


Fig. 10: Comparison between size of engine and fuel capacity

Electric car's surface result

The electric bikes surface is shown (fig. 11), factors taken under consideration are energy consumption, battery life, size of engines. The ANFIS methodology surface graph compares the maximum energy consumption to minimum energy consumption for e- bikes.



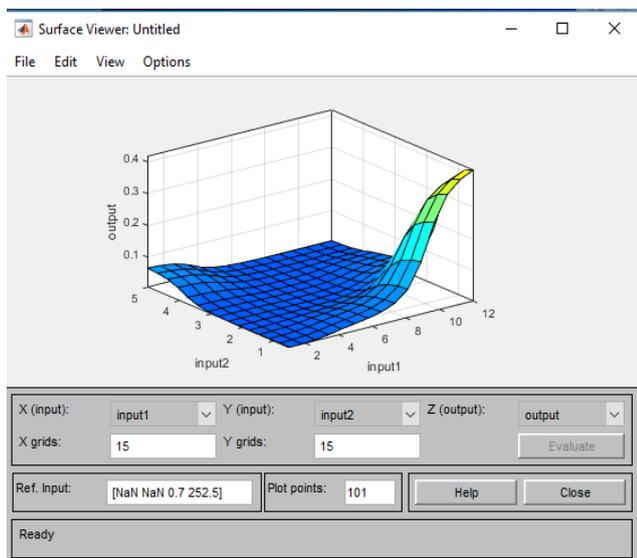


Fig. 10: Electric bikes surface model

V. SAVINGS AND CONSUMING

This section contain the comparison between e-bikes and fuel bikes. Though, it is obvious that fuel bikes creates more pollution and e- bikes are comparatively go easy for human survival.

The below tabulation shows (fig. 11 & 12) the factors effecting on the as shown, the factors contain percent value.

types of fuel	size of engine	fuel capacity	servicing time	distance	average speed
1	1.25	1.05	0.6	0.75	1
1	1.09	1.2	0.3	0.75	1
1	1.35	1.5	0.45	0.75	1.15
1	1.49	1.2	0.3	0.7	1.5
1	5	1.3	0.45	0.5	1.09
1	1.25	2.5	0.3	0.7	1
1	1.067	12.7	0.3	0.75	0.847

Fig. 11: Fuel bikes tabulation

battery	size of engine	avaerage speed	distance	hours
1	0.5	0.4	5	4.5
1	5	1	500	12

Fig. 12: Electric bikes tabulation

The factors affecting for fuel consumption bikes are more than that of electric bikes, as distance travelled by electric bikes for small charging time is more sufficient and efficient than fuel bikes.

Electric bikes are having one disadvantage of taking more time for charging batteries and this can be supplanted by most of its advantages that is creates less pollution and gives more desirable result. There is no problem of refueling and rise in petrol price.

ACKNOWLEDGMENT

This project “Electric bikes over fuel bikes with the help of ANFIS model” with its simulation is successfully achieved with fair results. I give credits to all who supported me directly and indirectly as well.

I would like to thank our project guide Mr. V.N. Ganesh for his constant source of inspiration. I am grateful to him for his encouragement and suggestions on my project.

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