International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

HAND MOUSE INTERFACE USING VIRTUAL MONITOR IN CONCEPT FOR NATURAL INTERACTION

[1] Akhila Meka, [2] Gudipuri Ramakrishna,[3] Prasanth Reddy Vangala, [4] Mohammed Nawaz Shareef

[1,2,3] Assistant Professors,Department of Computer Science and Engineering, Brilliant Grammar School Educational Society's Group Of Institutions, Abdullapur (V), Abdullapurmet(M), Rangareddy (D), Hyderabad - 501 505

[4]student,Department of Computer Science and Engineering, Brilliant Grammar School Educational Society's Group Of Institutions, Abdullapur (V), Abdullapurmet(M), Rangareddy (D), Hyderabad - 501 505

ABSTRACT

In this paper the "Hand Mouse Interface Using Virtual Monitor Concept for Natural Interaction" presents the development of a Virtual Mouse Control System utilizing hand gestures for clicking actions, implemented using Python. This project promotes an approach for the Human Computer Interaction (HCI) where cursor movement can be controlled using a real-time camera. it will proceed to compare the existing gesture within the frames with a list of gesture tip combinations, where different combinations consist of different mouse functions. If the current gesture combination found a match, the program will execute the mouse function, which will be translated into an actual mouse function to the user's machine.

I.INTRODUCTION

1.1 Project purpose

In the evolution of human-computer interaction, the quest for more natural and intuitive input methods has been ongoing. Traditional interfaces, such as mouse and keyboard, although effective, can sometimes feel cumbersome and detached from human movements. Gesture-based interaction systems have emerged as a promising solution to bridge this gap. By leveraging computer vision technologies, these systems interpret hand movements and gestures, offering users a more fluid and intuitive means of interaction with digital interfaces. This is an approach to virtual mouse control, focusing specifically on enabling clicking actions through hand gestures. Rather than relying solely on physical input devices, users can navigate and interact with applications using natural hand movements. By harnessing the capabilities of libraries such as Media Pipe, OpenCV, NumPy, and Py Auto GUI, our system provides an intuitive and efficient way for users to interact with digital interfaces. This approach holds significant potential for improving accessibility and user experience across a wide range of applications. The simplicity and effectiveness of our approach make it suitable for various applications, from enhancing accessibility for individuals with disabilities to facilitating hands-free

interaction in interactive environments. This introduction sets the stage for outlining the methodology and contributions of our virtual mouse system. Make this into very small points.

1.2 Project Definition

1.In modern era of computing, Human-Computer Interaction (HCI) is a noteworthy area of the field. HCI may be a multidisciplinary area of research that focuses on engineering design and, specifically, the interaction between humans (users) and computers. The creation of more collaborative and realistic interfaces is one of the most important challenges in Human Computer Interactions.

2.We are forced to use the devices that are pre-installed in our devices. The supply of a high-resolution pointing system with one, isolated two-dimensional cursor is currently absolute to computing environments. The modern algorithms provide the best solution of human interaction with computer day by day. Although computers have made tremendous advancements, the common human-computer interaction (HCI) still relies on input devices like keyboards and mouse. Later because Technology has been increased drastically wireless mouse was introduced soon enable hassle-free movement of the mouse and to enhance the accuracy.

3. Virtual Mouse using Hand Gesture goes to be a commendable change within the world of technology, where are employing our fingers to manage the mouse. This technology will make the computers interactions succeed in a new limit. This gesture movement is going to be programmed using the free sources soon make an ease for each individual user. Sources like OpenCV, Auto py, and Python etc. The virtual mouse is using the camera of its own system through which it'll be detecting the fingers. The main objective of this project paper is to cut back the price and to own accuracy at a high level besides of this we trying to help those people who are physically challenged and unable to use their hands on physical mouse so we try to give them an easy method to go their task easily and effortlessly.

II.LITERATURE SURVEY

Literature survey is the most important step in Hand mouse interface using virtual monitor concept for natural interaction.

[1]“Hand Tracking and Hand gesture Recognition for Human Computer Interaction” [Dejon Chandra Gope, Vol.4 No.6. Nov. 2012] The problem of hand tracking and hand gesture recognition for human-computer interaction is significant in the field of HCI. The implementation and analysis of a technique for estimating static hand poses based on vision are presented in this study. Using image processing in a 3D pointing interface is presented to estimate the pose of a with a finger motion. The vision community has investigated many methods for background-subtraction or skin-color segmentation to isolate human skin patches. However, this approach has a number of limitations in realworld applications because it uses a preset threshold for picture binarization and pre-set values for finger length and thickness. Despite achieving great speed and precision when measuring hand postures, this method is unsuitable for several

applications because to the restricted range of motion that the linked wires produce. As a result, we were unable to clearly discern the hand's shape from the video streaming. The scrolling result, however, indicated that the time was unsteady.

[2]"A Real Time Hand Gesture Recognition System Using Motion History Image" [Chen-Chaung Hsieh and Dung Hua Lieu, icsps, 2010] This system lacks a hand gesture system and instead relies on the generic mouse and trackpad method of monitor control. It is not possible to remotely view a monitor's screen using hand gestures. Although it is primarily attempting to implement, the scope is merely limited to the field of virtual mice. The hand recognition system is solely used for simple mouse actions in this project. This has few clearly defined activities and a lot of confusion.

[3]"Virtual Mouse Using Hand Gesture" [Swapnil Mathane, Prof. Shital Pawar, Kunal Chandak, Varad Deshpande, Firdaus Naseem,2022] In this research, a unique camera vision-based cursor control system is proposed, which makes use of hand motions recorded from a webcam utilizing a color detection method. The technology will allow users to move the entire cursor by using their hands to make distinct hand motions for the left click and dragging. In this study, an efficient hand gesture segmentation method based on preprocessing, background subtraction, and detection techniques is proposed. This project will focus on straightforward actions like clicking. And other hand gesture actions like transferring files between computers using complex socket programming and carrying out straightforward tasks that can be handled by hand recognition. System operates mouse functionalities by detecting red and performing mouse actions. This project's one limitation is that it cannot be completed in environments with many complicated backgrounds or lighting conditions. More precise hand detections must be made, though.

III.EXISTING SYSTEM

1.Hand Gesture Detection and Tracking:

The system employs computer vision techniques or depth sensing technologies to detect and track the user's hand movements in real-time. Algorithms analyze video frames captured by a camera to identify the position and orientation of the hand relative to the screen.

2.Gesture Recognition:

•Once the hand is detected and tracked, the system interprets specific hand gestures made with the index and thumb fingers as cursor control and clicking actions.

•Machine learning algorithms or heuristic rules are used to recognize predefined gestures associated with moving the cursor and clicking actions.

3.Cursor Control:

•Recognized gestures involving the index and thumb fingers are translated into corresponding cursor movements on the screen. Movements of the hand are mapped to the displacement and velocity of the cursor, allowing users to navigate through graphical user interfaces (GUIs) and interact with on-screen elements.

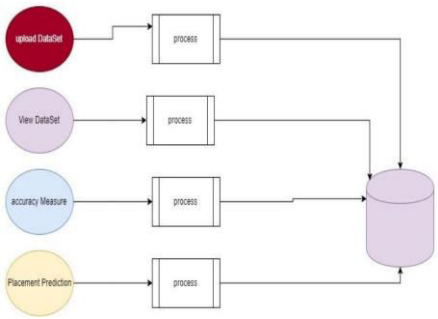
International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

IV. PROPOSED SYSTEM

As mentioned above Artificial Neural Networks (ANN) are often used to develop digital models for complex systems. The models proposed in highlight some of the difficulties faced by machine learning models when the input and output have different domains.In this study, the input is aggregated in the time domain over 10 minutes intervals and the output is fuel consumption over the distance traveled during the same time period. The complex system is represented by a transfer function F(p) = o, where F(•) represents the system, p refers to the input predictors and o is the response of the system or the output. The ANNs used in this paper are Feed Forward Neural Networks (FNN). Training is an iterative process and can be performed using multiple approaches including particle swarm optimization [20] and back propagation. Other approaches will be considered in future work in order to evaluation their ability to improve the model's predictive accuracy. Each iteration in the training selects a pair of (input, output) features from Ftr at random and updates the weights in the network. This is done by calculating the error between the actual output value and the value predicted by the model .

V.SYSTEM ARCHITECTURE

Software design plays a crucial role in the software engineering process, serving as a central component regardless of the development paradigm or application domain. It serves as the initial step during the development phase of any engineered product or system. The primary objective of a designer is to create a model or representation of an entity that will be constructed later. Once system requirements have been specified and analyzed, system design marks the inception of the development process, preceding the subsequent technical activities of coding and testing, which are essential for constructing and validating software. During the design phase, there is a continuous process of enhancing and refining data structures, program structures, and procedural details. These refinements are developed, reviewed, and documented. System design can be approached from both a technical and a project management perspective. From a technical standpoint, design encompasses four key activities: architectural design, data structure design, interface design, and procedural design.



5.1. System architecture VI.OUTPUT SCREENS

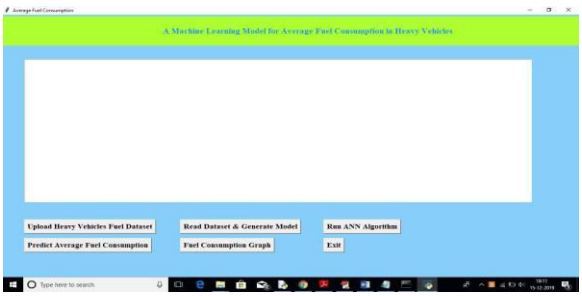


Figure 6.1 In above screen click on 'Upload Heavy Vehicles Fuel Dataset' button to upload train dataset

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

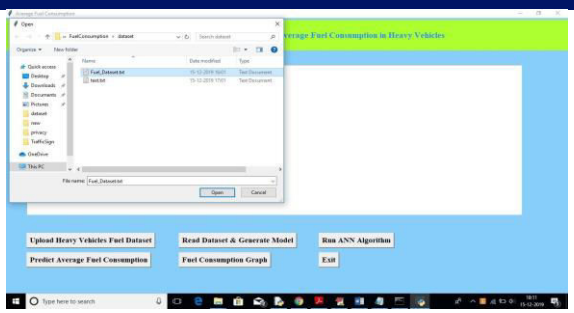


Figure 6.2 In above screen uploading 'Fuel_Dataset.txt' which can be used to train model. After uploading dataset will get below screen

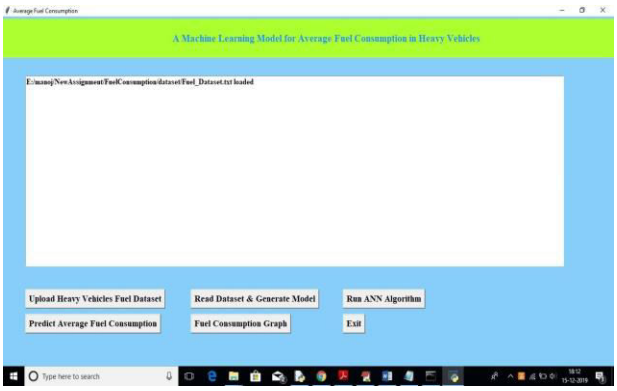


Figure 6.3 Now in above screen click on 'Read Dataset & Generate Model' button to read uploaded dataset and to generate train and test data

Figure 6.4 In above screen we can see total number of records in dataset, number of records used for training and number for records used for testing. Now click on 'Run ANN Algorithm' button to input train and test data to ANN to build ANN model.

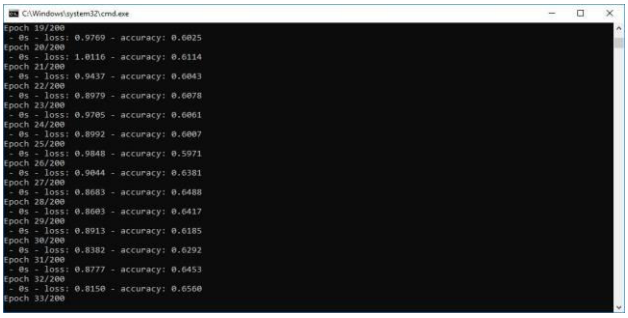


Figure 6.5 In above black console we can see all ANN processing details, After building model will get below screen

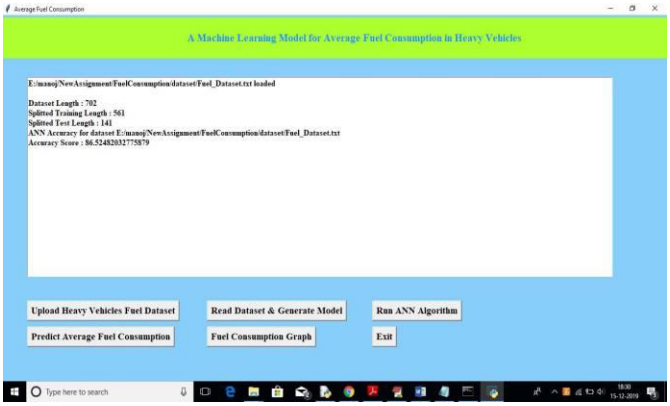


Figure 6.6 In above screen we got ANN prediction accuracy upto 86%. Now click on 'Predict Average Fuel Consumption' button to upload test data and to predict consumption for test data

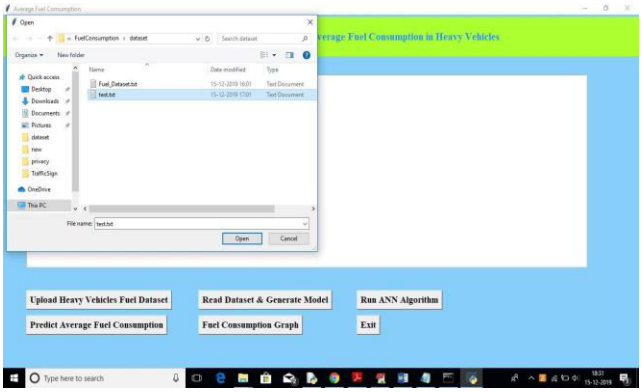


Figure 6.7 After uploading test data will get fuel consumption prediction result in below screen

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

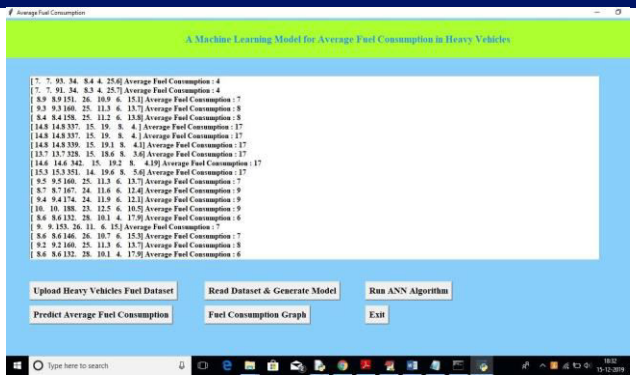


Figure 6.8 In above screen we got average fuel consumption for each test record per 100 kilo meter. Now click on 'Fuel Consumption Graph' to view below graph

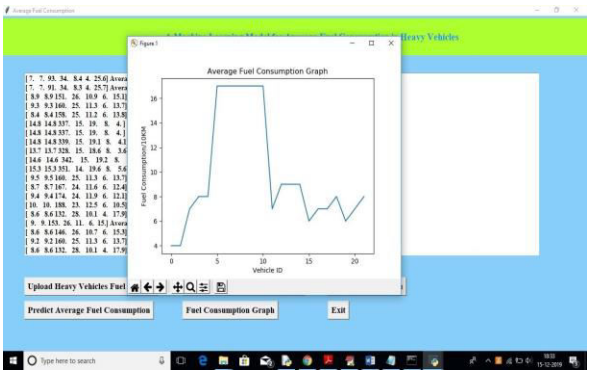


Figure 6.9 In above graph x-axis represents test record number as vehicle id and y-axis represents fuel consumption for that record.

VII.CONCLUSION

Machine learning model that can be conveniently developed for each heavy vehicle in a fleet. The model relies on seven predictors: number of stops, stop time, average moving speed, characteristic acceleration, aerodynamic speed squared, change in kinetic energy and change in potential energy. The last two predictors are introduced in this paper to help capture the average dynamic behavior of the vehicle. All of the predictors of the model are derived from vehicle speed and road grade. These variables are readily available from telematics devices that are becoming an integral part of connected vehicles. Moreover, the predictors can be easily computed on-board from these two variables. Machine learning model that may be created to be beneficial for each heavy vehicle in an armada. The seven indications that make up the model are: the number of stops, the stop duration, the average moving rate, the growth in trademark speed, the squared streamlined speed, the change in active energy, and the change in potential energy. The final two signs are discussed in this essay to help readers identify the normal and distinctive ways that each vehicle behaves. All of the model's indications are derived from street level and vehicle speed. Telematics devices, which are fast becoming an essential component of linked automobiles, may quickly access these parameters. Additionally, these two elements make it easy to figure out the signs.

VIII.FUTURE ENHANCEMENTS

The average fuel consumption project for heavy trucks utilising machine learning has the potential to lead to a number of developments in the future. These include investigating more sophisticated prediction models, such as ensemble approaches or deep learning architectures, to improve the precision and dependability of forecasts of fuel use. Sensors and telematics data may be used to provide real-time monitoring, providing quick feedback and fuel efficiency analyses. To proactively detect maintenance needs and optimise fuel use, predictive maintenance capabilities can be implemented. The project's scope can also be expanded by incorporating advanced

analytics techniques, predictive analytics for maintenance and fuel cost estimation, environmental impact analysis, and optimal route planning algorithms that take fuel consumption into account. These are the areas where the project focuses. may help heavy vehicle operations become more cost-effective, more environmentally friendly, and capable of making well-informed decisions.

IX.REFERENCES

[1]B. Lee, L. Quinones, and J. Sanchez, "Development of greenhouse gas emissions model for 2014-2017 heavy-and medium-duty vehicle compliance," SAE Technical Paper, Tech. Rep., 2011.

[2]G. Fontaras, R. Luz, K. Anagnostopoulus, D. Savvidis, S. Hausberger, and M. Rexeis, "Monitoring co2 emissions from hdv in europe-an experimental proof of concept of the proposed methodolgical approach," in 20th International Transport and Air Pollution Conference, 2014. [3] S. Wickramanayake and H. D. Bandara, "Fuel consumption prediction of fleet vehicles using machine learning: A comparative study," in Moratuwa Engineering Research Conference (MERCon), 2016. IEEE, 2016, pp. 90–95.

[4] L. Wang, A. Duran, J. Gonder, and K. Kelly, "Modeling heavy/mediumduty fuel consumption based on drive cycle properties," SAE Technical Paper, Tech. Rep., 2015. [5] Fuel Economy and Greenhouse gas exhaust emissions of motor vehicles Subpart B - Fuel Economy and Carbon-Related Exhaust Emission Test Procedures, Code of Federal Regulations Std. 600.111-08, Apr 2014.

[6]SAE International Surface Vehicle Recommended Practice, Fuel Consumption Test Procedure - Type II, Society of Automotive Engineers Std., 2012.

[7]F. Perrotta, T. Parry, and L. C. Neves, "Application of machine learning for fuel consumption modelling of trucks," in Big Data (Big Data), 2017 IEEE International Conference on. IEEE, 2017, pp. 3810–3815.

[8]S. F. Haggis, T. A. Hansen, K. D. Hicks, R. G. Richards, and R. Marx, "In-use evaluation of fuel economy and emissions from coal haul trucks using modified sae j1321 procedures and pems," SAE International Journal of Commercial Vehicles, vol. 1, no. 2008-01-1302, pp. 210–221, 2008.

[9]A. Ivanco, R. Johri, and Z. Filipi, "Assessing the regeneration potential for a refuse truck over a real-world duty cycle," SAE International Journal of Commercial Vehicles, vol. 5, no. 2012-01-1030, pp. 364–370, 2012.

[10]A. A. Zaidi, B. Kulcsr, and H. Wymeersch, "Back-pressure traffic signal control with fixed and adaptive routing for urban vehicular networks," IEEE Transactions on Intelligent Transportation Systems, vol. 17, no. 8, pp. 2134–2143, Aug 2016.

[11]J. Zhao, W. Li, J. Wang, and X. Ban, "Dynamic traffic signal timing optimization strategy incorporating various vehicle fuel consumption characteristics," IEEE Transactions on

Vehicular