AI Based Autonomous Car Driving Using Brainwaves

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ABSTRACT

In the current world, all types of cars are coming into the market, but not all people are not driving a car except a few. This paper considers the development of the brain-driven car. The purpose of our project is to control the car by physically disabled and abled person and also to reduce the accidents[1]. Since these cars will run on what the individual is thinking, they will not require any mechanical action of the driver. Most researchers hope that their work will eventually be incorporated into a machine with general intelligence (known as strong AI). Here, we use a methodology of AI (Artificial intelligence) which is the latest and advanced technology. It works on the asynchronous mechanism of Artificial intelligence. Also using the algorithm of Deep Learning algorithms gives fast processing and the major one of our projects is a dataset (human brain signal) for controlling the car. By using the brain signal the car will move automatically by what the controller is thinking. This is one of the advanced technologyin automobiles[2].

Keywords: AI, Deep Learning, EEG headset

1. Introduction

The branch of computer science is concerned with making computers behave like humans. The term was coined in 1956 by John McCarthy at the Massachusetts Institute of Technology. Currently, no computers exhibit full artificial intelligence. The best computer chess programs are now capable of beating humans. Today, the hottest area of artificial intelligence is neural networks, which are proving successful in several disciplines such as voice recognition and natural-language processing. Devices that pick up brain waves and translate them into mechanical action are being developed to control prosthetic limbs, robots, and video games. But now comes the Brain Driver, a car that is driven entirely by your thoughts and does not require to perform any mechanical operation of the vehicle. Brain-controlled technology has been implemented in all types of vehicles such as cars, bikes, bicycles, etc[1].**Artificial Intelligence** is an approach to making a computer, a robot, or a product to think how smart humans think. AI aims to improve computer functions that are related to human knowledge, for example, reasoning, learning, and problem-solving. Artificial intelligence (AI) is the ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans because they require human intelligence and discernment. AI will provide human-like interactions with software and offer decision support for specific tasks. AI technology is important because it enables human capabilities understanding, reasoning, planning, communication, and perfection. It gives perfect accuracy of the output[2].A regular car requires a human driver sitting behind the steering wheel and doing all the tasks from steering to navigating to gear-

shifting, it also may lead to making accidents. On the contrary, A self-driving car, also known as an autonomous vehicle, driverless car, or robotic car, is a vehicle that is capable of sensing its environment and moving safely with little or no human input. The future of this technology may have an impact on multiple industries and other circumstances. It may prevent accidents.So, the AI technology is entered into the autonomous vehicle is taken into the next stage which is AI-based autonomous car driving using brain waves. In this method, the car is fully controlled by the brain, hence not requiring any mechanical action. Finally, the organization of the study is to AI-based brain signal-controlled car to fully controlled by a brain is to become predict the accidents, accuracy and time-saving. This technology is not only used in a car but also used in various vehicles.

2. Literature review

a. Brain Controlled Car for Disabled Using Artificial Intelligence (Neuro Car)

This paper features about brain controlled car that uses asynchronous mechanism of artificial intelligence. This is of prime use to the physically disabled as it does not rely on any physical movements on the part of the individual. The car integrates signals from a variety of sensors like video sensor, weather monitor sensor, anti-collision sensor, steering sensor, Global positioning sensor among the others. Automatic navigation system ensures that the route to all the areas are mentioned in the database for selection by the driver. Automatic security system ensures the safety of the driver from the other autonomous vehicle. This system ensures that the handicapped is able to thrive individually without needing to depend on others for monitoring.This is an era of technology and artificial intelligence is going to conquer the globe in the years to come. With a few modifications to the existing system and an unanimous support from the government and the society, this project can be used to serve the disabled in greater ways and bring about a revolutionary change in the society. Thus the integration of bioelectronics with the automatic system is going to be the hour of the need for all futuristic vehicles.The brain is incredibly complex. All thoughts or actions are the result of simple electric signals in the brain is a gross understatement. There are about 100 billion neurons in a human brain. Each neuron is constantly sending and receiving signals through a complex web of connections. The driver has to think really hard and concentrate a lot to produce the distinct brain patterns which train the brain-computer interface to produce the corresponding sustained physical motion of the car[3].

b. EEG-Based Brain-Controlled Mobile Robots: A Survey

EEG-based brain-controlled mobile robots can serves powerful aids for severely disabled people in their daily life, especially to help them move voluntarily. In this paper, we provide a comprehensive review of the complete systems, key techniques, and evaluation issues of brain-controlled mobile robots along with some insights into related future research and development issues. We first review and classify various complete systems of brain-controlled mobile robots into two categories from the perspective of their operational modes. We then describe key techniques that are used in these brain-controlled mobile robots including the brain-computer interface techniques and shared control techniques. This description is followed by an analysis of the evaluation issues of brain-controlled mobile robots including participants, tasks and environments, and evaluation metrics. We conclude this paper with a discussion of the current challenges and future research directions.The major difference between brain-controlled mobile robots and other brain-controlled devices is that these mobile robots

require higher safety because they are used to transport dis-abled people. Many researchers have developed various brain-controlled mobile robots using different BCI techniques as well as other techniques such as intelligence techniques (in sensing situations, localization, and path planning) and shared control techniques so as to make these robots safer. The cost of EEG is effectively high and cannot take to any places and it take time to analyse the result[4].

c. A brain controlled Wheelchair to navigate in Familiar Environments

While brain–computer interfaces (BCIs) can provide communication to people who are locked-in, they suffer from a very low information transfer rate. Further, using a BCI requires a concentration effort and using it continuously can be tiring. The brain controlled wheelchair (BCW) described in this paper aim sat providing mobility to BCI users despite these limitations, in a safe and efficient way. Using a slow but reliable P300 based BCI, the user selects a destination amongst a list of predefined locations. While the wheelchair moves on virtual guiding paths ensuring smooth, safe, and predictable trajectories, the user can stop the wheelchair by using a faster BCI. Experiments with non dis- abled subjects demonstrated the efficiency of this strategy. Brain control was not affected when the wheelchair was in motion, and the BCW enabled the users to move to various locations in less time and with significantly less control effort than other control strategies proposed in the literature.To develop a brain controlled wheelchair for navigation in familiar environments, we decided to use a slow but reliableinterface for destination selection, and motion guidance for safe and autonomous navigation. The results obtained with healthy subjects demonstrate that our strategy enables them to move the wheel chair in a building environment safely, efficiently, with limited effort and in a reasonable time.To manufacture the wheelchair it takes more cost and the thinking capability is more important[5].

3. Research methodology

Fig.1 Shows To implement the AI based Autonomous Car Driving, we have to choose a vehicle which has a Bluetooth or Wifi connection, it could be connected with a computerwith EEGcaptured signals,then we have to take a decision from which direction we have to go (left,right,straight,forward,stop) for example, if we give a right direction command to the car suddenly the EEG captured right command signal and send to the computer, similarly it can captured the signal for left, forward, stop direction command which the signal is called Training set. Minimum we can store one thousand command like this. Then we have to prepared the algorithm to train the signal. After that when we driving a car we have to give the direction,for example if we think to go the forward direction, the computer automatically captured the signalby EEG. Then the captured signal is compared with previous signal. This technique is called Pattern matching. If the pattern is matching it can trigger the signal. Then the triggered signal is sent to the Microcontroller with the help of Bluetooth or Wi fi connection to the Robo Car. After that the car can start moving.
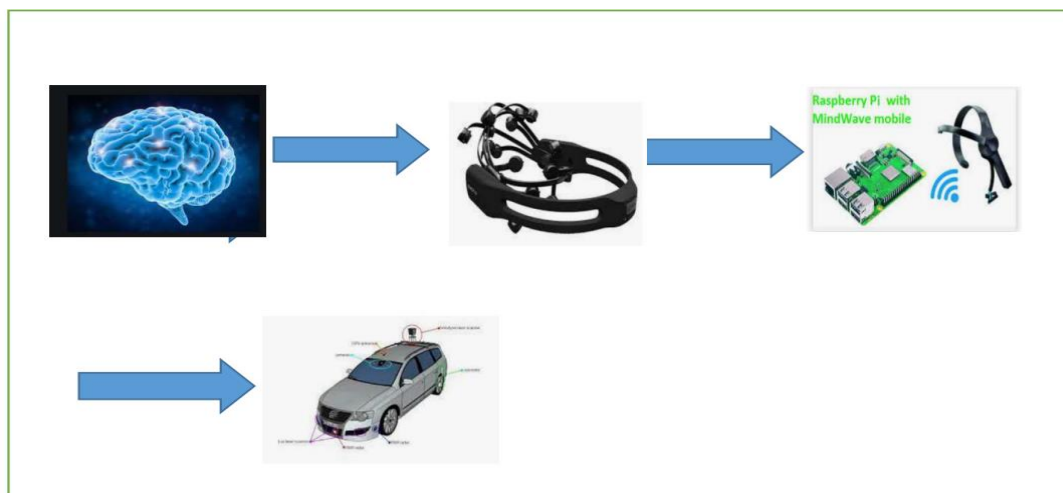
Fig.1.Brain controlled car

In this project, it has many methods like brain captured sensor method, EEG based method but here, we are using online dataset method which has the dataset already in online., so we have to train the signal using the Deep learning Algorithm because it gives the better output and fast processing.This method used in many fields like car, Ambulance and other automobiles etc,
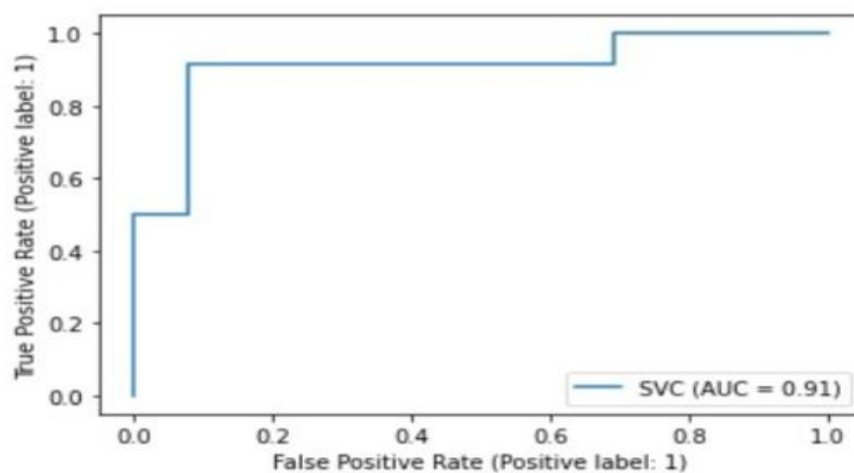
4. Results

Fig.2.Result of Proposed System

This is the graph of proposed system Fig.2 shows the time and accuracy level rate of the project. By using the deep learning algorithm it gives the fast processing and better output. Compared to existing method.

5. Discussion

In this method by using the dataset for comparing the signal it gives a proper output. that is controlling the car like the direction of left, right, straight, forward, stop. Comparing to the previous method it gives a accuracy level increases and take less time to reach the destination. By using the AI based autonomous car using brainwaves it is one of the latest technology in the automobile field. This emerging technology can make even the physically challenged person to be abled.

6. Conclusion

This technology would allow the driver to control the car with their mind itself. Drivers will be able to control their vehicle much faster than they would do with the conventional method.By using deep learning algorithm method we obtain the results like command left, right, straight, forward, stop. By introducing this method is useful for the all the peoples to drive a car easily and quickly. But don't stop this method here itself and make it to move to the next step of the technology.

7. References

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