



# BRAIN CONTROLLED CAR FOR DISABLED USING ARTIFICIAL INTELLIGENCE

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## ABSTRACT

This paper considers the development of a brain driven car, which would be of great help to the physically disabled people. Since these cars will rely only on what the individual is thinking they will hence not require any physical movement on the part of the individual. The car integrates signals from a variety of sensors like video, weather monitor, anti-collision etc. it also has an automatic navigation system in case of emergency. The car works on the asynchronous mechanism of artificial intelligence. It's a great advance of technology which will make the disabled, abled. In the 40s and 50s, a number of researchers explored the connection between neurology, information theory, and cybernetics. Some of them built machines that used electronic networks to exhibit rudimentary intelligence, such as W. Grey Walter's turtles and the Johns Hopkins Beast. Many of these researchers gathered for meetings of the Teleological Society at Princeton and the Ratio Club in England. Most researchers hope that their work will eventually be incorporated into a machine with general intelligence (known as strong

AI), combining all the skills above and exceeding human abilities at most or all of them. A few believe that anthropomorphic features like artificial consciousness or an artificial brain may be required for such a project.

## INTRODUCTION

The branch of computer science 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 a number of 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 required 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.

This technology would allow the driver to shift gears, change speed and acceleration with their mind itself.

## EMPATHY

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.

## DEFINE

A **brain-computer interface (BCI)**, sometimes called a direct neural interface or a brain-machine interface, is a direct communication pathway between a human or animal brain (or brain cell culture) and an external device. In **one-way BCIs**, computers either accept commands from the brain or send signals to it (for example, to restore vision) but not both. **Two-way BCIs** would allow brains and external devices to exchange information in both directions but have yet to be successfully implanted in animals or humans. In this definition, the word brain means the brain or nervous system of an organic life form rather than the mind. Computer means any processing or computational device, from simple circuits to silicon chips (including hypothetical future technologies such as quantum computing)

Once the driver (disabled) nears the car. The security system of the car is activated. Images as well as thermo graphic

results of the driver are previously fed into the database of the computer. If the video images match with the database entries then the security system advances to the next stage. Here the thermo graphic image verification is done with the database. Once the driver passes this stage the door slides to the sides and a ramp is lowered from its floor.

The ramp has flip actuators in its lower end. Once the driver enters the ramp, the flip actuates the ramp to be lifted horizontally. Then robotic arms assist the driver to his seat. As soon as the driver is seated the EEG (electroencephalogram) helmet, attached to the top of the seat, is lowered and suitably placed on the driver's head. A wide screen of the computer is placed at an angle aesthetically suitable to the driver. Each program can be controlled either directly by a mouse or by a shortcut. For starting the car, the start button is clicked. Accordingly the computer switches ON the circuit from the battery to the A.C. Series Induction motors.



**AUTOMATIC SECURITY SYSTEM:****IDEATE**

The impulse of the human brain can be tracked and even decoded. The Low-Frequency Asynchronous Switch Design traces the motor neurons in the brain. When the a physical movement is made, an impulse to the motor neuron is sent. These motor neurons carry the signal to the physical components such as hands or legs. Hence, we decode the message at the motor neuron to obtain maximum accuracy. By observing the sensory neurons we can monitor the eye movement of the driver.

As the eye moves, the cursor on the screen also moves and is also brightened when the driver concentrates on one particular point in his environment. The sensors, which are placed at the front and rear ends of the car, send a live feedback of environment to the computer. The angle of turn is calibrated from the distance moved by the dot on the screen.

**AUTOMATIC NAVIGATION SYSTEM:**

Programming the microcontroller assists us for providing the desired movement and controlling of motors by switching them on and off for particular track following. The main aim of Global Positioning System (GPS) Its main aim is location tracking and providing us the best route to reach to that point.

The computer automatically monitors every route the car travels and stores it in its map database for future use. With traffic monitoring system provided by am satellite radio the computer drives the car automatically. Video and anti-collision sensors mainly assist this drive by providing continuous live feed of the environment up to 180 m, which is sufficient for the purpose.

The EEG of the driver is monitored continually. When it drops less than 4 Hz then the driver is in an unstable state. A message is given to the driver for confirmation and waits for sometime, to continue the drive. A confirmed reply activates the program for automatic drive. If the driver is doesn't give reply then the computer prompts the driver for the destination before the drive.

**STEPS TO BE DONE IF COMPUTER IS HACKED**

When a car's computer is hacked through wireless, control the car while it was in motion, apply the brakes, selectively brake each wheel to steer, and shut down the engine completely. They were also able to shut down the brake and accelerator completely so the driver would have no control whatsoever - then removed malware once the vehicle had crashed.

**PROTOTYPE**

The biocontrol system integrates signals from various other systems and compares them with originals in the database. It comprises of the following systems

**BRAIN – COMPUTER INTERFACE**

Brain-computer interfaces will increase acceptance by offering customized, intelligent help and training, especially for the non-expert user. Development of such a flexible interface paradigm raises several challenges in the areas of machine perception and automatic explanation. The teams doing research in this field have developed a single-position, brain-controlled switch that responds to specific patterns detected in spatiotemporal electroencephalograms (EEG) measured from the human scalp. We refer to this initial design as the Low- Frequency Asynchronous Switch Design (LF-ASD)



control. Infinite real-time data acquisition (dependent upon hard drive size).

Real-time 3-D & 2-D FFT with peak indicator, Raw Data, and Horizontal Bar displays with Quick Draw mode.

Full 24 bit color support; data can be analyzed with any standard or user.

Customized color palettes; color cycling available in 8 bit mode with QuickDrawmode.

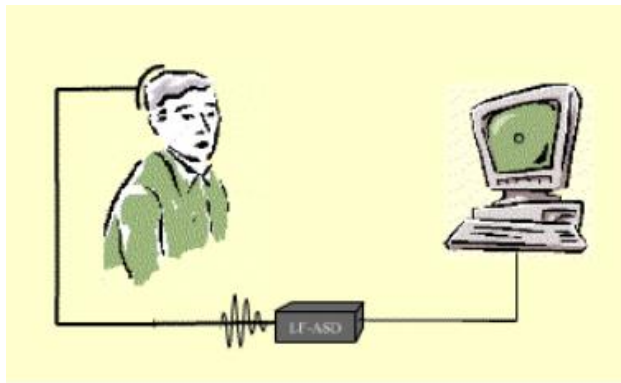
Interactive real-time FFT filtering with Quick Draw mode. Real-time 3-D FFT (left, right, coherence and relative coherence), raw wave, sphere frequency and six brain wave switch in one OpenGL display.

Full Brainwave driven Quick Time Movie, Quick Time

MIDI control; user configurable

Full Brain wave driven sound control, support for 16 bit sound; user configurable

Full image capture and playback control; user configurable.



The EEG is then filtered and run through a fast Fourier transform before being displayed as a three dimensional graphic. The data can then be piped into MIDI compatible music programs. Furthermore, MIDI can be adjusted to control other external processes, such as robotics. The experimental control system is configured for the particular task being used in the evaluation.

Real Time Workshop generates all the control programs from Simulink models and C/C++ using MS Visual C++ 6.0. Analysis of data is mostly done within Matlab environment.

## FEATURES OF EEG BAND

Remote analysis data can be sent and analyzed in real-time over a network or modem connection.

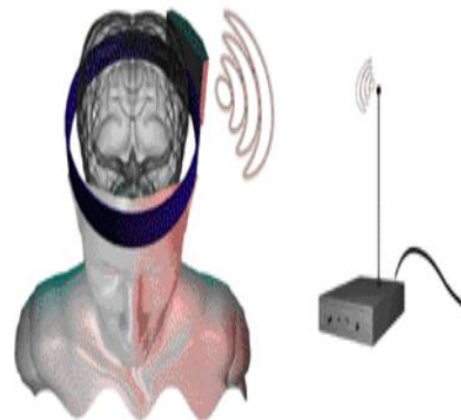
Data can be fully exported in raw data, FFT & average formats.

Ultra low noise balanced DC coupling amplifier.

Max input 100microV p-p, minimum digital resolution is

100 microV p-p / 256 = 0.390625 micro V p-p. FFT point can select from 128 (0.9375 Hz), 256 (0.46875 Hz), 512 (0.234375 Hz resolution).

Support for additional serial ports via plug-in board; allows extensive serial input & output



## CONCLUSION

This technology would allow the driver to shift gears, change speed and acceleration with their mind itself. Drivers will be able to control their vehicle much faster than they would do with the conventional methods. While braking, the time taken by the signals carried from the human being's nervous system to reach the brake pedal is saved, which will be very helpful in case of a sudden mishap on the road. This emerging technology can make even the physically challenged persons to be abled.

When the above requirements are satisfied and if this car becomes cost effective then we shall witness a revolutionary change in the society where the demarcation between the abler and the disabled vanishes. Thus, the integration of bioelectronics with automotive systems is essential to develop efficient and futuristic vehicles, which shall be witnessed soon helping the disabled in every manner in the field of transportation

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