INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3317 – 3322
RECEIVED : 15.03.2018 PUBLISHED : 19.04.2018
April 19, 2018

# AUTOMOBILE COLLISION AVOIDENCE USING INTERCONNECTIVE REPULSIVE SYSTEM

[1]keerthivasan R, [2]k S Srivastavan Iyer, [3]vyshnav A K, [4]m Vishal, [5]ganesan D

Department of Computer Science and Engineering, SRM Institute Of Science and Technology, Ramapuram, Chennai,India
Email: keerthivasan10e@gmail.com ; srivastavaniyer@gmail.com ; vyshnavak47@gmail.com ; vishalfps1023@gmail.com ; d.ganesan1@gmail.com

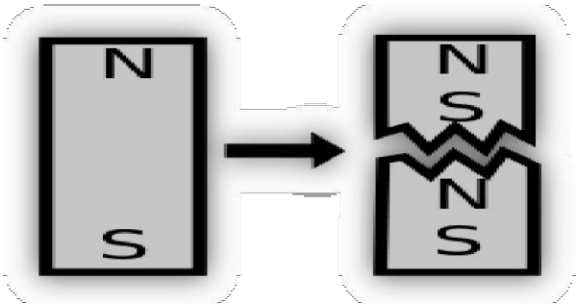
**Abstract:**

Road accident is the most unwanted thing to happen to a road user, though they happen quite often. The most unfortunate thing is that the road users do not learn from their mistakes on the road. Most of them are quite well aware of the traffic rules and safety measures while using the road. Main causes for the road accidents are over speeding, drunken driving, distractions to the driver, red light jumping, avoiding safety gears like seat belts and helmets and overtaking in a wrong manner etc. Various international and national researchers have found these as the common behavior of the road drivers which leads to the accidents. In order to overcome these road accidents, an intelligent idea is proposed. This idea deals with the use of artificial monopoles fitted externally to the vehicles so that the vehicle stops due to repulsion of the magnets. Usually magnets are dipoles which have the combination of both North Pole and a South Pole. But one exceptional case is the monopole; a magnetic monopole is a hypothetical particle in particle physics with only one magnetic pole. It has either a north pole without a south pole or a south pole without a north pole. Monopoles remain undetected until now but however several theories predict the existence of monopoles. A team of researchers from cologne university have managed to create artificial monopoles. Artificial monopoles possess similar characterstics to that of a monopole. Here, the link between monopole and the vehicle is explained. Artificial monopoles are fitted externally i.e front, rear and side in the vehicle. A force of repulsion is said to occur when the vehicles come close by. This force of repulsion plays a major role here. It causes the vehicle to stop immediately and automatically without waiting for the driver to apply the brake. The force of repulsion and the solutions to the problems caused by this method will also be discussed in the paper. Moreover, 'overtaking' is the major cause for the accidents to occur. Overtaking can be prevented by mounting a LIDAR sensor in combination with an alarm. This combination of LIDAR with an alarm will be highlighted in the paper. This paper clearly explains the application of the magnetic monopoles in the vehicles to prevent road accidents.

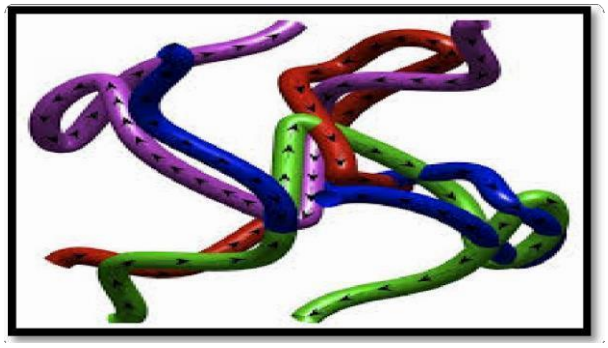
## I. INTRODUCTION

A magnet is a material or an object that produces magnetic field. Usually magnets are dipoles having the combination of both north pole and a south pole.

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3317 – 3322
RECEIVED : 15.03.2018 PUBLISHED : 19.04.2018
April 19, 2018




It is impossible to make magnetic monopoles from a bar magnet. If a bar magnet is cut into half, it is not the case that one half has a north pole and the other half has a south pole. Each piece has its own north pole and a south pole. A magnetic monopole cannot be created from atoms and electrons, but would instead be a new elementary particle.



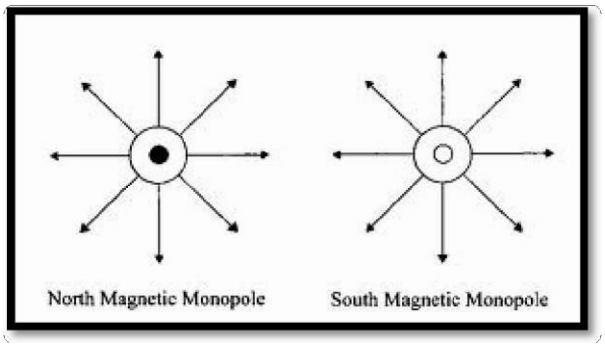
A magnetic monopole is a hypothetical particle in particle physics with only one magnetic pole. It has either a north pole without a south pole or a south pole without a north pole. In the material world, this is quite exceptional because magnetic particles are usually observed as dipoles which have a north pole and a south pole.

However there are several theories that predict the existence of monopoles. Among others, in 1931 the physicist **Paul Dirac** was led by his calculations to the conclusion that magnetic monopoles can exist at the end of tubes called **Dirac strings** that carry magnetic field. Until now they have remained undetected.

A team of researchers from Cologne, Munich and Dresden have managed to create artificial magnetic

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3317 – 3322
RECEIVED : 15.03.2018 PUBLISHED : 19.04.2018
April 19, 2018

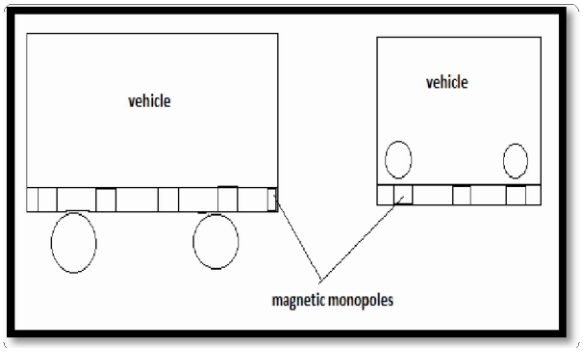
monopoles.



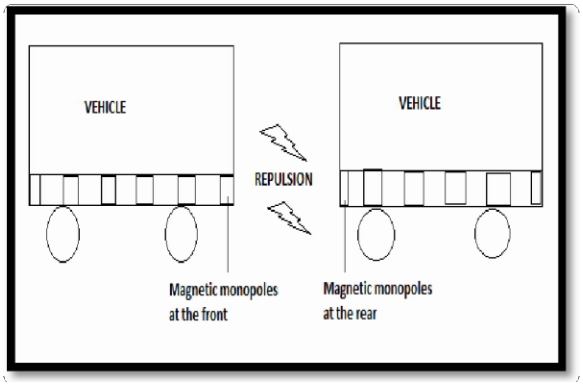

To do this, the scientists merged tiny magnetic whirls, so-called **skyrmions**. At the point of merging, the physicists were able to create a monopole, which has similar characteristics to a fundamental particle postulated by Paul Dirac in 1931. In addition to fundamental research, the monopoles may also have application potential. The discovery of new type of artificial monopole in a solid, i.e. particles, which have similar characteristics to monopoles, but which only exist within materials.

## I. APPLICATION OF ARTIFICIAL MONOPOLES IN VEHICLES

Side view and front view of the vehicle fitted with magnetic monopoles is shown in the figure:




Magnetic monopoles are fitted on the front, rear and side in the vehicle. In the above figure, back view of the vehicle is similar to that of the front view. Magnets possess a property which is familiar to everyone i.e like poles repel each other and unlike poles attract each other. As mentioned above, magnetic monopoles possess either a north pole without a south pole or a south pole without a north pole.



INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3317 – 3322
RECEIVED : 15.03.2018 PUBLISHED : 19.04.2018
April 19, 2018

In this case, monopoles need to repel each other. Suppose a vehicle fitted with north magnetic monopole comes closer to another vehicle fitted with the same north magnetic monopole, then there occurs a force of repulsion between them which causes the vehicle to stop automatically. The force of repulsion must be so strong that even when the vehicle at higher speed comes closer to another vehicle, it applies brake automatically due to repulsion. The force of repulsion depends upon the strength of the magnet. The strength of the magnet can be enhanced by various methods. Neodymium is a rare earth element. It possesses strong repulsion which lasts for longer distances. A very small proportion of neodymium can be added along with the magnetic monopole to increase the strength of the magnet. In this way force of repulsion also increases.
Figure below shows rare earth neodymium magnetic monopole:


## II. SOLUTIONS TO DRAWBACKS CAUSED BY THE MAGNET

One major problem is that magnets usually wear off after certain years. Factors affecting the strength of the magnets are heat, radiation and age etc. Buying new magnets and again fitting them back into the vehicle is a tedious job. When a magnet becomes weak, a strong magnet will revive them. This can be done by an electric magnetic recharger or even the earth's magnetic field can recharge the magnet. Another method to recharge the weakened magnet is to repeatedly rub a very strong magnet across the weakened magnet. The strong magnet will realign the magnetic domains inside the weakened magnet.
Another problem associated with magnetic monopoles is its production and cost. If production increases, cost will be reduced. For example, several hundreds of components are integrated into a single chip which we call it as integrated circuits. Earlier there was nothing as such. But as technology developed, the need for integrated circuits grew more which indeed led to enormous production of integrated circuits. Therefore cost of the integrated circuits became cheaper. Similarly, enormous production of monopoles can reduce its cost in the future. In this way, more number of inexpensive monopoles can be mounted on the vehicles in order to avoid road accidents caused due to lack of awareness of the drivers.

## I. COMBINATION OF A SENSOR AND AN ALARM

A common problem faced in this method is that when a slow moving vehicle is followed by a fast moving vehicle, the sudden repulsion may cause a jerk which affects the people inside the vehicle. It can be overcome by mounting a LIDAR sensor on the vehicle. LIDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light.

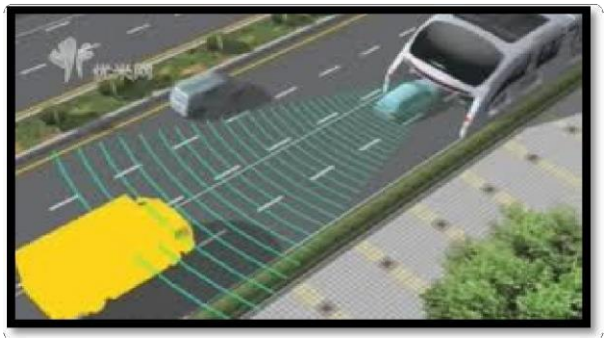
INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3317 – 3322
RECEIVED : 15.03.2018 PUBLISHED : 19.04.2018
April 19, 2018

LIDAR sensor

It is low cost, compact and light weight. Depending upon the strength of the magnets, repulsion occurs. This repulsion occurs within a particular distance. This distance is analyzed accordingly and depending upon that, the sensor detects the vehicle. For example, if the repulsion occurs within the range of 1m distance, then the sensor is made to detect the vehicle at the range of 2m. In combination with the sensor, an alarm is fixed beside the driver. When the distance between the vehicle reaches a range of 2m (detected by the sensor), the driver is indicated by the alarm sound and thus becomes aware.

The driver gets sufficient time to reduce the speed of the vehicle. In this way no jerk is produced by the time the distance between the vehicles reach the range of 1m distance. Another advantage of this method is that no overtaking is possible since repulsion between the vehicles will not allow the vehicle to move further. Automatically, every individual will maintain a constant speed while driving.

The figure below shows the representation of vehicle mounted with sensor:



## CONCLUSION

Magnetic monopoles can also easily be created with the help of a monopolar charging unit. Its applications involve weapons technology, transportation. Possible future directions of research are increasing the magnetization strength by building a more powerful charging unit, building a double monopolar chamber and the search for a magnetic tripole.

## REFERENCES

**[1]** Olney R.D.; et al. (November 1995), "Collision Warning System Technology", Intelligent Transport Systems World Congress, Yokohama, Japan

**[2]** Kanarachos, Stratis (2009). "A new method for computing optimal obstacle avoidance steering manoeuvres of vehicles".

**[3]** Cicchino, Jessica (2016). "Effectiveness of Forward Collision Warning Systems with and without Autonomous Emergency Braking in Reducing Police- Reported Crash Rates".

**[4]** Umar Zakir Abdul, Hamid; et al. (2016). "Current Collision Mitigation Technologies for Advanced Driver Assistance Systems–A Survey" (PDF). PERINTIS eJournal. 6 (2). Retrieved 14 June 2017.