AUTOMATIC INDICATOR SYSTEM

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Abstract

This study shows a new Auto-Indicator System that doesn't use sensors but instead uses electronic circuit breakers and basic mechanical parts. The main goal is to look at the rules that are already in place for the Indian auto business and come up with a possible design for a car that meets or beats those rules in terms of safety and comfort. Being able to notice changes in the style position is a key part of the method. This information sets off an electrical sequence that controls when the warning lights turn on and off. A close study of the Indian car environment and safety rules shows that the suggested Auto-Indicator System is in line with current industry standards. Using real-time data during the tests and planning stages helped get the best results. After careful planning, a lot of testing, and making sure the system worked perfectly, it was slowly put to use in the real world. At every stage of development, the needs of the Indian auto industry were carefully thought through. User safety, ease of use, and an exciting ride were all top priorities.This cutting-edge Auto-Indicator System is not only different from traditional sensor-based models, but it is also a great example of technology made just for the Indian car industry. This system is modern and user-centered, with a focus on safety. It could change the way auto-indicator technology is used in India.

Keywords *: Automatic Indicator,System Planning,Electronic Circuit,Mechanical Automation,Arduino Integration,Intelligent Algorithms,Real-time Data,Adaptive Technology,Turn Signal Automation Safety Standards*

1. Introduction

2. The Society of Automotive Engineers (SAE) says that almost half of all lane changes (48% of the time) and a quarter of all moves (25% of the time) happen without indicators being used. As many as 97% of all road deaths may be caused by mistakes made by people, like not using turn signs correctly.

3. The SAE said that "smart" signs would turn off themselves after a turn or lane change. In order to work, the tool will use the same sensors and software settings that are used in electronic stability control, which comes standard on all new cars sold in Australia.

4. Also, the mechanical switch that has been used to turn off the lights in cars since the 1940s would no longer work. Russell White is a road safety expert and a speaker for Fatality Free Friday. He says that the idea of automatic signs "sounds fine." "But I'm wondering how the changes in the lane would go," he goes on. You wouldn't know where or how far ahead of time you'd have to do that for the car to send a few flashes telling it to stop and start moving.

5. The thing in question seems like a benefit and might even be useful, but it could also make driving less difficult.But it's very important that technology doesn't take away from the duties we have as drivers, like using turn signs before changing lanes, turning, or doing anything else, and then turning them off afterward.

6. So, as drivers, we need to know how to keep our cars under control at all times. It's also not easy to make the technology "smart" enough to handle all the different cases where drivers need to safely show their desire to change lanes or directions.

2. Review of Literature

❖ Vehicle navigation system turn indicator by James Walker (2015)

Better turn-by-turn directions are made available with a navigation system for vehicles. When the navigation system detects a turn, the warning signals may be toggled to indicate the turn either inside or outside the car. Dedicated turn signals, such as those found in most vehicles' instrument clusters, are one example; external turn signals, such as those found near the front and rear bumpers, are another; and turn signals integrated with the side mirror are yet another. As there is no need for new indications or indicator systems, the use of pre-existing turn signals simplifies and reduces the cost of turn signals. Furthermore, the passenger of the vehicle and other cars in the area may be warned of the person's planned path via the use of both internal and external indictors to the vehicle. Heads-up displays are preferable than employing specialized turn signals since they place the turn notice directly in the driver's

line of sight [1].

Kenneth Schofield's 2015 work on lane-change assistance in automobiles.

A vehicle's lane change assistance system consists of a detector, an indication indicating the car's lane change maneuver may impact the other vehicle, and a control that receives information about the vehicle's movement. At the very least, the motion data allows the controller to construct a position history for the vehicle. Indicating whether a lane change action may influence the other vehicle, the control evaluates the detected existence of the other vehicle against the position history [2].

Automatically deactivating turn signals: 2014

Vehicles with a handle operatively attached to the wheel (via a steering column) are within the purview of the innovation. More specifically, the invention relates to direction indications or turn signals for automobiles. Turning off the signal is a good idea after the car has started moving or turned in the indicated direction. If you don't switch off your blinker after making a turn, you might cause accidents by confusing pedestrians and other drivers. The purpose of this innovation is to eliminate the aforementioned problems by delivering a handle bar-mounted auto-cancelling turn signal mechanism.

automobiles, motorcycles, and other powered vehicles.

The indication signal is automatically cancelled once the vehicle resumes forward motion following the turn, which is one of the goals of the present invention.

The current invention also aims to prevent the blinker from being disabled if the turning is for a shorter duration than the timing logic in the device has been programmed for. The manual cancellation of the automated turn signal is a secondary goal of the current innovation.

A turn signal device with an automatic cancellation capability is provided by the present invention to accomplish the aforementioned goal and solve the problems with the previous art. This gadget, run by a microprocessor, employs microprocessor logic to turn on and off an indicator light bulb in response to a signal from a manually actuated switch [3].

3. Rationale and Scope of the study

This paper's starting point is the concept of human convenience. Most individuals don't utilize their indicators while turning or changing lanes because of sheer laziness or forgetfulness.

It will be more cost-effective since we are not utilizing any form of sensor, therefore it will be cheaper to produce, set up, and maintain. Human labor may be reduced as a result. In addition, it will make things safer overall.

There is no sensor, simply an electric circuit, which has a minimal maintenance cost (cost effective) and prevents signs from turning on too early or too late.

Since we live in an age when automation and cutting-edge technology are often used to improve the quality of people's lives, it stands to reason that automated indication systems in automobiles will soon follow suit.

In contrast to the sensor-based automated indication systems used in most automobiles in the West, we rely nearly entirely on a mechanical component in this situation. There will be fewer accidents and drivers will be less distracted.

A growing nation, such as India. The age of revolutionary technology is here. The survey says many Indians are reckless when driving and sometimes don't observe the traffic/highway laws, which causes many accidents, hence the automated turn indication system will soon dominate the vehicle industry market.

4. Objective and hypothesis

Turning and changing lanes in a vehicle will be easier with automatic indicators. The indicator will work in conjunction with the steering wheel's motion. The indicator light will turn on and off when the electric circuit is made and broken. Typically, there are two phases to this set up.

Step 1: Minimal-Angle Design

The smallest possible angle at which the circuit is completed and the light comes on. Despite the fact that it is an entirely sensible approach. So, in the event of a lane change, we turn the wheel ahead of time. Say this distance is 30 meters and there is an offset of 3 meters between the lanes. Therefore, the angular velocity is equal to tan()=3/30 (Eq. 1).

That means =6 degrees

Given the margin for error, we'll set the minimum angle at 7.5(6+1.5) degrees; however, with a needle of 6 mm diameter and 60 mm in length, the indicator will only be activated after the needle has covered 10.5 degrees (three on one side).

Step 2: Complete and interrupt the circuit

If the angle is more than or equal to 10.5 degrees, the indicator will light up when the needle makes contact with the stationary metal ring and the circuit is completed. As the wheel is turned back to its starting position, the needle loses touch with the stationary conducting metal, triggering the indicator to flash.

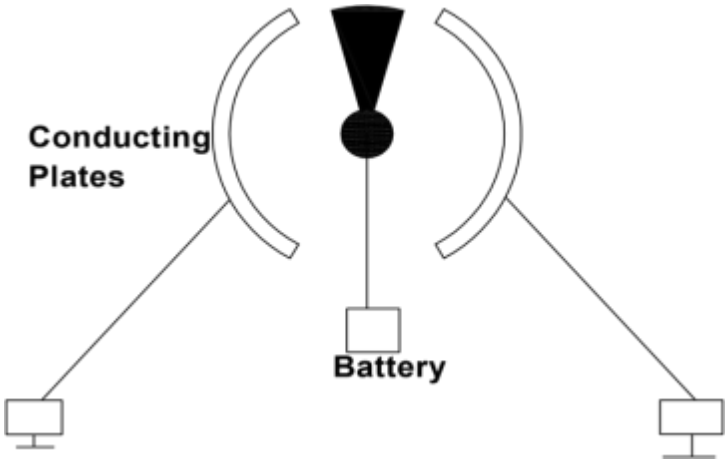

Fig.1. Assembly model

Microcontroller implementation, third stage

We're using The Raspberry Pi, a family of inexpensive single-board computers, to code and program the component that links the car's navigation system to Google Maps. We then connected that component to the car's indicating system, so that when the driver reached a destination we'd previously set, the indicator would light up or flash off in response to the driver's actions.

Figure 2 (Raspberry Pi 3)

5. Materials and equipment used:

a. Metal ring

The majority of metal products are made from mild steel. It's also employed in the manufacturing of several commonplace items. The most widely manufactured metal that is both inexpensive to make and not fragile is mild steel. Although it cannot be easily hardened or tempered, mild steel provides enough strength.

Mild steel has a carbon content of 0.16 to 0.18 percent, far below the limit 0.25 percent. Between 0.70 and 0.90 wt. % manganese

Maximum 0.40 percent Silicon Maximum 0.04 pct sulfur Maximum 0.04 percent phosphorus content.

The lowest carbon steel or mild steel grade comprises a very low carbon content of 0.05 to 0.26%. The electrical conductivity of mild steel is quite high. This allows for its rapid application throughout the welding process. Unlike structural steel, mild steel is extremely suited. Mild steel is used by several automakers for vehicle frames and other structural components [8].

Figure 3 (Metal ring)

b. Indicator:

The indicators, brake light, danger warning light, headlights, reverse lights, and vehicle horn are only few of the signaling systems found in an automobile. These gadgets allow drivers to inform other motorists of their intended actions. They are making it easier for drivers to "read the road." Signals provide advanced warning to other drivers that you intend to make a change. In order to ensure the safety of everyone on the road, it is crucial to send and receive signals correctly at all times. If you want other drivers to understand what you mean, you need to indicate far in advance of your move. Avoid sending signals before they're needed to avoid misunderstanding [7].

Figure 4 (Indicator)

5.3 Battery:

The electricity that powers a car comes from a refillable battery called a car battery. The engine's main job is to power the starter. During engine operation, the alternator sends electricity to the car's electrical parts. During startup, batteries rarely lose more than 3% of their overall capacity. In order to work, Start, Light, and Ignition (SLI) cells need to lose a lot of power quickly and then quickly charge again. There is no way to deep discharge these, and a full drain could shorten the battery's life. A high-voltage electric vehicle battery powers the car, but most electric battery vehicles also use a regular 12-volt car battery.

Figure 5 (Battery)

Raspberry pi:

Single-board computers (SBCs) are complete computers that are built on a single circuit board. They have memory, input/output (I/O) ports, microprocessors, and other useful computer functions. As the name suggests, single-board computers are made to handle more than one thing at the same time. A lot of current desktop PCs and laptops have all of their functions built into one circuit board [10].d [10].

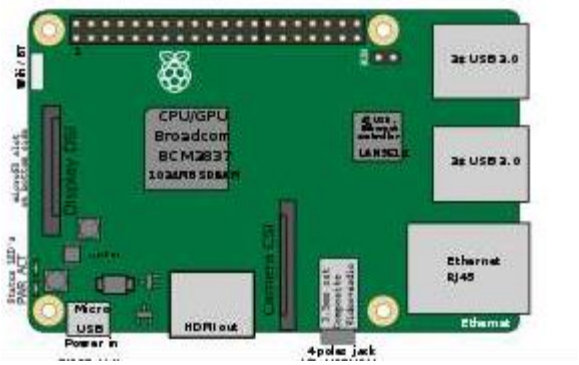

Figure 6 (Raspberry Pi prototype)

Types of raspberry pi:

The different Raspberry Pi types are: Raspberry Pi 1 B; Raspberry Pi 1 A; Raspberry Pi 1 B+; Raspberry Pi 1 A+; Raspberry Pi Zero; Raspberry Pi 2; Raspberry Pi 3 B; and Raspberry Pi Zero W.
Steering rod: The steering's main job is to point the wheels in the direction you want them to go. Most of the time, this is done with a chain reaction of links, rods, pivots, and gears. One important idea is the caster angle, which tells you which wheel is turned in front of the wheel with a pivot point [9]. This makes the turning look like it's centered in the direction of motion.

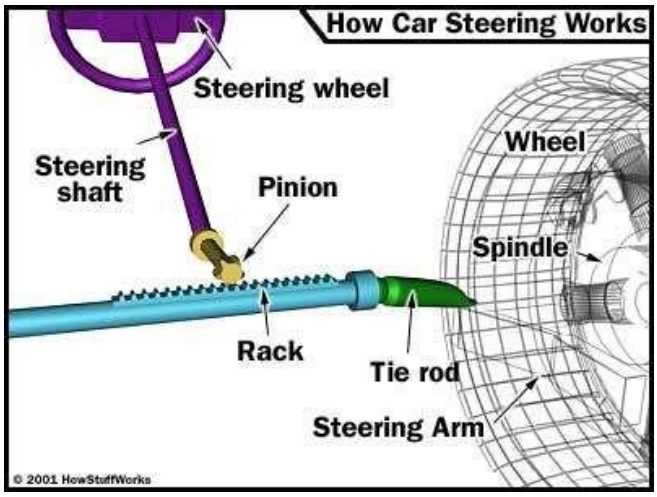

Figure 7 (Working of Steering)

Ford made the Falcon in the 1960s. It had a worm and industrial style that was famous in the 1930s and 1940s. The rocker shaft arm may have a wheel or a set of rotating pins that can act as a field to reduce friction.
Power steering has a cousin called speed-sensitive steering, which helps the turning a lot at low speeds and a little at high speeds. Manufacturers of vehicles are aware that drivers may have to press on the steering wheel a lot when stopping.
There are modes that let you turn off rear-wheel turning and turn on rear-wheel drive separately from the front wheels.

6. Research Methodology

Trigonometric formulas will be used for the basic calculations, which are to find the minimum angle or measure the angle of the turning wheel, even though this is a practical work. When rack and pinion manual steering systems were used, they had gears that let the angle of the shaft be calculated by looking at the motion or ratio of the gears.

Power steering only needs a hydraulic pump to work, so it doesn't need a rack and pinion gear change. This was only possible with manual steering before. This means that just watching how the turning wheel moves is enough to figure out the turn angle. To find the smallest angle, you have to use logic.

As a result, it is necessary to build a system that can be used to turn on the car's lights immediately. An electric battery connected to one of the two metal plates will power the system talked about in this piece when the turning wheel is turned. Then there is a needle that touches the conductive plates. The needle has a positive charge, and the conductive plates have a negative charge. To move a lane, we have moved the radius about 15 degrees. In a situation that needs the steering to turn faster than is possible, the electrical plates work as a contact breaker.

Find out how the automatic telling system in current cars works and how it works in theory. This system makes it possible for a lane change to happen with little help from the driver. This technology and all of its improvements and uses have a huge amount of promise. You can also do this system through a census, but by using two conducting surfaces in a simple way, we can do it with less human effort. This may have an effect on how people drive and possibly lower the number of deaths on the roads. For the purposes of this system, we will refer to it as a simple automatic indicating system for cars.

The metal ring is tilted 11 degrees so that it turns with the turning wheel of the system. It's mostly made of steel, which makes it a great carrier of electricity.

Good electrical conductor steel metal ring that fits over the needle contact on the steering rod and completes the circuit when the needle is in place.

The Ring is easier to maintain than devices, and it responds faster.

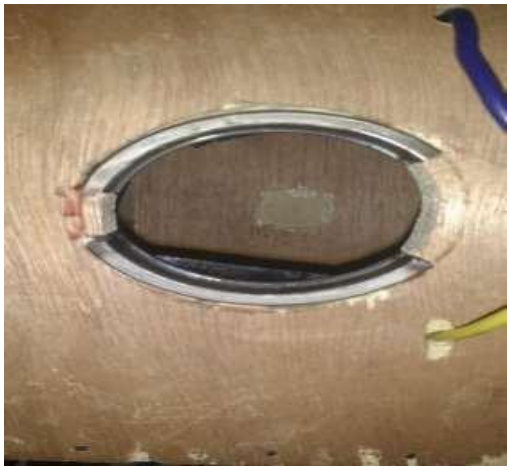

Figure 8 (Metal Ring)

METAL NEEDLE:

The system is complete when the relevant side indicator is activated and the needle of engagement on the steering wheel is engaged with the ring that maintains the system.

The steering mechanism is the simplest part of the system, and it also has the smallest potential for failure. We are able to switch on and off the indicating signal, which is already activated in most vehicles, using this method.

In this design, the steering needle is crucial since it is the only part of the circuit that is completed every time the wheel is turned [9].

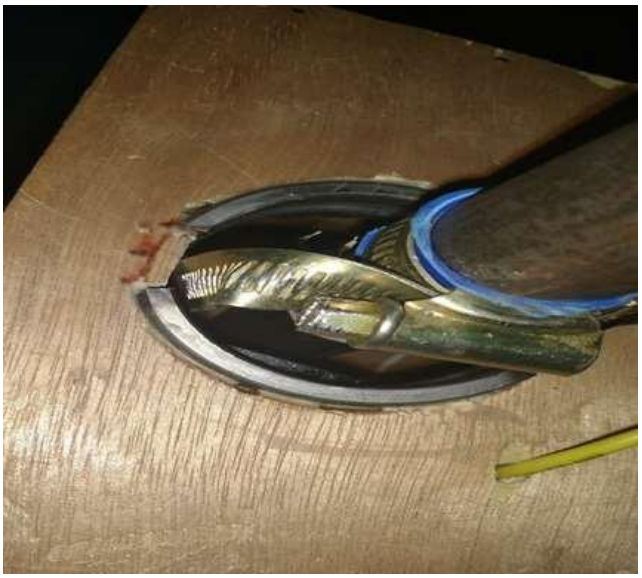

Figure 9(Metal needle)

7. Research and Experimental work done

Few study and effort have been done on car indicator automation. Depending on your needs, you may choose blinkers designed specifically for lane changes, parking, or turning. Indicator automation is used by many vehicles now, including Mercedes, Audi, Baleno, etc. Keeping in mind that it is not entirely automated everywhere, we put in a lot of effort to make it simple, inexpensive, and dependable.

Two metal ring parts, used at a 22 degree angle, carry electricity. These parts will be stored in a plastic or rubber cylinder with the same diameter as the ring, which will act as insulation for the ring's exterior. This set up would be fastened to the steering rod and a needle is connected to the steering rod. If the steering wheel is turned 11 degrees, the indicator will not come on, but if the wheel is turned any farther, the needle's positive charge will come into touch with the ring piece's negative charge, completing the electric circuit and turning the indicator on.

Only parking and switching lanes will be successful; making a turn will result in failure. We arrived at the concept of the minicomputer after much study. Since it is common knowledge that modern automobiles all employ electronic control panels, we reasoned that a minicomputer might be used to better access the navigation system and do other tasks. Once the destination is entered, the most efficient routes will be shown; once chosen, the indication for each turn will light up 50 seconds before the turn. This is what we focused on so that the automated car indication system would be practical, simple, secure, and dependable.

A prototype of the approach was used to carry out the real implementation of the system once its broad design was completed. Analyzing the rotation of the steering wheel provides sufficient data for calculating the turn angle. Although the steering rotation-based automated indicating system's angle of engagement is complicated, once it is in place the average risk of failure is so low that it may be considered insignificant.

Audi, the most popular brand of car, is developing next-generation automobiles with an automatic indicating system that uses the internet to determine the best routes and scans the surrounding area to pinpoint potential hazards in advance.

Then, a needle makes physical contact with the conductive plates, creating a positive charge on the needle and a negative charge on the plates; this represents a lane shift that requires about 11 degrees of radius.

Figure 11(Prototype of Real Model)

8. Results & Discussion

Vehicles are more likely to use the automated signaling system because the turning system used in vehicles works better with the system for vehicles. On the other hand, once it's in place, the usual chance of it breaking down is very low, or even negligible, even though the computerized warning system is complicated and depends on how the turning turns around the angle of contact. The method that needs the least amount of maintenance. There are more choices for automatic pointing devices.

automated warning method based on wheel spinning

tools with sensors that automatically show

Third, a system that lets you find your own way that uses real-time route choices, like Google Maps.

Fourth, an automatic pointing system based on steering wheel spin

We usually use the automatic signaling system based on the driving system to turn off the turn lights. But what if we used it to turn them on? We successfully put this system to use in go-karts and solar carts, which are both cars that are meant to move while the system is running.

Whether or not a car is changing lanes is very important to the process's general operation and performance.

This style can be put in a car without the need for extra space or storage. The system was thought of in a

broad sense, and the photo-type application of the method made it real. Looking at how the steering wheel turns gives you enough information to figure out the turn angle. A system that automatically lights up will save you time and effort. It will also make everything safer in general.

According to the study, a lot of Indian drivers are careless and don't always follow the rules of the road. This leads to a lot of crashes, which is why the automatic turn signal system will soon be the most popular type of vehicle system. Accidents will happen less often, and drivers will be less likely to be sidetracked.

It is easy and cheaper to use turn signals because you don't need to buy any new signs or marking systems. The current idea aims to provide an auto-cancellation and turn-on signal device that turns off and on the signal whenever the car starts to move forward in a straight or curved path after making a turn.

Because of this, we put saving lives ahead of making electricity, since there are more ways to make electricity than ways to save lives. We think about how simple things can help people feel better and make their lives easy. The question is which is more important for most people.

An automatic turn signal device would be very helpful. They wreck a lot of cars because they don't follow the rules of the road.

Table 2 (Component and there Function Chart)

Component	**Function**	**Material**
Bulb for indication	Putting out light as a signal	Glass and a tungsten wire
A case for the bulb	Bulb for effects on the outside	Steel fibers and plastic
Needle battery with a metal ring	Finishing the circle and turning on the lights	Steel, conductor metal
Pi Raspberry Pi	Touching the ring to turn on the warning lights	Microcomputer with lithium ion
A case for the bulb	Power source	Glass and a tungsten wire
Needle battery with a metal ring	The use of indications with Google Maps	Steel fibers and plastic

9. Conclusions and Summary

That's what we worked on: an automatic indicating system that was fully mechanically controlled and operated so that there was no need for outside interference with the indicating systems. The paper we made put human life more important than losing power, which is why we might be able to change the system so that it only needs one action to switch from automatic to manual operation for the parking system. We've already shown that the automated indicating system we talked about might help drivers park more quickly. This is because it steers the indicating signs in the best way. Due to its complexity and cost, the automatic signaling system we use needs most high-end cars and most devices. Audi, a well-known car brand, is working on a new line of cars for the future that will have an autopilot system that uses GPS and the internet to figure out the best routes and road conditions automatically. Because it costs a lot to buy a car with an automatic signaling system—a system that works mostly with sensors—we are working on making a system like this that can be used for less money and more effectively. To make the system work, we connect a conductor to the steering rod, then put it over an insulator and use a small voltage to power it. This finishes one part of the circuit. Next, we move the rings so that the top conductor hits the top of the dial. This shows that the circuit is finished.

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