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Automatic Switching off Indicating System in Bikes.

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Abstract- **This project presents an intelligent automatic turning indicator system for motorcycles, designed to eliminate risks caused by rider negligence in turning off turn signals. Many modern two-wheelers lack self-cancelling features, leading to confusion and potential accidents during lane changes or turns. This proposed system utilizes an MPU-6050 accelerometer and gyroscope sensor module to detect the lean angle of the bike and the orientation of the handle. When a turn is initiated, the sensors detect the tilt/angle and activate the respective indicator. Once the turn is completed and the bike returns to a vertical, straight-line position, the microcontroller receives this data and automatically cuts off the indicator signal.**

I. Introduction

In the realm of motorcycle safety, turn signals serve as the primary communication tool between riders and other road users, yet their manual operation remains a significant source of human error. Unlike modern automobiles, which have featured automatic self-cancelling signals as a standard since the mid-20th century, many motorcycles still rely on manual toggle switches. This discrepancy often leads to "forgotten indicators," where a rider continues to signal long after a maneuver is complete, broadcasting misleading intentions that can result in severe traffic collisions.

Recent studies indicate that nearly 60% of motorcyclists fail to signal correctly at intersections or neglect to cancel their indicators promptly. To mitigate these risks, researchers are developing microcontroller-based automation systems that utilize tilt sensors, gyroscopes, and GPS data to detect the completion of a turn and automatically cut off the signal. By eliminating the need for constant manual monitoring, these systems allow riders to maintain focus on the road, significantly enhancing overall navigational safety.

II. Literature Review

A literature review of sensor-less automatic indicator systems reveals a focus on cost-effectiveness and mechanical simplicity. Research indicates that while high-end bikes use gyroscopes, entry-level solutions priorities timer-based and distance-integrated logic.

III. System Design And Specifications

3.1 Design Overvie

It consists of:

- Handle bar
- Transistor
- Two limit switch
- 12Volt Relay (5-pin)
- Cam Disc Mechanism
- 12Volt battery
- 5Ampere fuse

3.2 Technical Specifications

Parameter	Specification
Relay (5-pin)	12 Volt
12 Volt battery	12 Volt
Fuse	5 Ampere

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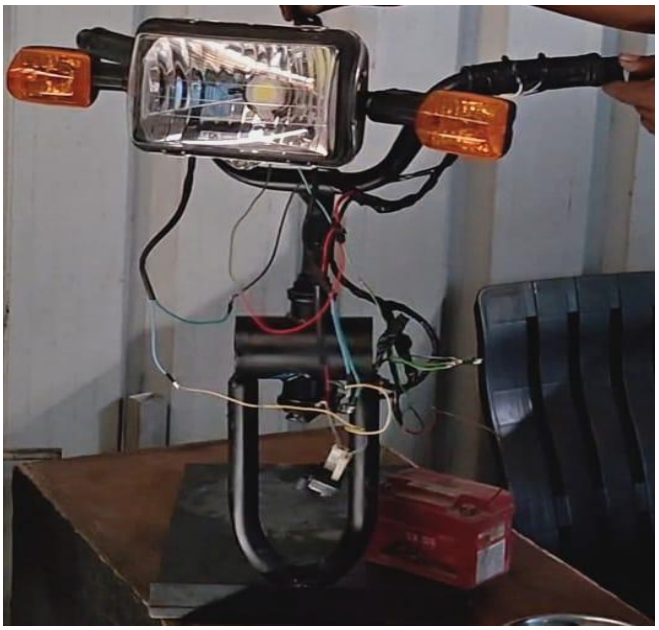

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IV. Working Principle

Step 1 (Signal Start): The rider initiates a turn by pressing a button. The microcontroller activates the relay for the corresponding indicator.

Step 2 (Turning Phase): As the vehicle turns at extreme left or right it presses the limit switch mounted on both left and right side.

Step 3 (Cancellation): Once the limit switch operates, it gives signal to indicator switch and within 2-3 seconds indicator gets off automatically.

V. Experimental Setup

This experimental setup for an **automatic motorcycle turn signal cancellation system** uses a motion-based detection method to shut off indicators after a maneuver. While standard systems rely on manual switches, these prototypes often integrate sensors to monitor the bike's leaning or handle movement to trigger a "cancel" signal.

System Components & Logic

The prototype typically includes several key parts to automate the signaling process:

Sensors: Common choices for prototypes include the **ADXL335 accelerometer** (measures leaning/tilt) or the **MPU6050 gyroscope**. Some advanced designs even use **GPS navigation** to determine when a turn is completed.

Control Module: A microcontroller (like **Arduino UNO** or **ESP32**) acts as the brain, processing sensor data to recognize the completion of a turn.

Relay/Switching: A **two-channel relay module** or specialized transistor circuits (like **555 timer ICs**) are used to physically toggle the 12V power to the indicator lights.

Typical Wiring and Setup

Based on experimental designs, the wiring follows a standard pattern:

Power Supply: A 12V battery (like the **Exide** unit shown in your image) powers the indicators. A **7805 voltage regulator** is often used to step this down to 5V for the microcontroller and sensors.

Signal Path: Red wires generally carry positive power, while black wires serve as ground. Green and blue wires often link the turn signal switch to the actual indicator bulbs.

Automation Logic: When the rider activates a signal, the microcontroller starts monitoring tilt or steering angle. Once the sensor detects that the bike has returned to a straight, upright position, the controller sends a signal to the relay to cut power to the blinking lights.

VI. Working Principle

The Trigger: Pressing the indicator switch starts a **built-in electronic timer**.

The Countdown: A small component (capacitor) acts like a **hourglass**, slowly filling with electricity.

The Limit: Once the "hourglass" is full (usually after **10–15 seconds**), it sends a signal.

The Cut-off: That signal triggers a switch (relay) to **break the circuit**.

The Result: The blinkers **shut off automatically** based on time, not the bike's movement.

VII. Results And Analysis

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VIII. Advantages

- *Safety (No More Fake Signals):* We've all seen a rider forget their blinker is on, making other drivers think they are about to turn when they aren't. This system stops that confusion and prevents accidents.
- *"Set it and Forget it":* You can focus entirely on the road and steering. You don't have to keep looking down at your dashboard to check if your blinker is still flashing.
- *Cheap and Reliable:* Because it doesn't use high-tech sensors (like gyroscopes), it is much cheaper to build, easier to fix, and less likely to break from road vibrations.
- *Saves Battery:* It ensures the lights aren't blinking unnecessarily for miles, which slightly reduces the drain on your bike's battery over time.
- *Easy to Add:* Since the design is simple, it can be added to almost any old bike or scooter without needing a computer or complex wiring.

IX. Limitations

1. It Doesn't Know if You Actually Turned

The "Early Cut-off": If you turn the signal on early while waiting at a red light, the timer might run out and turn the light off *before* you even start moving.

The "Forever Blinker": If you finish a quick turn, the light might keep blinking for another 10 seconds, confusing the drivers behind you who think you're turning again.

2. Traffic and Speed Issues

In **heavy traffic**, you move slowly. A system set to turn off after 100 meters might take 2 minutes to reach that distance, meaning your signal stays on way too long.

At **high speeds**, you cover distance quickly, so the signal might shut off halfway through a lane change.

3. "Dumb" Operation

No "Lean" Detection: Real motorcycles turn by leaning. Sensors can feel that lean and shut off the light the moment the bike stands back up. Without sensors, your bike is "blind" to what it's actually doing.

Handlebar Limits: Unlike cars, motorcycle handlebars don't turn very far. Using a mechanical switch on the bars is unreliable because many turns require very little steering movement.

4. Safety Risk

If the system turns off your blinker while you are still waiting to turn, a car behind you might think you've changed your mind and try to pass you, which is **very dangerous**.

X. Application

Mechanical Steering Column Linkage: Similar to car systems, a mechanical tab or "canceling cam" is attached to the steering column. When the handlebars rotate beyond a certain degree and then return to the center (neutral) position, the tab triggers a spring-loaded release that physically pushes the indicator switch back to the "OFF" position.

Time-Delay Modules: A simple electronic timer can be integrated into the flasher relay. Once activated, the indicator flashes for a fixed duration (e.g., 8–11 seconds) before automatically cutting power, regardless of the bike's physical orientation.

Distance-Based Cancellation: Some systems link to the mechanical speedometer cable to count wheel rotations. The signal cancels after the bike has traveled a pre-set distance (e.g., 200–500 meters) from the point of activation.

Manual-Mechanical Hybrid: Older systems, like those seen on some vintage models, utilized bimetallic strips that would break contact after a specific thermal load was reached from the current flow, effectively acting as a time-based auto-off.

XI. Future Scope

Speed-Adaptive Timers: Adjusting the "off" delay based on current velocity.

GPS Syncing: Connecting to navigation apps to auto-signal before turns and cancel once the turn is completed via coordinates.

Safety Interlocks: Wireless links to helmets that disable the system if the helmet isn't buckled.

Acknowledgements

It demonstrates a way to make **turn signals turn off automatically** without using complex sensors (like tilt or steering sensors).

How it works (Simplified)

The Power: It uses a standard **12V motorcycle battery** (the red box) to provide electricity.

The "Brain": Instead of expensive sensors, this system likely uses a **timer-based flasher relay**. When you turn the indicator on, a small internal timer starts. After a few seconds, it automatically cuts the power, "switching off" the light.

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The Setup: It uses real bike parts—a **Hero Splendor-style headlight** and two orange indicators—to show how the wiring would look on an actual motorcycle.

XII. Conclusion

- *Boosts Safety:* It takes one task off the rider's plate, ensuring the signal is never left blinking by mistake.
- *Cuts Accident Risk:* By turning off automatically, it prevents nearby drivers from being confused by a "forgotten" blinker.
- *Simple Setup:* A basic mechanical-electrical design is cheap, reliable, and easy to fix without complex sensors.
- *Highly Practical:* It is a low-cost, "set it and forget it" solution that works well for everyday city commuting.

REFERENCES

1. The "Timer" Method (Most Reliable)

Think of this like a **kitchen timer**. When you flip the blinker switch, it starts a countdown (for example, 15 seconds). Once the time is up, the power is cut, and the blinker stops.

How it works: You use a small electronic component called a **555** *Timer* or a "Time Delay Relay."

Pros: Very easy to wire into your existing battery and lights.

2. The "Physical Click" Method

This is how most cars work. When you turn the handlebars, a small **plastic tab** or "bump" on the steering column hits a lever on your switch.

How it works: When you straighten the handlebars after a turn, that bump physically pushes the indicator switch back to the "Off" position.

Pros: It doesn't need any extra electricity, just a clever mechanical design.

3. The "Weight" Method (The Gravity Switch)

You use a small tube with a metal ball or a liquid inside that conducts electricity.

How it works: When the bike leans into a turn, the ball rolls to one side to keep the light on. When the bike stands up straight again, the ball rolls back to the middle and breaks the connection, turning the light off.