

Traffic Signal Timing Control Using Sound Frequency

<https://www.youtube.com/watch?v=BVLKeSFyREA>

The proposed system, Traffic Signal Timing Control Using Sound Frequency, aims to reduce noise pollution and improve traffic discipline at intersections. The system utilizes an Arduino UNO as the central controller, interfaced with a sound sensor, TM1637 display module, and three traffic lights. The sound sensor continuously monitors the surrounding noise level, particularly focusing on horn sound intensity. A predefined standard frequency threshold—within the range of human audibility—is set as the limit. During the red-light phase, if the horn sound exceeds this threshold, the system interprets it as excessive noise and automatically extends the red signal duration by 30 seconds (from 60 to 90 seconds) to penalize impatient drivers. The TM1637 display module shows the countdown timer and the updated signal duration in real time. Conversely, if the sound level remains below the threshold, the red signal maintains its normal 60-second duration before switching to green. This intelligent traffic management system not only promotes compliance with traffic signals but also helps minimize unnecessary honking, contributing to a safer and quieter urban environment.

Objectives:

- To design a smart traffic signal system that operates based on sound intensity detection.
- To monitor and analyze real-time sound levels using a sound sensor integrated with the Arduino UNO.
- To extend the red signal duration automatically when excessive noise (e.g., honking) is detected.
- To display the signal countdown timer on the TM1637 4-digit display for driver awareness.
- To reduce noise pollution and promote disciplined driving behavior at traffic junctions.
- To demonstrate the use of microcontroller-based automation in improving urban traffic management.

Components Used:

- Adapter Power Supply.
- Arduino Uno.

- Three Traffic Led Lights.
- Sound Sensor.
- Tm1637 Display.

BLOCK DIAGRAM

