REDUCTION OF FUEL-CONSUMPTION AT TRAFFIC SIGNALS

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Abstract

The proposed research paper hereby suggests a way for managing engines in response to the traffic signals. In this method we need to establish a communication between the participating vehicles and the traffic signals to stop and ignite the vehicle's engine for control of fuel consumption, traffic rules and regulations and pollution control and minimizing the chances of the accident due to the breaking of the rules by the drivers.

Introduction

In the today's world the vehicle fuel consumption is one of the major issue prevailing in this world. With the increasing usage of the vehicles the problems for the traffic is also becoming an issue. Fuels may be wasted if the drivers don't turn off their engines at the red light of the traffic signal. Drivers may switch off the engine at the red signal, but don't do it in an efficient manner which may lead to increase the fuel consumption and the increase in the amount of air pollution. Another problems prevailing are the breaking of the traffic rules by the drivers which may lead to road accidents causing damage to the public and the roads.

Existing Methods

There are methods that has been proposed for the solution. One such solution has been proposed by the IBM[1] where they propose the method to send an notification to switch-off the engine and to switch-on the engine by the calculation of the optimal time to save the consumption of the fuel at the traffic signals

Proposed Method

The proposed research paper hereby suggests a way for managing engines in response to the traffic signals.

The traffic signals will be connected to the cloud and every vehicle that will be arriving at a particular distance will be creating a communication link with the traffic signal. The participating vehicles will create a link and the distance will be calculated and the data will be *sent to the cloud analyzed whether to switch- off the engine or whether to keep the engine idle at the traffic-signal. At the time of the "GREEN" signal the cloud will send the signal to switch-on the engine if the engine has been switched-off.*

Implementation

Each traffic signal will be having a directional yagi antenna mounted on it having certain specifications. The antenna transmits the radio frequency signals in a specified direction. The traffic signal will be connected with the cloud and will maintain the data of all the participating vehicles that do not have the connectivity with the cloud in it (including their unique identification number, distance of the vehicle).

The vehicles will be having an RFIG Tag to uniquely identify the vehicle. The vehicle will also be equipped by the radio receiver to receive the radio frequency transmitted by the antenna. The kill switch mechanism will also be used in every vehicle to switch the vehicle off when the radio receiver receives the signal to switch off the vehicle.

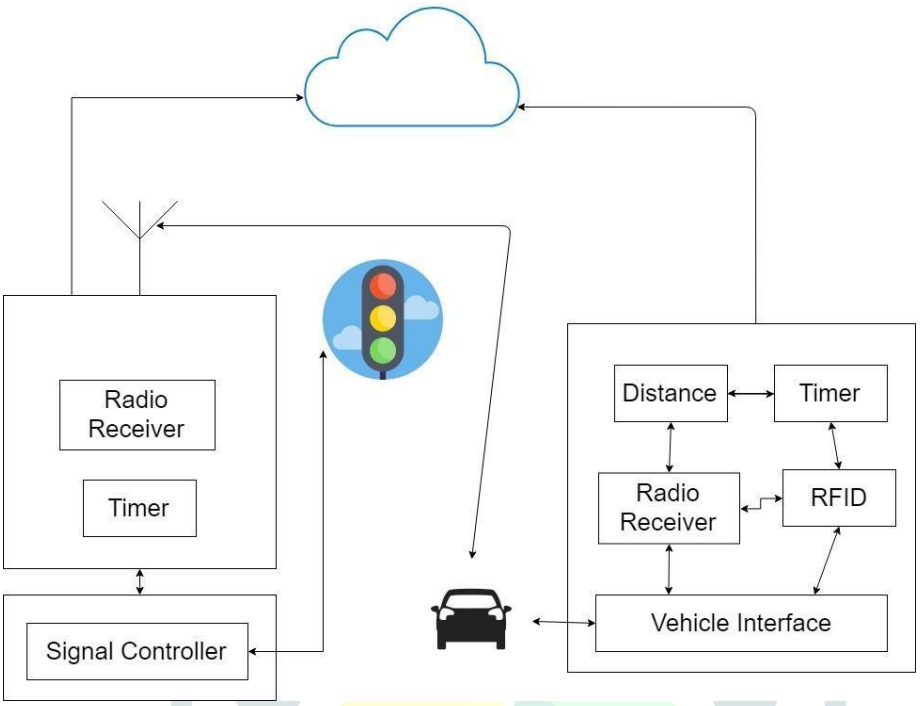

Figure 1: Block Diagram of the System

The vehicles need to establish a communication link between the participating vehicle and the traffic signal. The traffic-signal and the vehicles will have the timer mechanism that will be working on the synchronous mechanism that will synchronize the timer between the traffic- signal and the participating vehicle at the time of establishment of communication link from 0.
The distance of the vehicle from the traffic signal is calculated by the formula:

Distance of the vehicle from traffic signal = speed of the signal * the timer value of the vehicle (1)

Speed of the signal is calculated ahead based on the specifications of the antenna:

Speed of the signal = Range of the antenna
***the frequency of the signal transmitted by the antenna**(2)

The speed of the signal will be communicated to the vehicle at the time of the link establishment.

The distance of the vehicle will be sent to the cloud either from the traffic-light or from the vehicle and the cloud will determine if the engine must be switched off or must be kept in idle position based on the threshold value.

The threshold value is calculated as the idling time of the engine where if the idle time of the engine is more than the idling time of the engine then the signal to switch off the engine is released by the cloud to the traffic-signal. The traffic-signal then with the help of the antenna sends the signal to switch-off the engine.

The threshold value of idling for the 4-stroke 4-Cylinder engine is30seconds. If the idling time of the vehicle if more than the 30 seconds than the signal to switch-off the engine is sent by the traffic-signal from the response of

the cloud. The cloud decides whether to switch-off the engine or not by looking at the distance of the vehicle from the traffic-signal and the time left for the "GREEN-SIGNAL".

If the vehicle is within the specified range of the antenna and the "RED-SIGNAL" time is more than the threshold time (30 seconds) than the signal to switch-off the engine is sent which in turn switch-offs the engine. Before the 5 seconds from the signal goes from red to green the cloud will send the signal to start the engine of the vehicle which will start the engine of the vehicle using kill-switch mechanism.

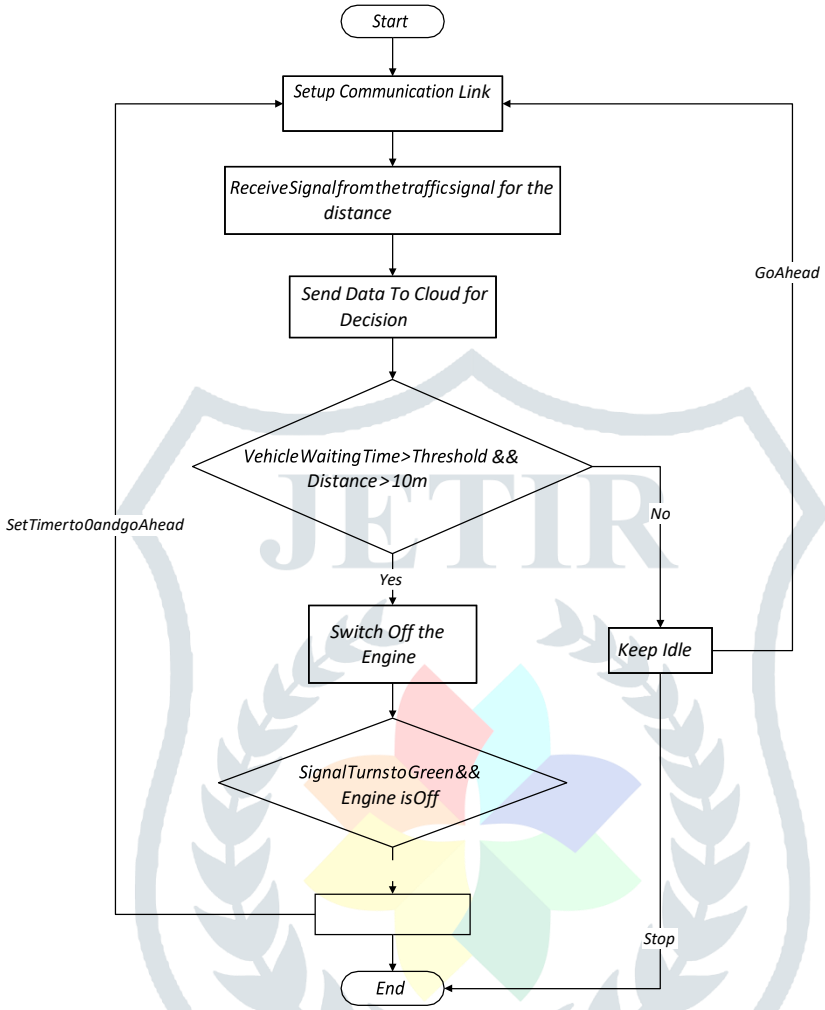

Figure 2: Flow of the System[1]

It is believed that the present paper and many of its advantages will be understood by description, and it will be apparent that various changes may be made in the form, construction and arrangements of the components without departing from the disclosed subject matter or without sacrificing all of its material advantages.

References:-

[1] http://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PG01&p=1&u=%2Fnetahtml%2FPTO%2 Fsrchnum.html&r=1&f=G&l=50&s1=%2220100125402%22.PGNR.&OS=DN/2010012540 2&RS=DN/20100125402#top

[2] https://itstillruns.com/much-gas-used-start-car-5269013.htm