

Development of an On-Board System for Measuring the Implicit Variables of the Driving Cycle for 250cc Carbureted Motorcycles

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Abstract

The implicit variables of the driving cycle are closely related to level of emissions produced by the vehicles, particularly, these are equipped with a series of pressure, flow, temperature, and instrumentation sensors that allow the measurement of the vehicle speed and engine revolutions, including GPS modules that allow collecting altimetry and position data in real time. However, motorcycles with displacements less than 250 cc usually use a carburetor and do not have all this instrumentation since it would raise the manufacturing cost, and consequently, sale price. This is a key factor to the customers which prefers that mode of transportation due to the facility of movement in congested roads and low cost of operation. Specially, in some countries such as Colombia, the quantity of motorcycle and traffic is very high and thus a higher rate of violation of regulations, its participation in accidents and contribution in air pollution should be considered more carefully. The challenge is the inclusion of precise technology without increasing costs and to be able to monitor its performance and location to include it in a smart city environment.

Currently, there is no low-cost device developed in Colombia for the measurement of real fuel in motorcycles, since most of the engine types are fueled by carburetor due to the nature of the combustion process it is difficult to get an accurate measurement and find available sensors or embedded systems in the market. Another reason why a device of this style has not been developed is because the cylinder capacity of these motorcycles is less than 250 cc, with which fuel consumption goes unnoticed by the owners of these vehicles, creating little awareness of saving and caring for the environment in terms of polluting gas emissions. Besides, the study of driving cycles is a useful task to be able to analyze the environmental and economic impact that the use of vehicles and motorcycles leaves in a given area, since fuel consumption and vehicle speed are closely related to emissions.

The project aims to design a semi-industrial scale an instrumental system that monitors and records the position, speed, RPM and fuel consumption of a carbureted motorcycle with a displacement of less than 250 cc as well as develop a mobile application that allows the visualization and storage in the cloud of the data obtained from a monitored route. Finally, is necessary to carry out the device performance test based on measurements obtained through laboratory and road tests.

Keywords

motorcycles, driving cycles, fuel consumption.

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Biographies

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