IOT APPLICATION: EXHAUST PIPE MONITORING EQUIPMENT

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Introduction

Problem 1: Vehicle explosion can result in serious damages for the vehicles and death or serious injury for the owners. These acciddents are caused either by human errors (poor maintenain, mishandling with petrol, etc.,) or technical defaults (Overheated engine, fuel system leak, etc.,)

Solution 1: Our equipment ultilizes temperature sensors embedded in the exhaust pipe to measure its temperature. On mobile app or web, you can follow the real-time temperature and if it exceeds a certain threshold, the system will send an alert to you via mobile message and email, thus enabling intevention in time to prevent explosion

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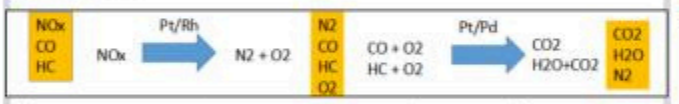
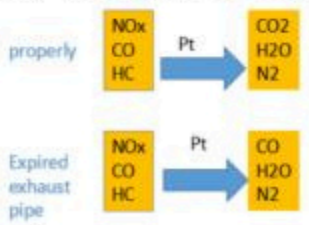
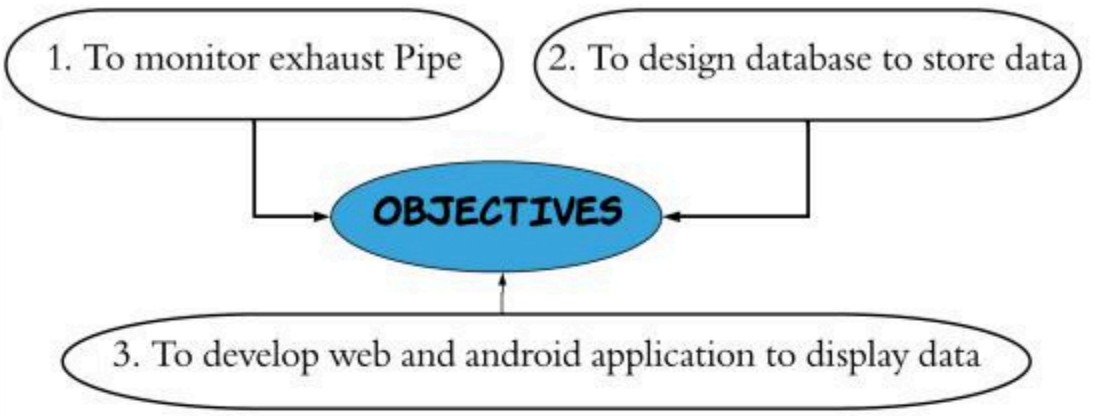
Problem 2: In the exhaust pipe, catalytic converter convert toxic gases and pollutants from an internal combustion engine into less-toxic gas by catalyzing a redox reaction which combine O2 with CO and unburned hydrocarbons (HC) to produce CO2 and H2O. In another hand, it reduce NOx through these following reactions:



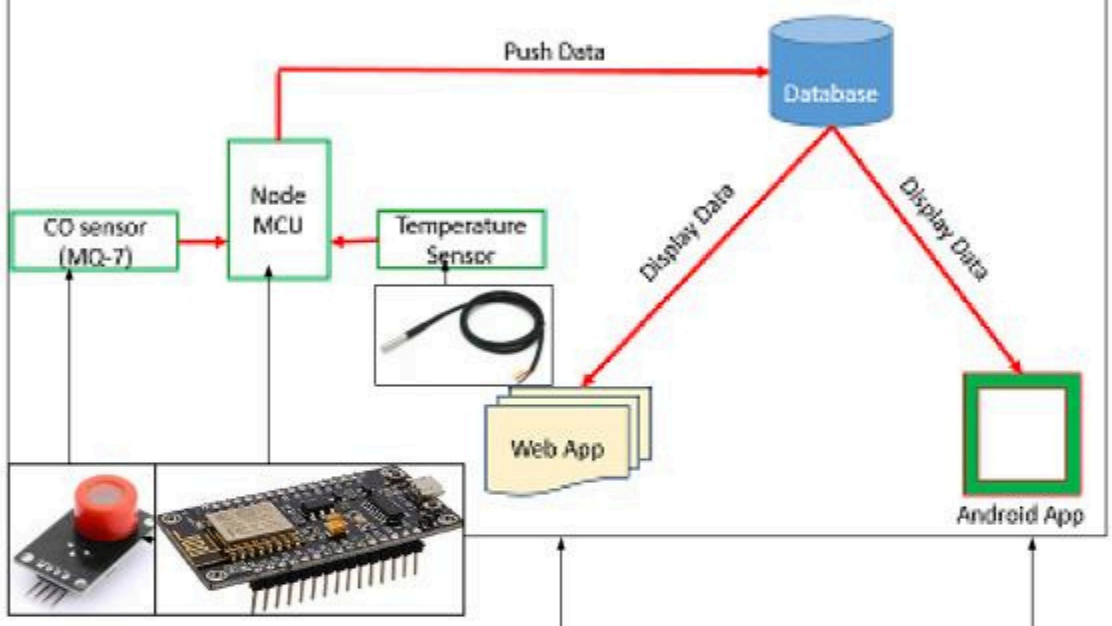
These reactions are accelerated by catalytists in exhause pipe, including Pt/Rh and Pt/Pd in the catalytic converter. But when the catalytic converter expires, the engine will perform inefficiently and consume lots of fuel It will also generate lots of toxic and greenhouse gases, which contribute to damage the ozone layer and to worsen air polution, as follow:



Solution 2: Our equipment ultilizes CO sensors embedded in the exhaust pipe to measure the CO concentraion. Based on these data, the system can predict the expriration date of your exhaust pipe. When it come to that date, you will receive an alert on mobile message and email, which remindy ou to replace the exhaust pipe.



System Architecture



Result on Web & Mobile Application

Conclusion

IoT technology can be applied to eliminate the risk of vehicle overheating and to manage the expiration date of the exhaust pipe, which helps to optimize fuel consumption and reduce the environmental damages caused by CO and other greenhouse gases

Tools

1. NodeMCU
2. Resistor and jumpers
3. Breadboard
4. Sensors: Temperature and MQ-7
5. XAMPP
6. Android Studio
7. HTML
8. CSS
9. PHP