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Abstract

**CASE-BASED REASONING FOR AUTOMOTIVE ENGINE
ELECTRONIC CONTROL UNIT CALIBRATION**

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The automotive engine performance is greatly affected by the ECU calibration, which controls fuel injection and ignition advance over different timing. The method for ECU calibration is traditionally done in a trial-and-error way. Every trial means an adjustment to the fuel and ignition maps and then run on a dynamometer to verify the engine performance. This traditional method takes a considerable amount of time, efforts and financial cost.

In order to shorten the working time and reduce the cost of ECU calibration, Case-based Reasoning (CBR) from artificial intelligence field is employed so that the maps of a fully calibrated ECU can be adapted to fit another similar class of engines.

In the process of ECU calibration, it is necessary to adjust the parameters of the map to fit different performance requirements in the same engine, even to fit another but similar engine. CBR appears to be a perfect solution to the problem. A general prototype system has been developed to verify the usefulness of CBR in ECU calibration. Through experiments, the result shows that the efficiency of ECU calibration is absolutely improved by applying CBR, and the cost of calibration is also reduced.