

A Decision Support System for Car Fault Diagnosis Using Expert System

By: Kadarsah Suryadi

Eri Ricardo Nurzal

Industrial Engineering Department

Bandung Institute of Technology

FTI-ITB Jl. Ganesa 10 Bandung

Indonesia

Fax.62222509336

Email:Kadarsah@Bandung.centrin.net.id

Abstract

Expert system can become one approach in dealing with dependence of expert mechanic. An overview and the function of car fault diagnosis expert system for helping inexperienced mechanic or driver are presented in this paper. In addition, this paper also discusses a design of decision model for car fault diagnosis.

Keywords

Expert system, car fault, decision model.

A Decision Support System for Car Fault Diagnosis Using Expert System

By: Kadarsah Suryadi
Eri Ricardo Nurzal

1. Introduction

Today transportation technology, especially car, grows fast, but many drivers do not know how to work their car. This causes the drivers will get difficulty if their car are broken.

Car fault identification is not easy for inexperienced mechanic or driver because it is needed a lot of knowledge for finding the fault. Therefore, they extremely depend on expert mechanic.

Dependence of the expert can be minimized if its expertise can be documented into a computer system. The proposed system for dealing with the problem is an expert system.

An expert system is a system that employs human knowledge captured in a computer to solve problem that ordinarily require human expertise [1]. Expert system seek and utilize relevant information from their human users and from available knowledge bases in order to make recommendations [2].

With the expert system, the user can interact with a computer to solve a certain problem. This can occur because the expert system can store heuristic knowledge.

This paper will discuss three aspects : the function of the system, the overview of the system and the benefit of the system.

2. The Function of the System

The proposed system performs the following function :

- It will conclude its diagnosis based on answers of the user to specific question posed by the system to the user.
- It provides facility in order to take the user opinion on the following :
Does the user agree with the system's diagnosis ?
Does the user disagree with the system's diagnosis ?
- It provides explanation, picture, why and fact facility.
- It stores the facts and the conclusion of the inference of the system and the facts and the conclusion of the inference of the user, for each case, in data base.
- It processes the data base in order to extract rules, which complete the knowledge base.
This process acts as a adaptive system.

3. An overview of the system

The system is composed of the following modules :

- a. Inference engine.
- b. Knowledge base.
- c. Data base.
- d. System-user interaction.
- e. Adaptive system.

This system is written in object oriented programming language. The construction of data base takes place during the running of the system. There are two approaches for controlling inference engine in expert system : forward and backward chaining [3]. Inference technique is used in this system is backward chaining. This technique is selected because there is a small number of outputs with many possible inputs.

The system-user interaction takes place when the user runs the system. When the system concludes its diagnosis, the adaptive system interacts with the user in order to confirm he agrees or disagrees to the expert system's diagnosis. All system's and user's results are stored in the data base. The adaptive system processes the data base and extracts additional rules for the knowledge base.

4. The benefit of the system

Expert system are extensive computer programs capable of simulating the decisive activity of the experts in solving very complicated task which are rather strictly problem oriented.

Generally, the proposed system can help inexperienced mechanic or driver in diagnosing the fault of the car. In addition, the system have the following benefit :

➤ Prevent the loss of customer and income.

If mechanic's repair shop makes a wrong diagnosis, the customer will be reluctant to come back to the repair shop. With this system, the situation can be avoided.

➤ As a tool for training inexperienced mechanic.

➤ Improve productivity.

Having this system may allow mechanic to do more work in less time.

➤ Help improving knowledge driver in diagnosing the fault of car.

➤ Reduce the need for skilled mechanic.

The repair of car requires a high level of expertise. With this system, inexperienced mechanic can be guided to find the fault.

➤ Be able to work without stopping.

As a human, expert mechanic will be tired if he works continuously.

5. Conclusion

The proposed system can help inexperienced mechanic or driver in providing decision support system, interactive training tool and expert advice. Using this system, loss of customer and income due to lack of knowledge can be avoided. Having this system may allow mechanic to do more work in less time, thus bringing in more revenue. And mechanics gain through improved productivity.

References

1. Beverly G. Hope, Rosemary H. Wild, « An Expert Support System for Service Quality Improvement», Proceedings of the Twenty-Seventh Annual Hawaii International Conference on System Science, 1994.
2. E. Turban, « Expert System and Applied Artificial Intelligence, Macmillan Publishing Company, New York, 1992.
3. Waterman, D.A., « Guide to Expert System, Reading, Mass.: Addison-Wesley, 1986.