

Self-monitoring cars to detect own faults

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Discovery News has reported a major leap forward in automobile technology: future cars will be able to diagnose and monitor their faults. According to the report, the new technology will determine which parts are damaged and state how long they can last. Scientists are aiming to make vehicles equipped with this facility available in the next few years.

According to Douglas Adams and Muhammad Haroon, co-writers of a paper on health-monitoring systems for cars, the fault-detecting device will work in a similar way to the fuel gauge. The paper was presented in November at the International Mechanical Engineering Congress and Exposition in Orlando, Florida.

The technology will allow car owners to ascertain at which stage any car part is in its lifespan; bad news for rogue repairers seeking to replace perfectly serviceable components.

In a study of auto suspension, the system supporting the car on its axles, an Isuzu Impulse was placed on an automatic shaker, simulating the bumps and jolts of a typical car ride. Sensors were attached to the bottom of the car's strut, steering knuckle-control arm connection and other parts of the suspension system to measure the various levels of vibration generated. The scientists then simulated damage by loosening a bolt connecting the steering knuckle to the control arm through a ball joint.

The vibrations were then analyzed on a computer. The results showed a replica of human heartbeats. The computer identified and quantified the

damage, making it possible to pinpoint the parts affected.

Adams told Discovery News that all mechanical systems have a 'vibration fingerprint' during operation. The fingerprint can indicate how one component responds relative to all other components. When one of the components is damaged, its fingerprint changes, in turn affecting the fingerprint of the system as a whole. It is the changes in these fingerprints that are used to determine both the location and extent of any damage sustained.

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