<u>RoadCrack: Automated Detection of Road Cracks</u>

CSIRO's RoadCrack imaging technology automates the task of surveying the nation's roads with a capacity to detect cracks one millimeter wide from beneath the chassis of a moving vehicle. CSIRO's RoadCrack, developed in collaboration with the NSW Roads and Traffic Authority (RTA), is a mobile camera and image-processing tool that detects, classifies and reports on cracking in road pavement.

RoadCrack is the first system in the world to achieve the RTA's standards for an automated, objective and accurate crack detection system. It has successfully surveyed hundreds of thousands of kilometers of Australian roads.

The problem
Manual surveying the condition of road surfaces suffers problems of cost, accuracy, safety, efficiency. The RTA approached CSIRO to assess the potential of automated crack detection technologies.

What CSIRO did
Our solution, RoadCrack, is a fully-automated system. It combines advances in:
- machine vision
- parallel computing
- artificial intelligence
- image analysis.

High-speed cameras are mounted under a vehicle to collect digital images of the pavement surface while the vehicle is moving at highway speeds. A special reflector system focuses light to illuminate tiny cracks. High-resolution images are collected for small sections of pavement and then consolidated into bigger images that cover half-metre intervals of the road surface.
CSIRO also developed algorithms and computer hardware for extracting the relevant information in real time.

Outcomes
RoadCrack detects cracks as fine as one millimeter in width, while travelling up to 105 kilometers per hour. It can also operate at night as the system provides its own lighting for road imaging.
The objective data from RoadCrack provides valuable input into management of road pavement assets, saving the NSW State government roads authority tens of millions of dollars each year in road maintenance costs.

Digital image of road pavement

Detected crack patterns

During operation, road images are passed to a processing module that uses sophisticated image analysis algorithms to classify cracks as they are detected. Cracks are reported according to type, severity and extent.

A truck fitted with RoadCrack equipment testing the road surface

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