

# **AUTOMATIC ROAD CRACK DETECTION AND CHARACTERIZATION**

## **ABSTRACT**

A fully integrated system for the automatic detection and characterization of cracks in road flexible pavement surfaces, which does not require manually labeled samples, is proposed to minimize the human subjectivity resulting from traditional visual surveys. The first task addressed, i.e., crack detection, is based on a learning from samples paradigm, where a subset of the available image database is automatically selected and used for unsupervised training of the system. The system classifies non-overlapping image blocks as either containing crack pixels or not.

The second task deals with crack type characterization, for which another classification system is constructed, to characterize the detected cracks' connect components. Cracks are labeled according to the types defined in the Portuguese Distress Catalog, with each different crack present in a given image receiving the appropriate label. Moreover, a novel methodology for the assignment of crack severity levels is introduced, computing an estimate for the width of each detected crack. Experimental crack detection and characterization results are presented based on images captured during a visual road pavement surface survey over Portuguese roads, with promising results. This is shown by the quantitative evaluation methodology introduced for the evaluation of this type of system, including a comparison with human experts' manual labeling results.

## **EXISTING SYSTEM**

The Crack and Pothole in the roads is one of the major problems nowadays. People are struggling to travel from one place to another. People feel lazy to complain to the government about the issue. So for this purpose, we propose the automatic crack and Pothole detection using the sensor and monitor on the Google map.

## **PROPOSED SYSTEM**

In this paper we propose the automatic road crack and pothole detection using the sensor and the information will be updated on the PC. The place where the crack will be detected is monitored by using the Google map. If the crack has presented in the road by using the sensor the information regarding the crack or pothole is updated on the PC and also

# Project Report For Automatic Road Crack Detection

**Maurizio Crispino, Emanuele Toraldo**



## **Project Report For Automatic Road Crack Detection:**

**Automated Inspection of Pavement Cracking Distress** Y. Huang, 2006 *Computer Vision and Image Processing* Harkeerat Kaur, Vinit Jakhetiya, Puneet Goyal, Pritee Khanna, Balasubramanian Raman, Sanjeev Kumar, 2024-07-02 The three volume set CCIS 2009 2010 and 2011 constitutes the refereed post conference proceedings of the 8th International Conference on Computer Vision and Image Processing CVIP 2023 held in Jammu India during November 3 5 2023 The 140 revised full papers presented in these proceedings were carefully reviewed and selected from 461 submissions The papers focus on various important and emerging topics in image processing computer vision applications deep learning and machine learning techniques in the domain **Measurement of Pavement Surface Condition, 1990**, 1990 Transportation... Weekly Government Abstracts, 1991 Proceedings of the Conference Strategic Highway Research Program and Traffic Safety on Two Continents in Gothenburg, Sweden, September 18-20, 1991 Statens väg- och trafikinstitut, 1991 **Advances on Testing and Experimentation in Civil Engineering** Carlos Chastre, José Neves, Diogo Ribeiro, Maria Graça Neves, Paulina Faria, 2022-08-17 The book presents the recent advances on testing and experimentation in civil engineering especially in the branches of geotechnics transportation hydraulics and natural resources It includes advances in physical modelling monitoring techniques data acquisition and analysis and provides an invaluable contribution for the installation of new civil engineering experimental facilities The first part of the book covers the latest advances in testing and experimentation in key domains of geotechnics soil mechanics and geotechnical engineering rock mechanics and rock engineering and engineering geology Some of the topics covered include new developments in topographic survey acquisition for applied mapping and in situ geotechnical investigations laboratory and in situ tests to estimate the relevant parameters needed to model the behaviour of rock masses and land structures monitoring and inspection techniques designed for offshore wind foundations The second part of the book highlights the relevance of testing and monitoring in transportation Full scale accelerated pavement testing and instrumentation becomes even more important nowadays when for sustainability purposes non traditional materials are used in road and airfield pavements Innovation in testing and monitoring pavements and railway tracks is also developed in this part of the book Intelligent traffic systems are the new traffic management paradigm and an overview of new solutions is addressed here Finally in the third part of the book trends in the field and laboratory measurements and corresponding data analysis are presented according to the different hydraulic domains addressed in this publication namely maritime hydraulics surface water and river hydraulics and urban water **Transportation Research Record**, 1991 **Annual Report** Roads and Traffic Authority of New South Wales, 1993 Quality Management of Pavement Condition Data Collection Gerardo W. Flintsch, Kevin K. McGhee, 2009 *The Highways Department Annual Report* Manitoba. Highways Dept, 1968 Development of In-situ Detection Methods for Materials-related Distress (MRD) in Concrete Pavements Scott Schlorholtz, 2003 The purpose of this research was to

summarize existing nondestructive test methods that have the potential to be used to detect materials related distress MRD in concrete pavements The various nondestructive test methods were then subjected to selection criteria that helped to reduce the size of the list so that specific techniques could be investigated in more detail The main test methods that were determined to be applicable to this study included two stress wave propagation techniques impact echo and spectral analysis of surface waves techniques infrared thermography ground penetrating radar GPR and visual inspection The GPR technique was selected for a preliminary round of proof of concept trials GPR surveys were carried out over a variety of portland cement concrete pavements for this study using two different systems One of the systems was a state of the art GPR system that allowed data to be collected at highway speeds The other system was a less sophisticated system that was commercially available Surveys conducted with both sets of equipment have produced test results capable of identifying subsurface distress in two of the three sites that exhibited internal cracking due to MRD Both systems failed to detect distress in a single pavement that exhibited extensive cracking Both systems correctly indicated that the control pavement exhibited negligible evidence of distress The initial positive results presented here indicate that a more thorough study incorporating refinements to the system data collection and analysis is needed Improvements in the results will be dependent upon defining the optimum number and arrangement of GPR antennas to detect the most common problems in Iowa pavements In addition refining high frequency antenna response characteristics will be a crucial step toward providing an optimum GPR system for detecting materials related distress

*Scientific and Technical Aerospace Reports* ,1994      **Pavement Management**  
National Research Council (U.S.). Transportation Research Board,1991      Nchrp Synthesis 401 ,      Pavement Management System Review ,2009      Highway Research Abstracts ,1993      **Monthly Catalog of United States Government Publications** United States. Superintendent of Documents,1979 February issue includes Appendix entitled Directory of United States Government periodicals and subscription publications September issue includes List of depository libraries June and December issues include semiannual index      **Bearing Capacity of Roads, Railways and Airfields**  
Andreas Loizos,Imad Al-Qadi,Tom Scarpas,2017-07-20 Bearing Capacity of Roads Railways and Airfields includes the contributions to the 10th International Conference on the Bearing Capacity of Roads Railways and Airfields BCRRA 2017 28 30 June 2017 Athens Greece The papers cover aspects related to materials laboratory testing design construction maintenance and management systems of transport infrastructure and focus on roads railways and airfields Additional aspects that concern new materials and characterization alternative rehabilitation techniques technological advances as well as pavement and railway track substructure sustainability are included The contributions discuss new concepts and innovative solutions and are concentrated but not limited on the following topics Unbound aggregate materials and soil properties Bound materials characteritics mechanical properties and testing Effect of traffic loading In situ measurements techniques and monitoring Structural evaluation Pavement serviceability condition Rehabilitation and maintenance issues

Geophysical assessment Stabilization and reinforcement Performance modeling Environmental challenges Life cycle assessment and sustainability Bearing Capacity of Roads Railways and Airfields is essential reading for academics and professionals involved or interested in transport infrastructure systems in particular roads railways and airfields **Federal Information Processing Standards Publication** , *Roads and Airports Pavement Surface Characteristics* Maurizio Crispino,Emanuele Toraldo,2023-06-05 Roads and Airports Pavement Surface Characteristics contains the papers presented at the 9th International Symposium on Pavement Surface Characteristics SURF 2022 Milan Italy 12 14 September 2022 The symposium was jointly organized by the Italian company that manages Italy s National Roads ANAS Ferrovie dello Stato Italiane Group the World Road Association PIARC and Politecnico di Milano The contributions aim to improve the quality of pavement surface characteristics while accomplishing efficiency safety sustainability and addressing new generation mobility needs The book covers topics from emerging research to engineering practice and is divided in the following sections Advanced and performing construction methods and equipment Next generation mobility Data monitoring and performance assessment Surface features and performances Maintenance and preservation treatments Pavement management Economic and political strategies Safety and risk issues Minimizing road impacts Sustainability and performances issues about materials and design Pavements surfaces and urban heat islands Weather conditions impact Airport pavements Roads and Airports Pavement Surface Characteristics is of interest to academics engineers and professionals in the fields of pavement engineering transport infrastructure and related disciplines

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