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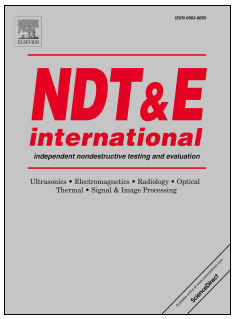

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Kien Dinh, Nenad Gucunski, Trung H. Duong

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ACCEPTED MANUSCRIPT

Migration-based Automated Rebar Picking for Condition Assessment of Concrete Bridge Decks with Ground Penetrating Radar

Kien Dinh[a], **Nenad Gucunski**[b], and **Trung H. Duong**[c]

[a]CONSEN Inc., Montréal, Canada

[b]Department of Civil & Environmental Engineering, Rutgers University, New Jersey, USA

[c]Department of Engineering, Colorado State University-Pueblo, Pueblo, Colorado., USA

E-mail: kien.dinh@consen.ca, gucunski@soe.rutgers.edu, trung.duong@csupueblo.edu

ABSTRACT

Automatic identification and localization of rebar from ground penetrating radar (GPR) data has been a research topic of great interest. This paper presents an automated rebar picking algorithm for GPR data of concrete bridge decks. The algorithm is based on the Limited and Simplified Hyperbolic Summation (LSHS) technique in which the width of migration is limited and a counter is used to check if a hyperbolic signature exist in a sub-region of GPR image. More specifically, after a time-zero correction, each pixel in the raw GPR image with a positive amplitude will be migrated, as it is usually done with the conventional hyperbolic summation (HS) technique. However, for each pixel to be migrated, the width of migration is limited in the horizontal direction and a unit value will be used for migration, instead of the true amplitude values of the pixels. In the obtained image, the pixels containing rebar peaks will normally have the intensity values close to the number of pixels corresponding to the width of migration and, therefore, can be picked. Whereas the method is rather straightforward and simple to develop, its implementation on GPR data of two concrete bridge decks has shown good results. First, the GPR condition maps obtained from the

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