Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : EL HAMI Given names : Abdelkhalak

Status (prof., assistant prof., ...) : Prof.

Laboratory : LMNI Website address : https://www.insa-rouen.fr/

Institution : INSA Rouen Normandie Website address : https://www.insa-rouen.fr/

Scientific competence of the supervisor:

Material and structural modelling, Finite element simulation, algorithms, Optimization and prediction.

Two major publications in the field proposed for the PhD :

1. David Bassir, Haochen Chang, Juri Majak, Real-Time Crack Detection on Concrete Using Non-Destructive Approaches Based on Yolo Series: Review, Materials Science and Engineering Application X, 820 - 826
2. Chen, G.; Chen, X.; Yang, L.; Han, Z.; Bassir, D. An Inversion Algorithm for the Dynamic Modulus of Structures Based on a Convolutional Neural Network. Appl. Sci. 2023, 13, 1192.

Website address of the personal page :

Supervisor's email : aelhami@insa-rouen .fr and david.bassir@utbm.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** VI-2

Title : 3D Crack prediction and Modeling on Civil Infrastructures for Safety Health Monitoring

Subject :

Infrastructure components such as buildings, power plants, roads, and other commonly utilized structures play a critical role in the daily lives of citizens. These elements are indispensable to the sustained development of societies. These structures warrant heightened attention towards sustainability to ensure longevity and resilience. Particularly, concrete a fundamental material in infrastructure often exhibits significant surface cracking over time due to exposure to harsh environmental conditions and human-induced stressors. Concrete, boasts many beneficial mechanical properties, including resistance to fire, water, corrosion, and cyclic loading. Which make it popular for a wide range of infrastructure such as bridges and various building components. However, concrete's low tensile strength makes it particularly susceptible to cracking, which is considered one of the most critical forms of deterioration. In recent years, numerous disasters globally have underscored this vulnerability. These incidents highlight the need for ongoing infrastructure health monitoring strategy. 2D Crack detection is actually the main way to monitor cracks. However, this method, does not gives information about the 3D shape and depth of the crack. We propose in this work to built a predictive model that can generate the 3D shape of the Crack and allow us to make better prediction and avoid collapses

Keywords :

Crack prediction; Modeling; Safety Health Monitoring.

Expected collaborations :

All civil engineering applications that need to monitor the safety of their infrastructures are concerned.

Background required from the applicant :

Mechanical background, Phython or Matlab knowledge, Finite element methods. And a solid backround of mathematics and modelling.

Existence of a PDF file detailing the proposal ("yes" or "no") : NO

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