Ayala-Cabrera, David; Izquierdo, Joaquín; Montalvo, Idel; Pérez-García, Rafael


Summary: This paper uses a multi-agent approach as a quick and easy tool for the interpretation and analysis of the characteristics of Water Supply System (WSS) components when working on a collection of Ground Penetrating Radar (GPR) survey files. The multi-agent algorithm proposed in this paper has been developed in Matlab and is based on Game Theory. The input is the result of the GPR radargram survey and the output consists of the agent scores in the game proposed in this paper. Useful information can be gained by interpreting the columns of the output matrix that describe the agents’ movements, together with the associated racing times. In effect, this analysis enables a simple determination of the electromagnetic properties of the underground system and provides an accurate classification of these properties. The results of this agent racing algorithm are promising, since it groups, and consequently, decreases the number of points that make up the initial radargrams; while at the same time preserving its main properties, and enabling clearer views of pipes and a better identification of the components in WSS.

MSC:
94A12 Signal theory (characterization, reconstruction, filtering, etc.)
94A08 Image processing (compression, reconstruction, etc.) in information and communication theory

Keywords:
ground penetrating radar; signal processing; images processing and analysis; multi-agent systems; agent race

Software:
Matlab

Full Text: DOI