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Intelligent recognition of underground pipeline From GPR image based on Hash algorithm

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Ground penetrating radar (GPR) is a high-resolution geophysical non-destructive detection method, which is widely used in near surface target detection, and has been successfully applied in urban construction and geotechnical engineering. In urban life, underground pipelines undertake important missions such as energy transmission and information transmission. As the basic data of smart city, the acquisition of spatial location information of underground pipelines depends on geophysical detection data such as GPR. The traditional recognition and interpretation of GPR underground pipeline image mainly depends on and is seriously limited by the professional experience of the staff, which is very disadvantageous to the development of large-scale urban underground pipeline survey. To address this problem, according to the GPR reflection image characteristics of isolated targets such as underground pipelines, this paper proposes an intelligent recognition concept of isolated targets in GPR profile based on CBIR (Content-based image retrieval) According to Hash algorithm and improved vector K-means clustering analysis, the intelligent detection, automatic image sorting and recognition of underground pipeline target in GPR profile are realized. Finally, the pipeline material is judged by extracting the image brightness function of the middle trace in the recognition area. The application results of numerical simulation experiments and measured data show that this algorithm can effectively identify the hyperbolic characteristics of the pipeline in the GPR profile, and the identified area can accurately reflect the spatial location of the underground pipeline.