Tohoku Univ. Technology

Soil estimation method

Automatic estimation of ground strength while excavating

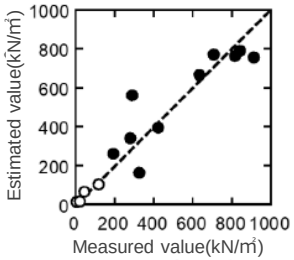
Overview

In civil engineering works, the need for unmanned construction of construction machinery is increasing, and it is required to ensure safety and improve work efficiency not only during disaster recovery but also in normal times. However, the current unmanned construction is only monitored by cameras, and the work efficiency is worse than manned construction. The shortage of ground information is a problem as a factor of this efficiency lowering.

Generally, the cone index, an indicator to assess the running ability of construction equipment, is measured using a cone penetration tester, but the number of measurement points increases in a wide area of land due to ground variations from place to place. In addition, the measurement needs to be carried out independently from excavation and other earthworks, which is time-consuming.

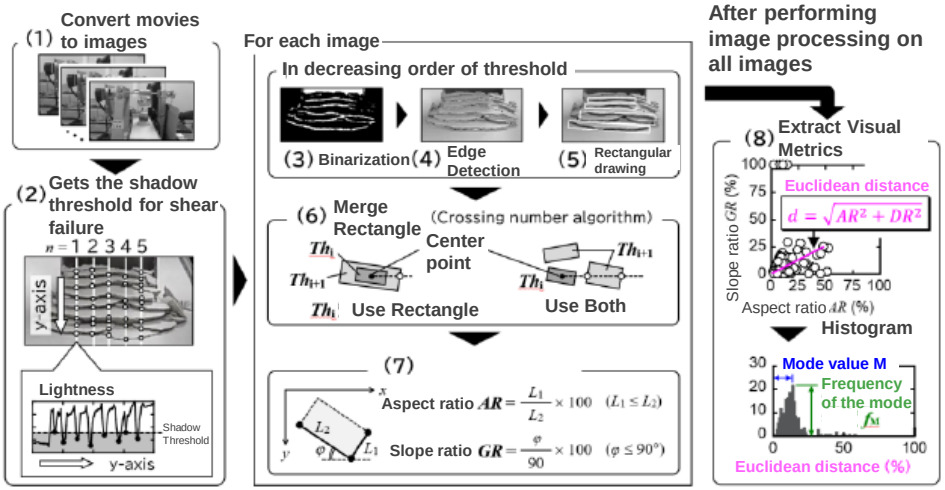
This invention is based on the relationship between the fracture morphology of soil excavated by hydraulic excavators widely used in the field and the cone index. It is possible to automatically estimate the strength of the ground from visual information by photographing the fracture morphology of the soil being excavated and extracting the features of the fracture morphology. In addition, the visual information can be combined with the force sense information acting on buckets. Since the invention can estimate in real time while excavating, it is expected to greatly improve the work efficiency in unmanned construction.

Estimated and measured Cohn index



Estimation using only visual information

Features・Outstandings



Product Application

- Soil estimation device ・・・ Assume a system linked with construction machinery

Related Works

[1] The 59 Geotechnical Society Conference, 2024

IP Data

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