香港浸會大學
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Centre for Mathematical Imaging and Vision

Distinguished CMIV Lecture

Multi-granular Computing-the Key to Image Classification

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Venue: FSC1217, Fong Shu Chuen Building,
Ho Sin Hang Campus, Hong Kong Baptist University

Abstract

The aim of the talk is to expound the basic principle and characteristic of multi-granular computing by using image classification as an example. We will present the theoretical framework of granular computing and its application to image classification. The theory is called the quotient-space based theory since we use a set of quotient spaces as a mathematical model of different grain size worlds and use the model to analyze the relationship among different worlds. In image classification, we first discuss the image representation problem. It's known that an image can be represented in computers with different granularities from fine to coarse grain-size such as pixel-based, global features, local features, etc. Each representation has its own expressiveness and robustness. But if one representation has good expressiveness then its robustness always becomes poor. Thus, the better way is to made use of the representations with different grain-sizes simultaneously, i.e., by multi-granular computing. Second, by the experimental results we show that the multi-granular computing based image classification is superior to the uni-granular one. Unfortunately, a lot of research works have been dong so far in image classification but the well-known algorithms, either based on multi-granular or uni-granular ones, are far from effectiveness. Therefore, the image classification in computer science is still an open problem. From neuroscience, many experimental results show that the information processing in human vision, for example, the information processing in human's visual cortex, supports the concept of multi-granular computing. Image classification, or in general computer vision, should learned something from those knowledge. It seems that one of future research directions that we should explore is to take full advantage of the principle of visual processing in human brain.

All are welcome

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