Title	カメラモーション推定のためのビデオ解析およびスポーツビデオでの魅力的瞬間の自動抽出への応用
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Abstract

Videos are main sources of information and entertainment. They are presented in sequence of visual and audio information. For entertainment purposes, entertaining videos (e.g. sport videos) are made by video makers in order to entertain viewers whose cannot watch at the stadium because of their limitations. In order to access the video in a short time, several researchers begin to make an automatic system that can index attractive moments in the entertaining videos based on the human perspective. By the ideas of uncertainty in game information and motions in computer vision, a new research in the study area of information science is established. The contributions of this research are discussed in the two chapters of this thesis:

Chapter 3 presents a new algorithm of computer vision model to make computers understand the camera motions in each video frame automatically. To understand the camera motions, a 2D motion vector histogram is used instead of 1D motion vector histograms as described in existing works. The properties and behavior of the 2D motion vector histogram are analyzed in order to recognize the camera motions. Compare with 1D motion vector histograms, it shows that the 2D motion vector histograms can recognize more types of the camera motions.

Chapter 4 presents a mathematical model to show how the attractive moments can be retrieved by the camera motions. Based on the idea of changing in game information, the attractive moments are potentially occurred when the game information is changed. Since video makers notice the attractive moments, they operate the cameras in order to guide the viewers for attentions. From all camera motions, zooming camera motions potentially retrieve several attractive moments in soccer games. For example, score attempting, foul, player claim to the referee's judgment, etc. Finally, we generate a shortening video application based on this idea.

Keywords: Attractive images, Camera motions, Computer vision, Image processing, Video analysis.