

<<基于机器的智能人脸识别>>

图书基本信息

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前言

We cant solve the problems by using the same kind of thinking we used when we created them. Albert Einstein (1879-1955) State-of-the-art machine-based face recognition technology , although boomingsince last decades , is still suffering a lot from critical research challenges , suchas the lack of fundamental intelligence , the difficulties of running completelyautomatically and unsupervisedly without separate training , and the typicalfailures of dealing with free face pose variations , etc. Those limitations greatlyhinder the wide applications it could have had. This book is the first to discussthe general engineering methods of imitating intelligent human brains forvideo-based face recognition. The advances and evidences from the cognitivescience research are introduced in this book , which further strengthen ourthoughts and proposals to achieve such a fundamental intelligence in machinevision. Regarding intelligence , we have defined two directions. The first effort isto simulate the ability of self-learning , self-matching and self-updating. Thisside of intelligence can be detailed into the following features : the whole recognition procedure is running in an unsupervised , automatic , non-invasive , and self-updated way. It is important to note that , the fully automatic procedure is a generalized face recognition procedure , which includes the task of enrollment (training) and updating as well. However , those steps are typicallyseparate arld supervised in machine learning , and therefore missing the essentials of intelligence.

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内容概要

Machine, based Intelligent Face Recognition discusses the general engineering method of imitating intelligent human brains for video-based face recognition in a fundamental way, which is completely unsupervised, automatic, self-learning, self-updated and robust. It also overviews state-of-the-art research on cognitive-based biometrics and machine-based biometrics, and especially the advances in face recognition. This book is intended for scientists, researchers, engineers, and students in the field of computer vision, machine intelligence, and particularly of face recognition.

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章节摘录

Although the two parties who hold opposite opinions provide us much information for the face recognition in cortex, further cognitive research is highly demanding for ending the debates and providing us a clearer answer. However, we, although as researchers in a different field, can now still figure out that, each side has unfortunately one limitation in common: the importance of frontal lobe is not taken into consideration at all. As mentioned earlier, the frontal lobe contributes to the high-level analysis such as reasoning, planning, and problem-solving, etc. Frontal lobe is performing the most complicated task, being expected to be involved in all brain process, and hence demonstrating the fundamental intelligence. This region should be definitely explored for the face recognition procedure. In early 1990s, Gross [29] suggests that the face processing cells are extended to the frontal lobe. In reality, this study focuses on finding the visual ability of the frontal lobe rather than the intelligence of it. More recently, Mechelli et al. [30] and Johnson et al. [31] found out that, the face processing task, although mainly performed in posterior cortical regions such as FFA, OFA and fSTS, is modulated by top-down signals originating in prefrontal cortex. The main purpose in [31] is to point out that, refreshing is a component of more complex modulatory operations such as working memory and mental imagery. And the refresh related activity may thus be involved in the common activation patterns seen across different cognitive tasks. In summary, most researches are still concentrating on specific and different prospects. However, they convincingly support our fundamental opinion: the high-level intelligence performed in frontal lobe is crucial for face recognition. It is important to note that, there is a high level research on cognitive based face recognition, published by P. Sinha et al. [32]. They reported nineteen basic results from the face recognition by humans. Those high-level findings provide us further remarkable insights in designing the corresponding computer vision systems. In the following, we reorganize and analyze the nineteen results for the readers for a better understanding. ~ Results for the image-based face recognition algorithms. The findings from Result 3 to Result 12 include the following information that contribute and/or influence the face recognition performance: high-frequency information, facial features, holistic processing, face aspect ratios (width and height dimensions), encoding, shape information, color cues, contrast variations, and illumination changes.

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