

MASTER'S THESIS

Human face image searching system with relevance feedback using sketch

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Human Face Image Searching System with Relevance Feedback
using Sketch

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for the degree of
Master of Philosophy

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Abstract

Sketching is the most popular and well-known suspect identification (SI) method. A suspect sketch mainly consists of six facial components, namely hair, eyebrows, eyes, nose, mouth and face outline. There are around one hundred variations for each facial component. Mug shot search is another widely used SI method. Mug shots are displayed page by page until the witness can find the target. The objective of this research is to improve the efficiency of the SI process by combining these two existing systems (sketching and mug shot search).

A human face searching system using sketch is designed and developed in this thesis. The proposed system consists of two phases, namely sketch-mug shot matching and mug shot search by relevance feedback.

In the first phase of the sketch-mug shot matching, we develop a feature matching algorithm using both local and global facial features. Local feature measurement compares the shapes of facial components and performed on five local features, namely eyebrows, eyes, nose, mouth and face outline. Point distribution model (PDM) is adopted to calculate the local feature distance. Global feature measurement compares the facial geometric distances among facial feature points. Experimental results show that 70% accuracy is achieved by considering the top 15% ranks. In fact, the main error is due to the situations in which only part(s) of the sketch image looks like the original mug shot. To overcome this limitation, this project makes use of the concept of human-in-the-loop and proposes a human face image searching algorithm using relevance feedback. The proposed algorithm employs linear discriminant analysis (LDA)

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