A Characterization of Visual Feature Recognition

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Abstract

Natural human interfaces are a key to realizing the dream of ubiquitous computing. This implies that embedded systems must be capable of sophisticated perception tasks. This paper analyzes the nature of a visual feature recognition workload. Visual feature recognition is a key component of a number of important applications, e.g. gesture based interfaces, lip tracking to augment speech recognition, smart cameras, automated surveillance systems, robotic vision, etc. Given the power sensitive nature of the embedded space and the natural conflict between low-power and high-performance implementations, a precise understanding of these algorithms is an important step developing efficient visual feature recognition applications for the embedded space. In particular, this work analyzes the performance characteristics of flesh toning, face detection and face recognition codes based on well known algorithms. We also show how the problem can be decomposed into a pipeline of filters that have efficient implementations as stream processors.