

Project Idea For Multidimensional Signal Processing

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Scaling Invariant Pattern Matching Based on a Generalized Transform

The high throughput of many image processing systems has proven to be extremely computationally demanding. For example, only in the last few years techniques such as robust pattern matching have become of widespread use.

One of the strategies to tackle high data throughput is to use algorithmic randomization. A comprehensive study of randomized algorithms is presented in [1]. Randomization allows not only better performing algorithms, but also implementations that are much simpler and robust [2].

Randomization can also be used to explore data redundancy. In pattern matching, for example, a randomized sampling algorithm for rotation and shift invariant pattern matching was presented in [2,3]. A correlation based approach was used, but sampling randomization allowed an incredible speedup in the matching process.

Another pattern matching problem that can be approached using the same idea is scale invariant pattern matching. In this project, we propose studying scale invariant pattern matching, using a randomized sampling approach, and a new data reduction technique.

The proposed data reduction technique has a strong relationship with Discrete Fourier Transform approaches [4] for signal detection. One of the advantages of using the proposed technique is that the three most commonly observed template distortions (shift, rotation and scaling) can be smoothly integrated into a unique solution.

Bibliography

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