

Homework 5 by Tatyana Nuzhnaya.

Report on “Rotation Invariant Shape Contexts based on Feature-space Fourier Transformation”

Content

The authors propose a new pixel-level shape descriptor. First, shape contexts are computed. Then, 2D FFT is performed on each 2D histogram from shape contexts.

Contribution

The scheme solves the rotation-invariance problem of shape contexts based on the shift theorem of Fourier Transformation while does not increase the computational complexity.

Motivation

Shape matching is important in variety of applications and using shape contexts receives much of attention in the literature. The advantage of using of shape context is that computations are performed on pixels and no preprocessing is needed. Shape contexts are robust against deformations and occlusions and have a good discriminative power. However, the rotation invariance of shape contexts depends on the tangent at every boundary point. In view of limitations of shape contexts, the authors propose a new descriptor in statistical integration of pixel-level constraint histograms. It preserves the main advantages of shape contexts while solves rotation invariance.

Writing style, references

The paper is technically sound. It convincingly shows that using theorem of Fourier Transformation solves the rotation-invariance problem of shape contexts. However, the paper is not clearly written and readable. The number of references (only 3) is not sufficient. The authors should perform an exhaustive background review and properly address how their research is connected to the current state of art as well as provide more comments to the proofs and definitions.

Experiments and results

Only 3 tests were conducted in total. The conclusions that are made have a very general nature. There is no explanation why parameters of the model have been set to specific values. The authors suggest that the proposed scheme merits further investigations for refinement but never mention any possible solutions.

Conclusion

This paper describes interesting work; however, it has great room to improve. It is not addressed properly how do the results compare with state of the art? Is this acceptable? The theoretical proof of the invariance of the proposed descriptor is presented but additional comments should be provided for clarity. I suggest accepting the paper after adding major/minor revisions.