

# Part 4: Conclusion and Future Directions

# Summary

- Learning effective distance metrics can better measure the similarity of samples. Hence, better visual analysis performance can be obtained.
- Different learning strategies are developed for different visual analysis tasks with different settings. Better performance can be obtained when suitable metric learning methods are designed and employed.

# Future Directions

**Scalability:** large-scale metric learning

1. Online learning
2. Batch based learning

**Nonlinearity:** nonlinear metric learning

1. Kernel metric learning
2. Local metric learning
3. Deep metric learning

# Future Directions

**Robustness:** metric learning with noisy/missing labels

## **New settings:**

1. Metric learning for ranking
2. Multi-task metric learning
3. Domain transfer metric learning
4. Metric learning for structured data
5. Multi-modal metric learning

**Unsupervised metric learning:** metric learning for clustering

**Deep metric learning:** metric learning with deep networks

# Pattern Recognition Special Issue on Distance Metric Learning for Pattern Recognition

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## Special Issue on Distance Metric Learning for Pattern Recognition

Machine learning techniques have played a central role in pattern recognition, and a variety of machine learning methods have been developed for various pattern recognition applications over the past decade. Among these learning methods, distance metric learning has achieved many state-of-the-arts in many pattern recognition applications, which aims to learn an appropriate distance function given some constraints between samples. To better discover the geometric property of high-dimensional feature spaces and exploit the complementary information of different feature spaces, manifold learning and multi-view learning strategies have also been integrated into distance metric learning to further improve the performance of various distance metric learning methods. While these methods are helpful to learn the similarity of data such as images, videos, texts, radars, and voices, how to develop task-specific distance metric learning algorithms for different pattern recognition tasks

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