

#### Few-Shot Learning Based on Metric Learning Using Class Augmentation

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#### Introduction

- Few-shot learning is a machine learning problem in which new classes are learned from only a few samples.
- We propose a few-shot learning approach based on metric learning in which the number of classes in the training data for performing metric learning is increased.

# **Problem Definition**

- N-way K-shot learning: the few-shot learning from N classes data with K labeled samples in each class
- Three datasets are used for learning and testing.
  - Training set: dataset for learning prior knowledge
  - Support set: samples for learning N classes
  - Testing set: dataset for testing the few-shot learning results



# **Proposed Method**

• New samples in an imaginary class generate by combining samples in two original training set classes.



# **Embedding Function**

• A CNN is used as an embedding function for few-shot learning.



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# Synthesis Method



One-stream

Two-stream during metric learning

# **Results of Preliminary Experiments**

• The number of classes has a greater impact on the accuracy of few-shot learning than the number of samples per class in training set.



# **Results of Main Experiments**

• The accuracy of few-shot learning increases as the number of classes used in metric learning increases until m = 16.



# Conclusion

- We proposed a few-shot learning approach that increases the number of classes for the training data to perform metric learning.
- Although the proposed method is relatively simple, the method demonstrated good performance.
- Future works will involve investigating whether the combination of the proposed method with other approaches.

### Thank you for listening.