Beyond Direct Relationships: Exploring Multi-Order Label Pair Dependencies for Knowledge Distillation

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Motivation

1. Existing KD methods do not explicitly distill the dependencies between labels, which limits the model ability to capture multi-label correlation.

2. Furthermore, although existing methods for multi-label image classification have utilized the second-order label pair dependency (direct dependency between two labels), the high-order label pair dependency, which captures the indirect dependency between two labels, remains unexplored.

Contributions

1. We first explore the indirect label pair dependencies, denoted by high-order label pair dependencies, in the field of multi-label image classification.

2. We propose an MDKD framework for multi-label image classification that transfers knowledge to identify label pair dependencies at multiple orders, including direct (second-order) and indirect (high-order) ones.