Interactive Multi-Label CNN Learning with Partial Labels

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**Motivation**

- **Multi-label Learning:**
  - Recognize all labels in images → **Costly** to gather annotation for all labels
  - Each image is often **partially labeled**

- **Prior work on learning with partial labels:**
  - Missing label as negatives → falsely label images
  - Use model prediction to impute missing labels → error propagation

- **Contributions:**
  - **End-to-end** CNN training using label and image dependencies
  - **Interactively learn** model parameters and dependencies
• **Interactive CNN Learning:**
  - **Label dependency:** determine image labels from co-occurring labels
  - **Image dependency:** similar images must have similar visual features
  - **Prediction smoothness:** via Label + Image dependencies

• **Alternate** between CNN learning and dependency estimation
Experiments

- Performance improves for both small and large # annotations

- Qualitative Results: can capture most labels in images