04

Self-supervised adaptation for unknown domains/classes

No labels? Count on me!

Abstract

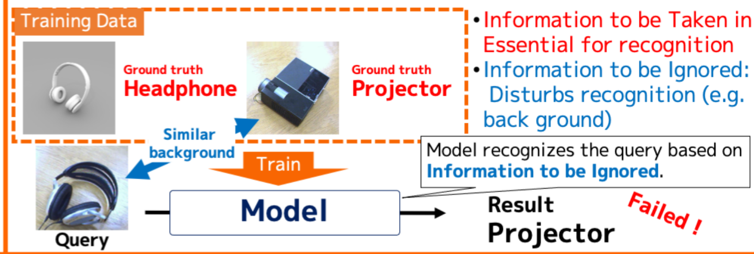
We propose a method that enables us to use miscellaneous data collected under various conditions directly for deep learning. When we train a model using miscellaneous data, the model's performance is often degraded by "Information to be Ignored," which disturbs correct recognition. Our proposed method dramatically improves the model's performance by estimating the "Information to be Ignored" and training the model not to be affected by it. Our technique will make it possible to easily utilize miscellaneous data for learning and will contribute to expanding AI services into fields where deploying deep learning has been challenging.

Learning from miscellaneous data

Deep learning using data collected under **various conditions**

Difficulty Information to be Taken in and to be Ignore

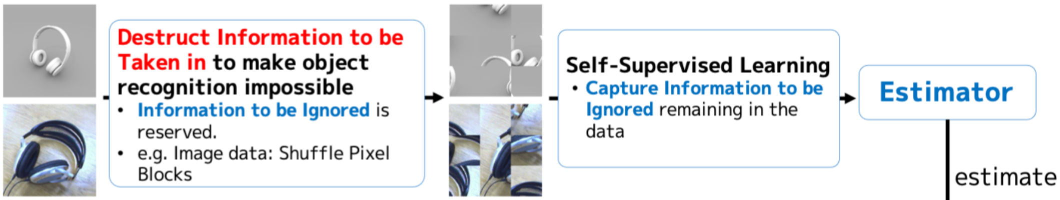
- Information to be Taken in: Essential for recognition
- Information to be Ignored: Disturbs recognition (e.g. back ground)



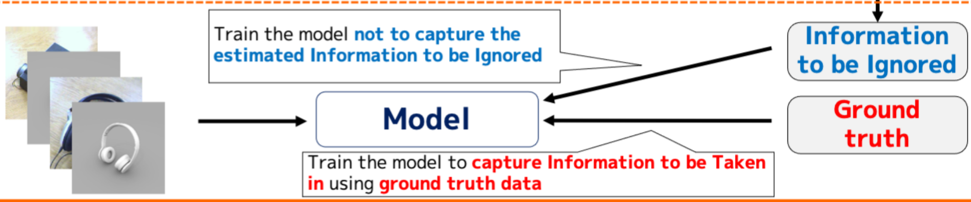
Self-supervised adaptive learning to capture Information to be Taken in

Estimate Information to be Ignored and train the model not to be affected by them.

Point 1.
Destruct Information to be Take in; then **capture Information to be Ignored** by **self-supervised learning**



Point 2.
Train the model to **capture Information to be Taken in** and **not to capture Information to be Ignored**



Performance

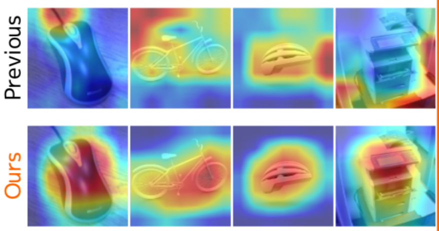
Ours achieves high recognition accuracy.

- Previous method degrades model performance due to **Information to be Ignored.**

Methods	Accuracy[%]
Previous	3.6
Ours	**77.4**

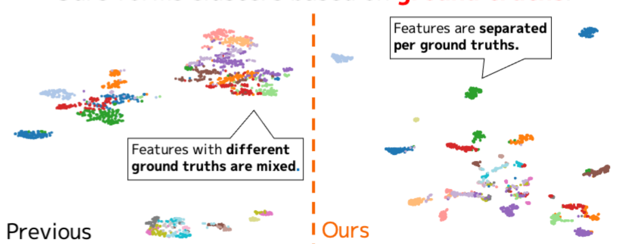
Visual explanations

Our method focuses on **targets.**



Visualization of feature embeddings

Ours forms clusters based on **ground truths.**



References

[1] Y. Mitsuzumi, G. Irie, D. Ikami, T. Shibata, "Generalized Domain Adaptation," in *Proc. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.
[2] R. Tobias, R. Stiefelhagen, "Adaptiope: A Modern Benchmark for Unsupervised Domain Adaptation," in *Proc. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2021.

Contact

Yu Mitsuzumi / Recognition Research Group, Media Information Laboratory
Email: cs-openhouse-ml@hco.ntt.co.jp