

Semisupervised Deep Learning

Muchang Bahng

Spring 2023

Contents

1	Semi Supervised Learning	2
1.1	Pseudo Label Learning	2
1.2	Consistency Regularization	2
1.3	Distribution Alignment	2
1.4	Weak Supervision	2
1.5	Student Teacher Models	2
	References	2

1 Semi Supervised Learning

There has been good stream of work done at Google Brain that first came up with MixMatch in 2019 [BCG⁺19], which combined the state of the art semi supervised methods. This model was then improved the next year with ReMixMatch [BCC⁺20], and then improved again with a much more simple model called FixMatch [SBL⁺20].

1.1 Pseudo Label Learning

Generating psuedo labels on unlabeled datasets and training on them.

1.2 Consistency Regularization

Ensuring that the model is consistent with its predictions on certain inputs and neighbors of the inputs. It relies on the assumption that perturbed versions of the same input should have the same output. When wanting to make sure that the outputs are consistent with augmentations of the input, this is called **augmentation anchoring**. There are ways in which we use a combination of **weak augmentation** and **strong augmentation** to achieve this.

1.3 Distribution Alignment

1.4 Weak Supervision

1.5 Student Teacher Models

References

- [BCC⁺20] David Berthelot, Nicholas Carlini, Ekin D. Cubuk, Alex Kurakin, Kihyuk Sohn, Han Zhang, and Colin Raffel. Remixmatch: Semi-supervised learning with distribution alignment and augmentation anchoring, 2020.
- [BCG⁺19] David Berthelot, Nicholas Carlini, Ian Goodfellow, Nicolas Papernot, Avital Oliver, and Colin Raffel. Mixmatch: A holistic approach to semi-supervised learning, 2019.
- [SBL⁺20] Kihyuk Sohn, David Berthelot, Chun-Liang Li, Zizhao Zhang, Nicholas Carlini, Ekin D. Cubuk, Alex Kurakin, Han Zhang, and Colin Raffel. Fixmatch: Simplifying semi-supervised learning with consistency and confidence, 2020.