

# Machine Learning with Limited Data

- Pattern Exploitative Training
- Learning with Limited Data

# Pattern Exploitative Training

PET or Pattern Exploitative Training

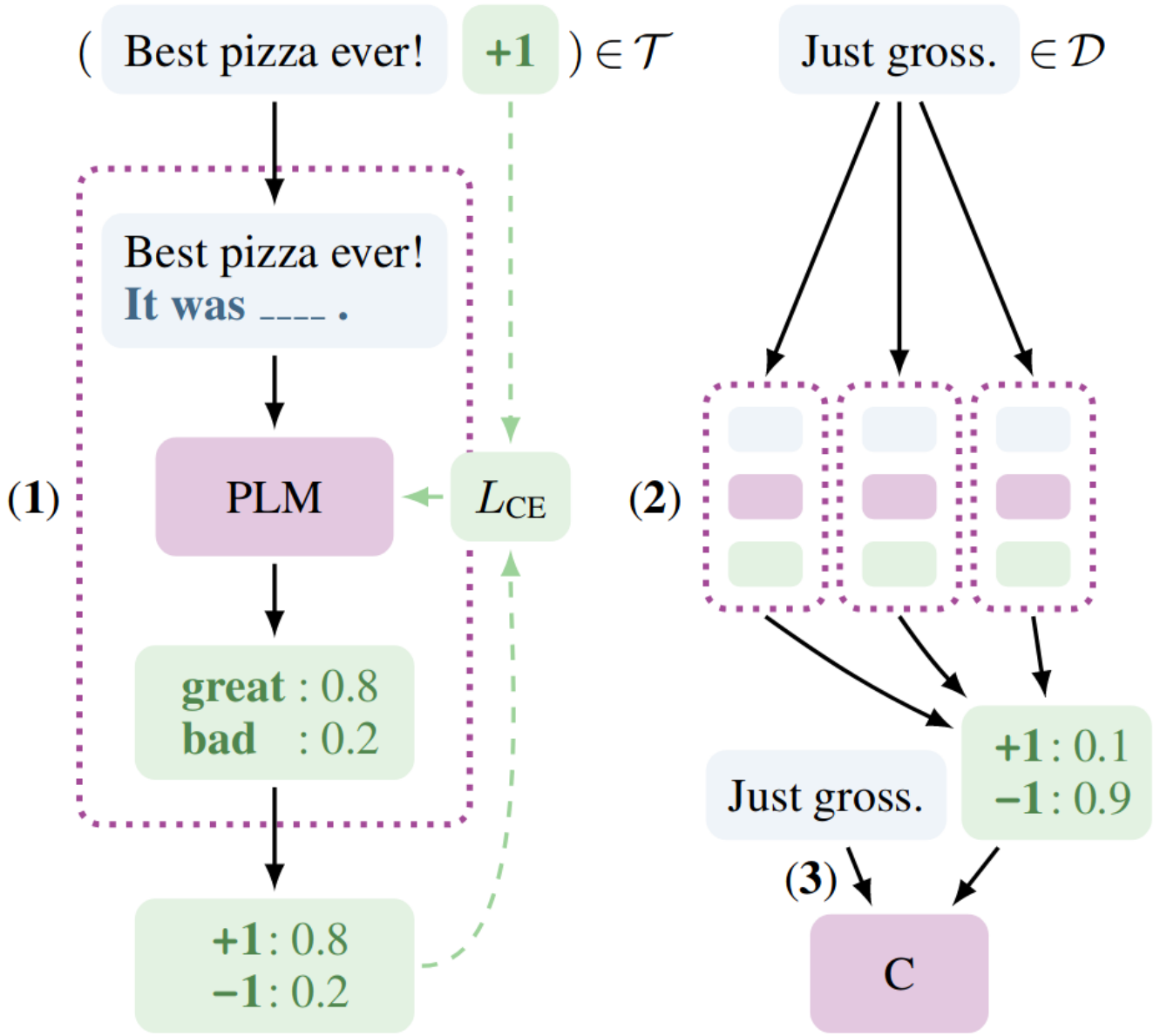


Figure 1: PET for sentiment classification. **(1)** A number of patterns encoding some form of task description are created to convert training examples to cloze questions; for each pattern, a pretrained language model is finetuned. **(2)** The ensemble of trained models annotates unlabeled data. **(3)** A classifier is trained on the resulting soft-labeled dataset.

```
journal={Computing Research Repository},  
volume={arXiv:2001.07676},  
url={http://arxiv.org/abs/2001.07676},  
year={2020}  
}
```

```
@article{schick2020small,  
  title={It's Not Just Size That Matters: Small Language Models Are Also Few-Shot Learners},  
  author={Timo Schick and Hinrich Schütze},  
  journal={Computing Research Repository},  
  volume={arXiv:2009.07118},  
  url={http://arxiv.org/abs/2009.07118},  
  year={2020}  
}
```

# Learning with Limited Data

Good machine learning is heavily dependent on good data. A few more good data-points is likely to be worth billions of model parameters.

However, sometimes we need to train models when data is limited. There are a number of strategies that we can try.

## Zero-Shot and Few-Shot Learning

- Pattern Exploitative Training is a way to use a small number of examples to train text classifiers. It is technically an example of synthetic data generation.

## In Context Learning (ICL)

## Synthetic Data Generation and Augmentation