

Learning with Delayed Feedback

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Delayed Feedback

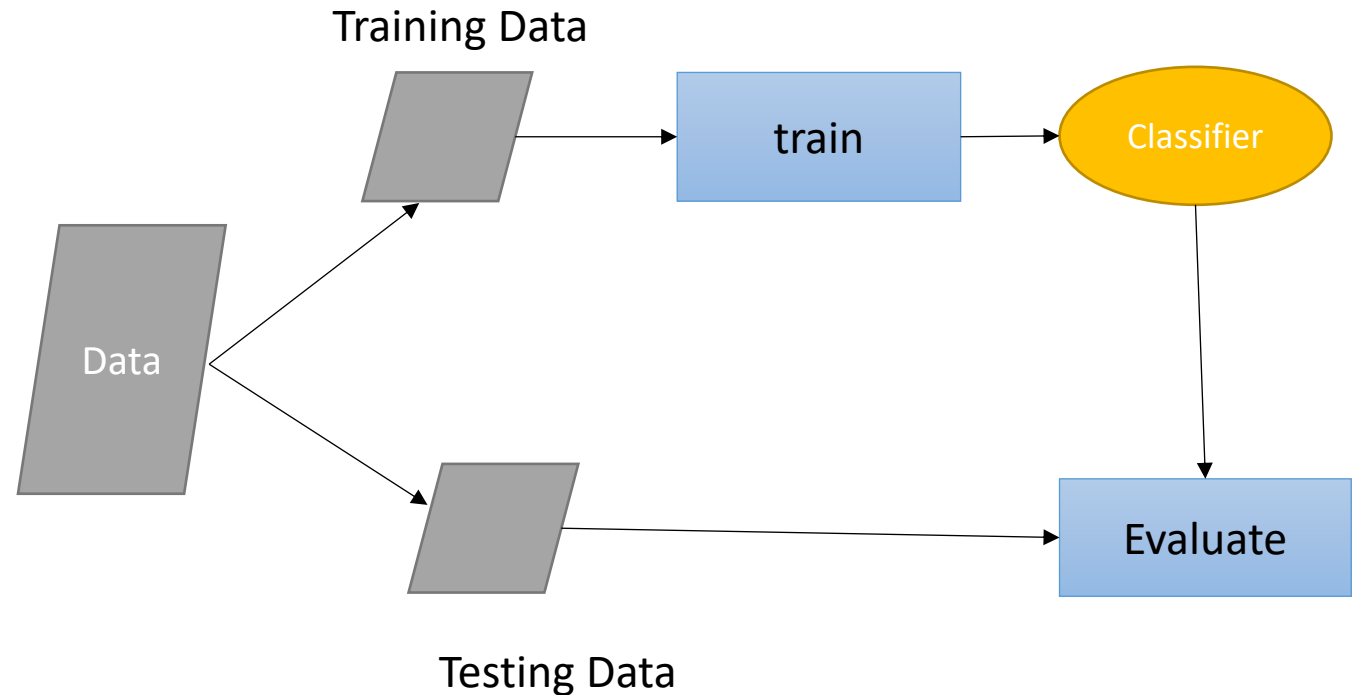
Somebody gives feedback with a car to the learner.



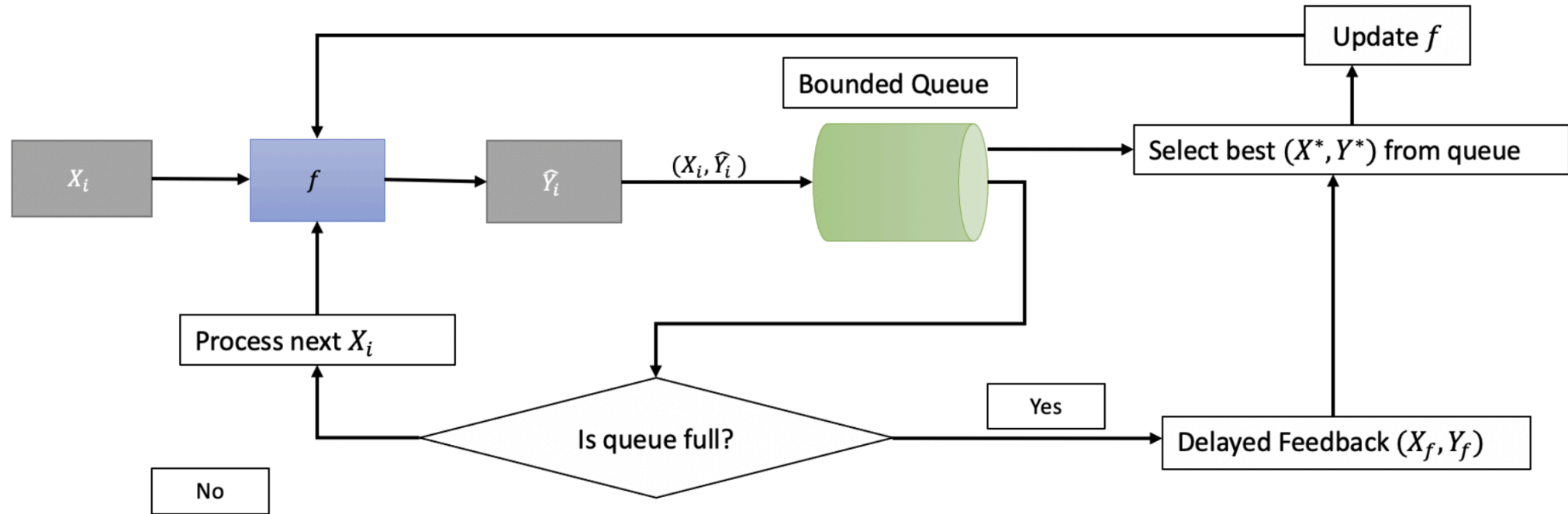
Car

Traditional Learning vs Learning with Delayed Feedback

- There is no training or testing phase in brain. (Continuous learning)
- How to handle Delayed Feedback?
- We introduce two new phases which are Seeding phase and Growing phase.



Growing Phase



Results – Image Classification

- CIFAR10 dataset is used with the division of 10000 images for Seeding phase and 50000 images for Growing Phase.
- A modified version of AlexNet is used as the learner.
- Base line accuracy is 69.52%.

Queue Size	Output Similarity(%)	Input and Output Similarity(%)	Input and Output Similarity and Batch Update(%)
1000	69.92	69.92	68.37
2000	70.42	70.69	69.46
3000	71.39	71.50	70.23
5000	73.09	73.08	72.01
10000	77.31	77.23	75.89

Results – Image Captioning

- COCO dataset is used with the division of 113287 images for Seeding phase and 5000 images for Growing phase.
- A neural network with LSTM is used as the learner.
- Baseline BLUE4 score is 0.225.

Queue Size	Output Similarity	Input and Output Similarity	Bounding Boxes	Image Segmentation
100	0.233	0.237	0.228	0.230
200	0.232	0.236	0.227	0.228
300	0.224	0.235	0.220	0.222
400	0.226	0.228	0.223	0.221
500	0.226	0.231	0.221	0.223

Example Caption

T-NN produced the caption - “a couple of women standing next to a cake”,

DL-NN produced the caption - “a man and a woman are posing for a picture”.

The latter caption is qualitatively better.



Conclusion and Future Works

- Test the strategy with a completely different forms of feedback such as audio.
- Implement our strategy with other base learners such as SVM, and Decision Trees.