

Niv Yosef – 206100968
Omer Etzion – 311128847

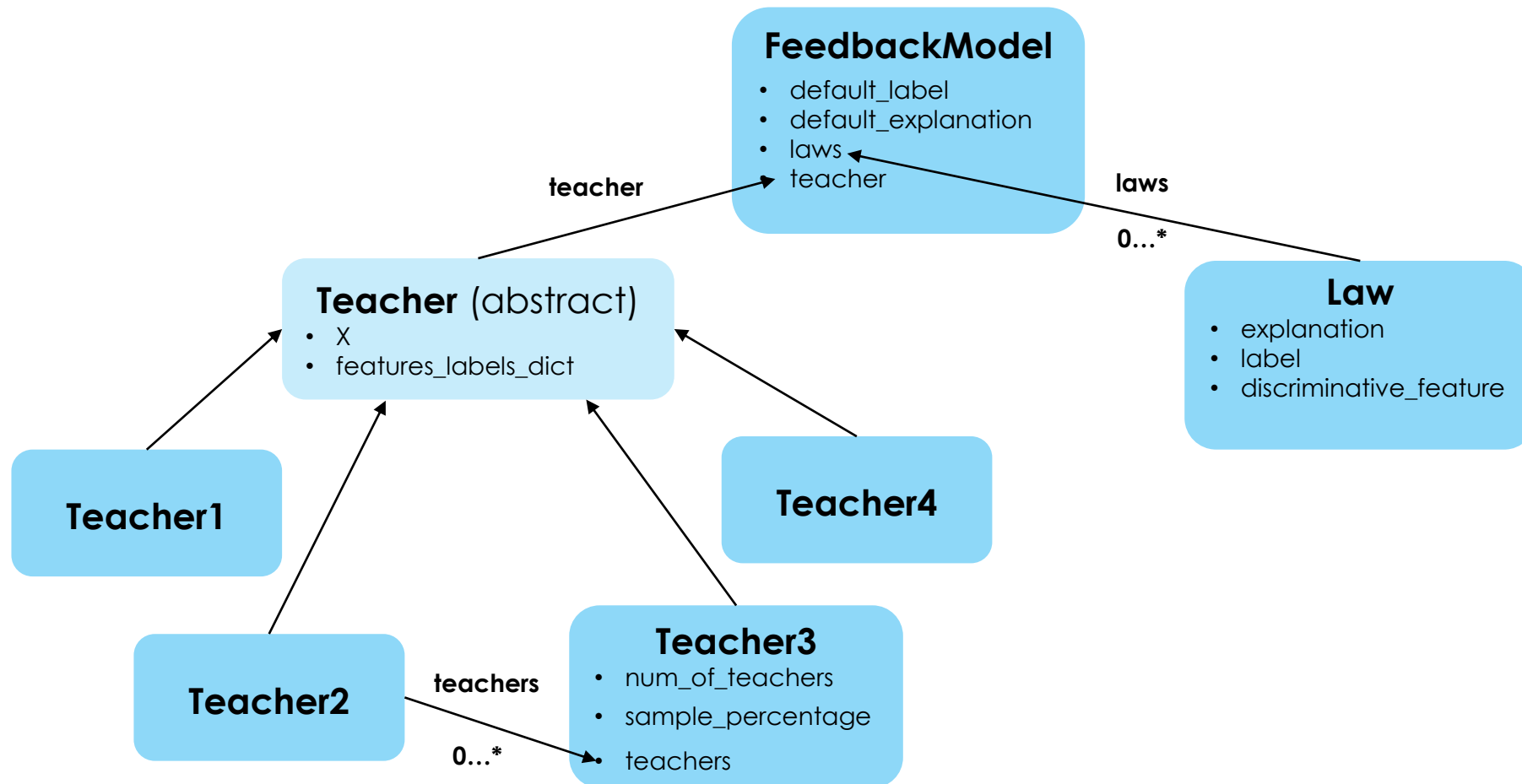
DATA ANALYSIS

Learning with explanations

The background features abstract, flowing waves in shades of red, orange, and yellow, creating a dynamic and energetic feel. The waves are layered, with some appearing more prominent than others, and they curve across the frame.

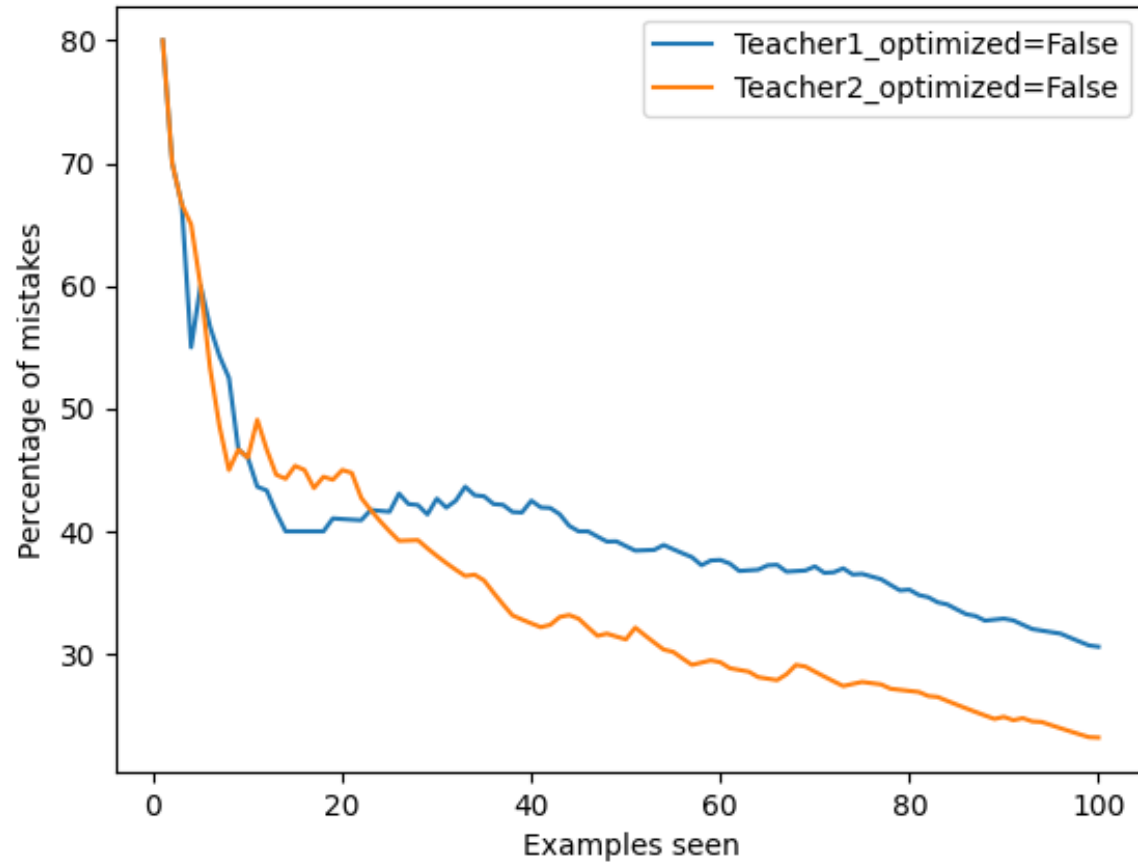
PART A

OVERVIEW

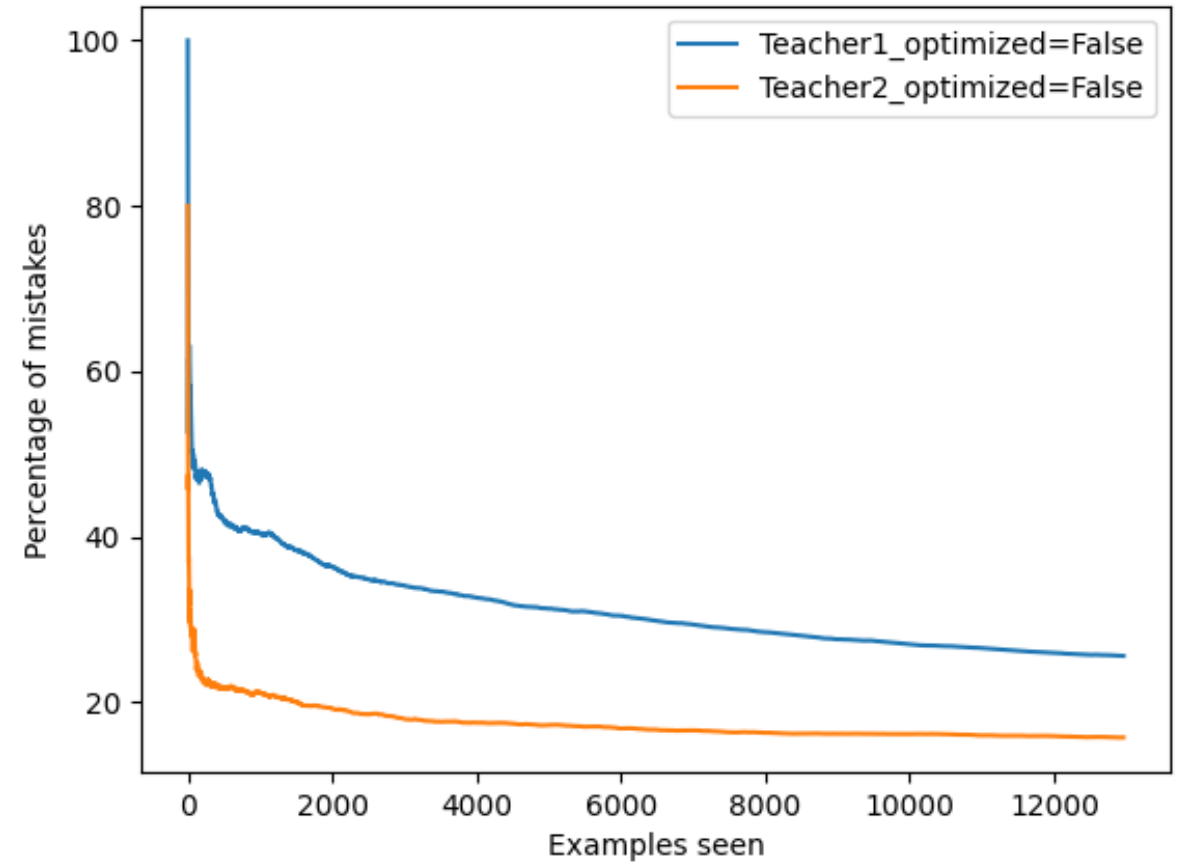


RESULTS OF TEACHERS 1,2 ON ZOO AND NURSERY DATASETS

Mistakes made over time of teachers on zoo



Mistakes made over time of teachers on nursery



DECISION LISTS OF TEACHERS 1,2 ON ZOO AND NURSERY DATASETS

- **Zoo:**

- **Teacher1:**

- Run1, Run2, Run3, Run4, Run5

- **Teacher2:**

- Run1, Run2, Run3, Run4, Run5

- **Nursery:**

- **Teacher1:**

- Run1, Run2, Run3, Run4, Run5

- **Teacher2:**

- Run1, Run2, Run3, Run4, Run5



CONCLUSION:

TEACHER2 PERFORMS CONSISTENTLY
BETTER THAN TEACHER1

The background features abstract, flowing waves in shades of red, orange, and yellow, creating a sense of movement and energy. The waves are layered, with some appearing more prominent than others, and they curve across the frame.

PART B

THE NEW DATASET

- **The dataset:** [wifi localization](#)
- **Explanation:** predicts the location of a smartphone (1 of 4 rooms) based on the strength of 7 different wifi signals
- **Number of instances:** 2000
- **Number of attributes per instance:** 7
- **Labels:** 1 - 4

IMPROVEMENTS TO THE ALGORITHM

- **feedbackModel.predict2():** If an example doesn't fit any law – guess the **best fitting law** instead of the default label. - **improves performance**
- **Teacher3:**
 - Array of Teacher2s.
 - Each teacher gets a random subset of the dataset.
 - Each Teacher2 gives a “discriminative score” to the discriminative feature it suggests.
 - Teacher3 returns the feature that had the max sum of “discriminative scores” .

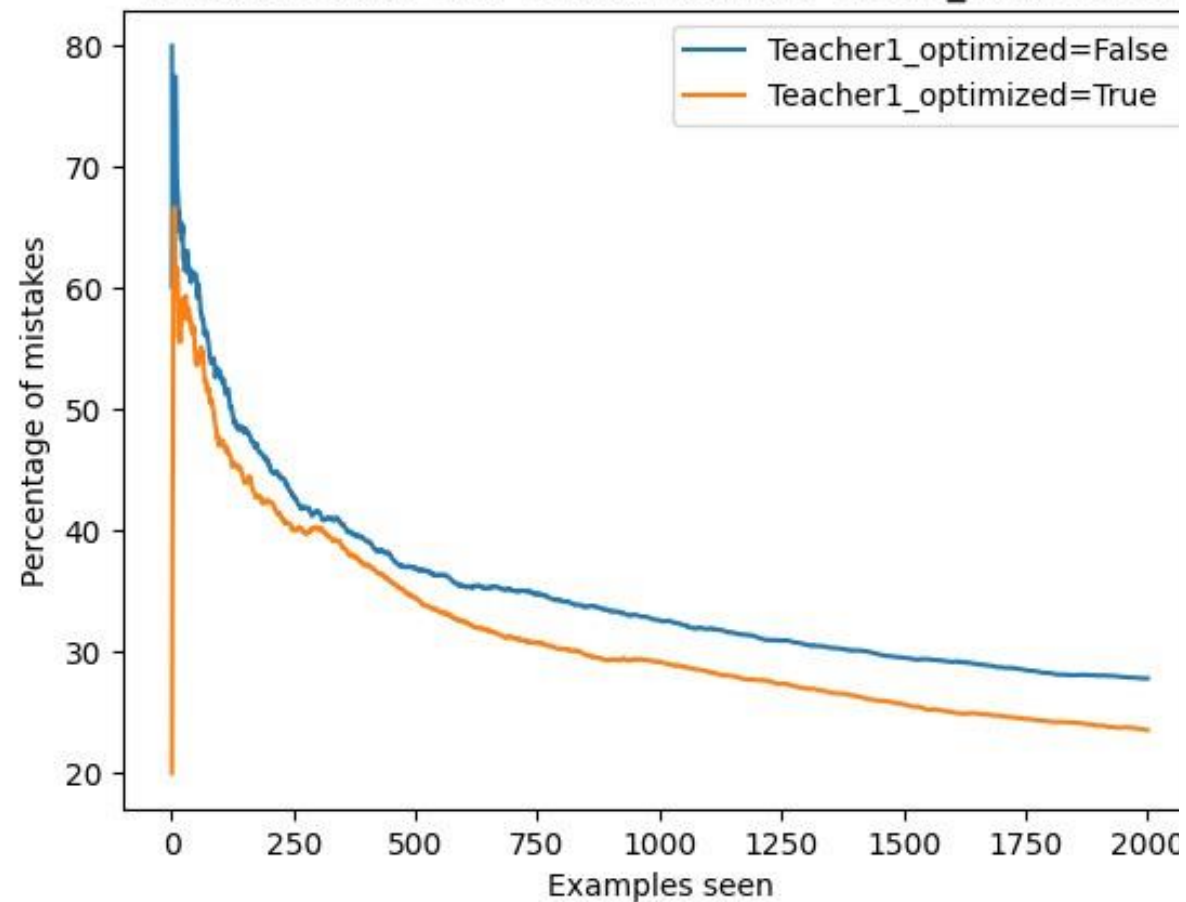
IMPROVEMENTS TO THE ALGORITHM

- **Teacher4:**

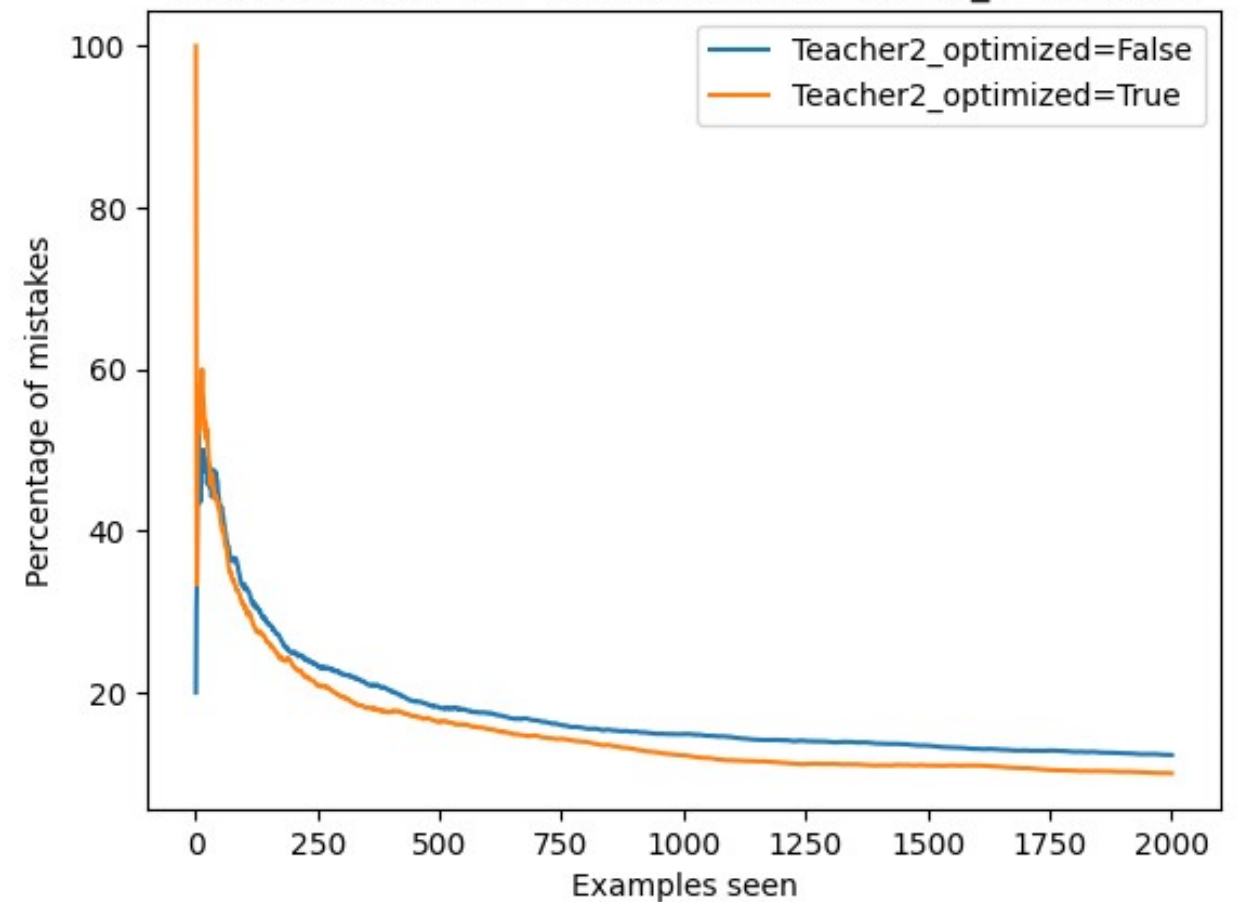
- Instead of returning one most discriminative feature (like Teacher2), randomly chooses a number **n** and returns the **n most discriminative features**.
- $1 \leq n \leq \text{number of different features between example and explanation}$
- This **n** is not chosen uniformly, there is a much higher chance of choosing a lower number (closer to 1).

AVERAGE RESULTS OF TEACHERS 1, 2 ON WIFI_LOCALIZATION DATASET

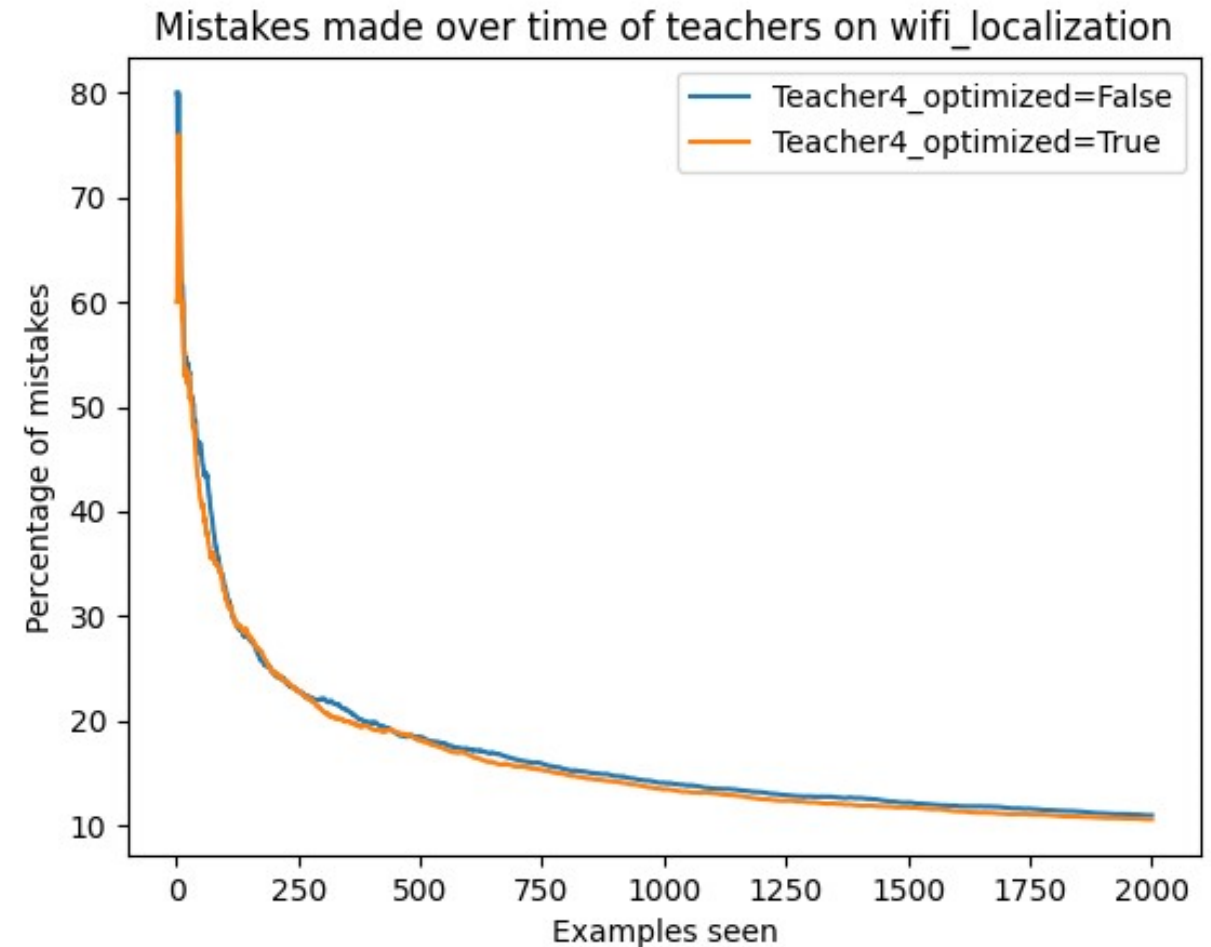
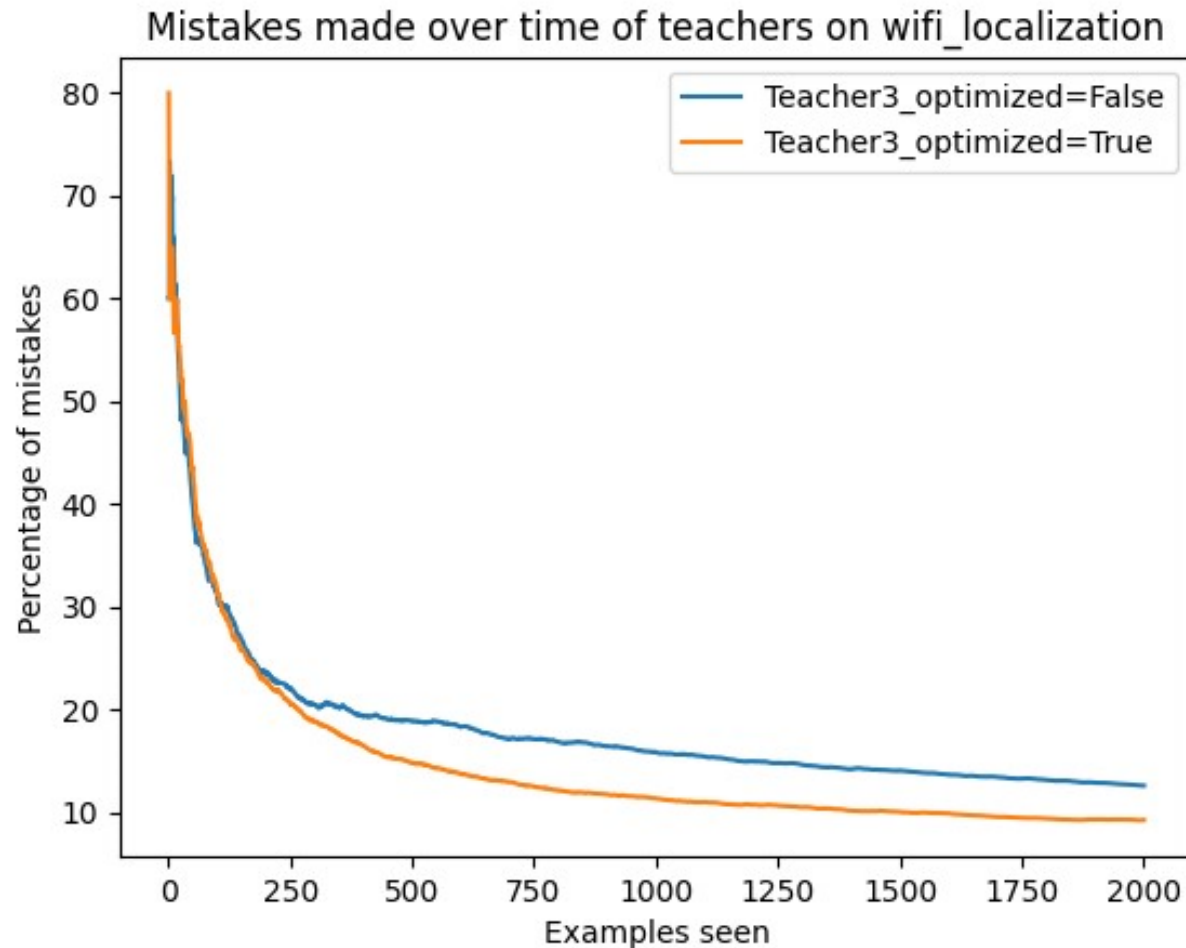
Mistakes made over time of teachers on wifi_localization



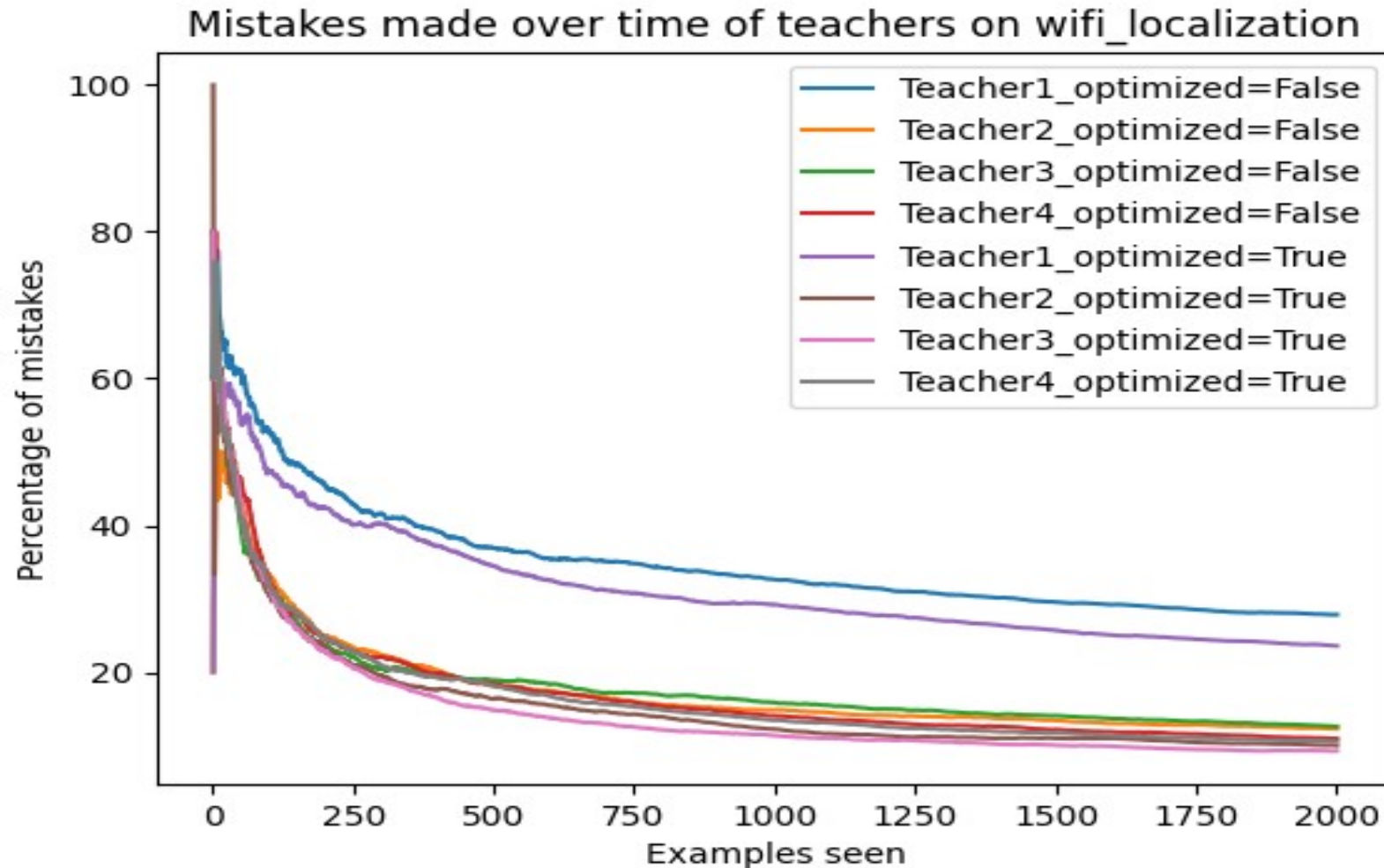
Mistakes made over time of teachers on wifi_localization



AVERAGE RESULTS OF TEACHERS 3, 4 ON WIFI_LOCALIZATION DATASET



AVERAGE RESULTS OF ALL TEACHERS ON WIFI_LOCALIZATION DATASET



CONCLUSION

- The **predict** optimization improved the performance of the model, no matter which teacher was used.
- Teacher3 and Teacher4 did not improve the performance consistently enough to be noticeable.
- The best performing variation is **Teacher3 with the predict optimization**.
 - If we don't consider runtime.
 - Compared to Teacher2 with the predict optimization, the improvement is marginal, but the runtime is considerably longer for Teacher3 (~3x longer).
 - If runtime is a factor, **Teacher2 with the predict optimization** will be a better choice.