

Abstract.

This describes our submissions to the Social Media Mining for Health Applications (SMM4H) shared task 2022. Our team (mattica) participated in detecting stances and premises in tweets about health mandates related to COVID-19 (Task 2).

HOW WE TACKLE ITN

Our approach was based on using an in-domain Pretrained Language Model, which we fine-tuned by combining different strategies.

TRANSFER LEARNING.

Leveraging an additional stance detection dataset through two-stage fine-tuning.

JOINT LEARNING.

Joint learning Stance and Premise detection objectives.

ENSEMBLING.

Ensembling the sentiment-polarity given by an off-the-shelf fine-tuned model.

Results.

SUBMITTED RUNS.

• Subtask-2a - Stance detection

⌵ (2st-ft), two-stage fine-tuning using COVIDLies.

⌵ (2st-ft + MTL), two-stage fine-tuning and MultiTask learning in the second fine-tuning.

⌵ (2st-ft + sent + MTL), two-stage fine-tuning, with sentiment logits and MultiTask learning in the second fine-tuning.

• Subtask-2b - Premise detection

⌵ (2st-ft + MTL), two-stage fine-tuning and MultiTask learning in the second fine-tuning.

⌵ (2st-ft + sent + MTL), two-stage fine-tuning, with sentiment logits and MultiTask learning in the second fine-tuning.

EVALUATION. We observed that the combination of the different strategies resulted in small but consistent gains for the stance detection task performance (see Table 2).

• Impact of different strategies (see Fig. 1)

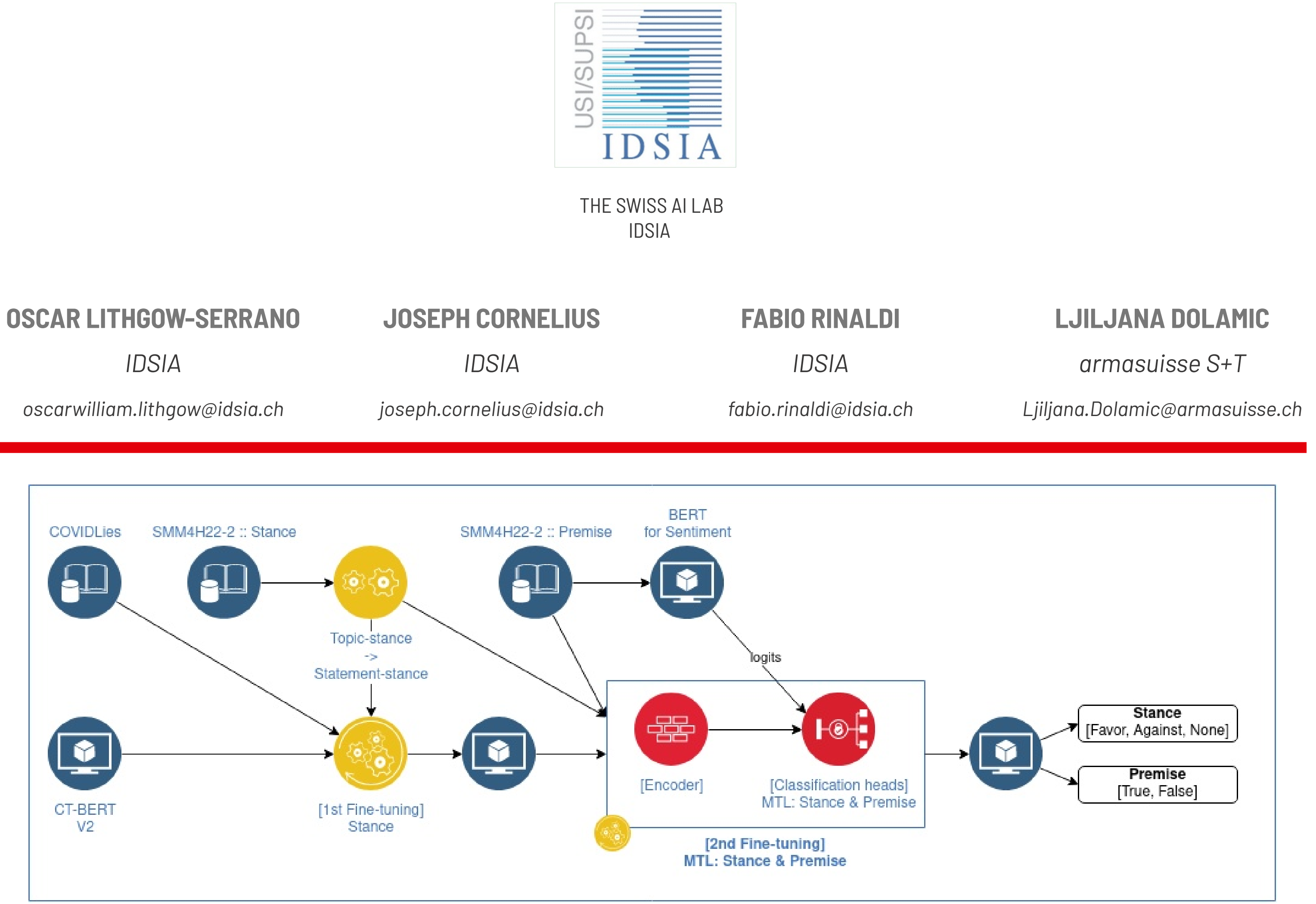
. Sentiment polarity boost detection of the FAVOR stance.

. MTL is more beneficial for the AGAINST stance.

. Combining the strategies resulted in the best balance.

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Leveraging sentiment for stance & premise joint learning



Conclusions.

. Best official result for stance detection (subtask 2a) was 0.633, i.e., 14 percentage points (p.p.) above the mean and 8 p.p. above the median.

. Best official result for premise detection (subtask 2b) was 0.647, i.e., 7 p.p. above the mean and equal to the median.

. The results show that jointly learning to detect premise and stance is beneficial for both tasks.

Methodology.



EXTRA DATA AND PRE-PROCESSING.

• Extra data

. COVIDLies (Hossain et al., 2020), 6,7612 COVID-19-related tweets, each paired with a misconception and annotated with the concerning tweet's stance.

• Pre-processing

. The competition's dataset contains stances about a topic whereas COVIDLies has stances about statements. To combine them we mapped the topics in the competition dataset to stances (see table 1).

Topic	Statement
face masks	Face masks help to protect us.
stay at home orders	Stay at home is a needed measure.
school closures	Schools need to remain closed.

Table 1: Map from *topic* to *statement*.

SYSTEM DESCRIPTION.

• Backbone model

. CT-BERT V2 (Müller et al., 2020), a transformer-based language model pretrained on a corpus of Twitter messages on the topic of COVID-19.

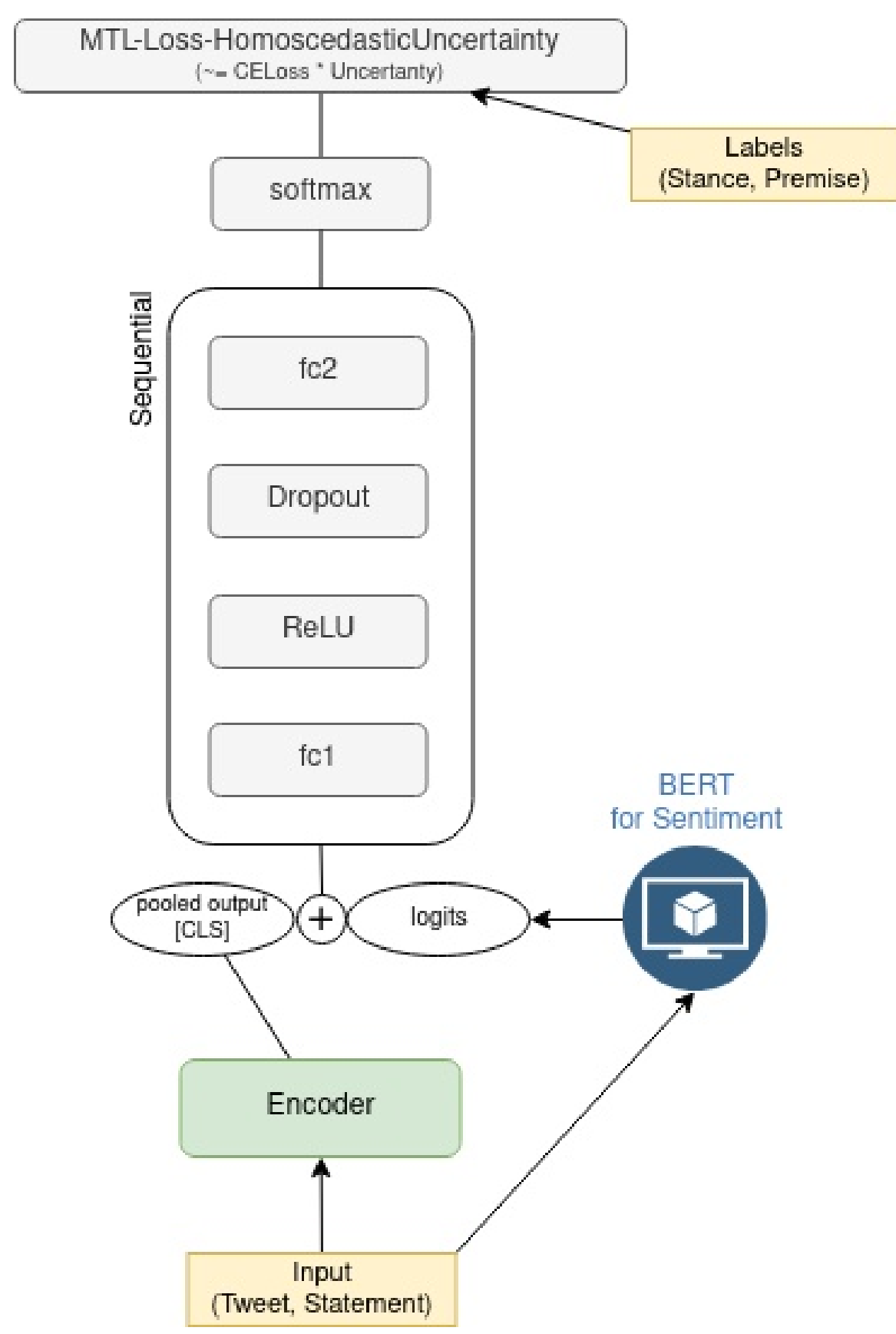
• 1st fine-tuning

. Fine-tuned for Stance-detection on COVIDLies + 10% of competition's dataset

• 2nd fine-tuning

. Fine-tuned for jointly predict Stance and Premise on the competition's dataset

. During training the output logits of a sentiment classification model were appended to the embeddings just before the classification heads.



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