

# Slot filling and Intent classification - Lab 5

*Marco Prosperi (257857)*

University of Trento

`marco.prosperi@studenti.unitn.it`

## 1. Introduction

The first part of the NLU project involved enhancing the AIS model for intent classification and slot filling on the ATIS dataset [1], evaluated using F1-score and accuracy. Two key features were added: a BiLSTM layer, which processes input sequences bidirectionally to better capture contextual information, and dropout layers to prevent overfitting by randomly deactivating neurons during training. These changes aimed to improve the model's generalization on unseen data. In the second part, the LSTM architecture was replaced with a BERT-based model. This involved fine-tuning and handling sub-tokenization, leveraging BERT's contextual embeddings to boost performance in both tasks.

## 2. Implementation details

For the first part of the project, I've added incremental changes to the base AIS model. First, I added a bidirectional layer to the LSTM architecture, allowing the model to process the input sequence in both forward and backward directions. This change was implemented by setting the bidirectional parameter to True in the LSTM layer and by multiplying the output by 2 because it concatenates the forward and backward outputs.

The second change was the addition of dropout layers that further improved the model's performance.

## 3. Results

prova prova

## 4. References

- [1] UniTrento, "Natural language understanding labs," 2025. [Online]. Available: <https://github.com/BrownFortress/NLU-2025-Labs/tree/main>