# UAlberta at SemEval-2024 Task 1: A Potpourri of Methods for Quantifying Multilingual Semantic Textual Relatedness and Similarity

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### Introduction

Semantic Textual Relatedness (STR) is a broad term for measuring the degree of commonality between pairs of sentences.

Semantic Textual Similarity (STS) measures the degree in which pairs of sentences are close in meaning.

#### Methods

We investigate ten different methods, divided into four types.

Method Type	Method Name	Resources	
	Word Overlap <b>(WO)</b>	Python Libraries	
Explicit Semantic	Concept Overlap (CO)	AMuSE-WSD	
	Abstract Meaning Representation (AMR)	Sapienza-API	
Extrinsic	Paraphrase Indentification (PI)	RoBERTa & fine-tuned classifier	
	Natural Language Inference (NLI)	RoBERTa NLI Classifier	
Distributional (Embeddings)	Embed-B	BERT	
	Embed-R	RoBERTa	
Large Language Models (LLMs)	Prompting	ChatGPT	
	Fusion	Open-source LLMs	
	Fine-tuning	T5, GPT2, RoBERTa, MPNet	

We hypothesize that similarity is a special case of relatedness: sentences that are highly similar should also be highly related.

When I tried again, I was able to juggle. High relatedness and When I went back to it, I was able to juggle! J high similarity

Old car driving down the road. Two old women enjoying at a gathering. Low relatedness and low similarity

Can we measure relatedness by ensembling an array of methods that measure similarity?

## **Semantic Textual Relatedness (STR)**

Our ensemble method achieved **SOTA** for the English SemRel2024 dataset. Out of 51 competing teams, we rank amongst the top 3 entries for **16** of the language/track settings.

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Our best results are reported from a regression ensemble system



involving the 4 fine-tuned models, known as XGB-4MS and a variant Target-XGB.

## STR vs STS

Our results provide strong evidence to support our hypothesis that semantic similarity is a special case of relateness.

