

COMPUTER AND CONTROL ENGINEERING

Empowering Multilingual Inclusive Communication

Funded By	Dipartimento DAUIN Politecnico di TORINO [P:iva/CF:00518460019]
------------------	--

Supervisor	CERQUITELLI TANIA - tania.cerquitelli@polito.it
-------------------	---

Contact	
----------------	--

Context of the research activity	<p>The Ph.D. student will develop a multidisciplinary study across the research areas of Deep Learning Natural Language Understanding and Linguistics, with the goal of promoting equality and inclusion in communication. Linguistic and discursive criteria will be defined to fully represent diversity in a community (e.g., gender, special needs) in formal communication. Deep-learning methods will be developed to identify non-inclusive text snippets and suggest inclusive text reformulations.</p>
---	---

	<p>Today, we observe two interrelated trends: (1) a significant increase in attention to inclusive languages promoted by academia and policy makers, and (2) unprecedented successes in artificial intelligence and deep learning. Unfortunately, the proliferation of automated machine translation and conversational agents has further exacerbated the problem of non-inclusive texts by relying on non-gender-specific document corpora. Innovative intelligent systems are urgently needed to help users create inclusive communications.</p> <p>The PhD student will develop a multidisciplinary study across the research areas of Deep Learning Natural Language Understanding and Linguistics, with the goal of promoting and ensuring equality and inclusion in communication, contributing to a more inclusive, innovative, and reflective society. Linguistic and discursive criteria for modeling diversity in a community (e.g., gender, special needs, age, ethnicity, and religion) and their intersectionality will be defined to fully represent them in formal communication.</p> <p>Deep-learning methods will be developed to automatically identify non-inclusive text snippets, suggest alternative forms, and create inclusive text reformulations. Novel strategies for training deep-learning models will be coupled with human-in-the-analytics analysis loop strategies to ensure fair, privacy-friendly, and responsible data processing and to create fair and unbiased models that can accurately represent the diversity of our society.</p> <p>Specifically, this study aims to overcome discriminatory use of language within a text through Deep Learning methods to disseminate correct language use that reflects the diversity of our society. To achieve this ambitious goal, a number of different but highly interrelated research objectives (RO) will be pursued</p>
--	--

Objectives

RO1. Automatically process raw input text, identify discriminatory text segments, and suggest alternative inclusive reformulations, that is:
++ RO1a. How to define what linguistic "bias" means, e.g., which linguistic expressions are likely to be correlated with non-inclusive communication.
++ RO1b. Whether Deep Learning techniques are able to override the bias in the input text and produce an appropriate reformulation of the text.
++ RO1c. To what extent large, general, multilingual collections (e.g., Wikipedia) are suitable for learning pre-trained models that can be conveniently tuned to specific tasks (e.g., text reformulation and generation).

RO2. Improve engine learning capabilities by storing and leveraging end-user feedback.

RO3. Define an interactive tool to effectively explore the capabilities of the proposed automatic text rewrite tool.

RO4. Benchmark and evaluate the proposed system tailored to formal communication used mainly in academia and public administration, adapted for two Romance languages (i.e., Italian and French), which are particularly prone to non-inclusive wording.

The above objectives open a broad multidisciplinary research landscape that touches core aspects of linguistic research activities and data scientists working in the field of NLP research. The study will promote the application of a Deep Learning-based methodology for processing raw input text, identifying discriminative text snippets within an input text, and generating alternative and more comprehensive reformulations.

To further improve the adaptability of the system, the engine continuously learns from user feedback and interactions and uses the acquired linguistic expertise to improve the ability of the Deep Learning methods to correctly handle the paraphrasing task and improve system performance.

Skills and competencies for the development of the activity

Data science methodologies and techniques, Natural Language Processing, Machine Learning algorithms