NL4AI 2023: Overview of the Seventh Workshop on Natural Language for Artificial Intelligence (NL4AI 2023)

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Abstract

The Natural Language for Artificial Intelligence (NL4AI) workshop serves as a platform to explore the area situated at the intersection between Natural Language Processing (NLP) and Artificial Intelligence (AI), with a special emphasis on recent activities carried out in both fields in Italy. The seventh edition of the workshop set a new record with 23 submissions, of which 18 were accepted. The submissions span a broad spectrum of topics, encompassing foundational NLP research, applied NLP, and works that bridge the realms of NLP and AI. Notably, this edition exhibited a growing international presence, featuring contributions from authors representing 9 countries. The submissions also reflect a diversity of languages (e.g., English, French, Italian) and modalities (e.g., text, vision), underscoring the workshop's commitment to inclusivity and comprehensive exploration.

The Natural Language for Artificial Intelligence (NL4AI) workshop is an annual initiative aimed at promoting a reflection and discussion about various interactions within the field of Artificial Intelligence (AI). The workshop specifically emphasizes the importance of Natural Language Processing (NLP) in AI research, highlighting its role in learning, knowledge representation, and cognitive modeling. Recent AI achievements demonstrate positive impact on complex inference tasks and offer extensive application possibilities in linguistic modeling, processing, and inferences. Nevertheless, Natural Language Understanding remains a rich research topic, whose cross-fertilization extends to diverse areas such as Cognitive Computing, Robotics, and Human-Computer Interaction. For AI, Natural languages serve not only as the central focus for paradigms and applications but also as fundamental elements, playing a crucial role in the automation, autonomy, and learnability of a broad spectrum of intelligent phenomena — from Vision to Planning and Social Behavior. Reflecting on these diverse and promising interactions constitutes a significant objective for ongoing AI studies, aligning seamlessly with the core mission of AIxIA. Specifically, the NL4AI workshop is endorsed by the Special Interest Group on NLP of the Italian Association for Artificial Intelligence (AIxIA) and by the Italian Association of Computational Linguistics (AILC).

For this edition, we received a record number of 23 submissions, representing a 35% increase

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compared to last year [1]. From these, we have accepted 18 papers after peer-review, for an overall acceptance rate of 78%. The call for papers attracted submissions by 72 unique authors from Italy (39), Germany (6), Denmark (5), India (5), United States (5), Australia (4), Argentina (3), Estonia (3), and Belgium (2). The contributions to the workshop cover a spectrum of topics, ranging from foundational NLP research to applied NLP and works that bridge NLP and AI. The submissions also consider diverse languages (e.g., English, French, Italian) and modalities (e.g., text, vision). In what follows, we provide a short overview of the accepted papers grouped by main topics.

Aligned with current research trends, several authors have explored the application of large language models (LLMs) in addressing traditional NLP tasks, such as machine translation and question answering, while also evaluating their performance in challenging scenarios. Specifically, Hu et al. [2] performed an empirical study to assess the effectiveness of employing multiple encoders with heterogeneous deep learning methods in the context on neural machine translation. Scotta and Messina [3] investigated whether current LLMs for Italian can generate news article titles showing that adaptation through supervised fine-tuning outperforms solving the task in a zero-shot setup with existing models. Arici et al. [4] explored the utilization of GPT-4 to automate the understanding of problem descriptions in tickets and their assignment to appropriate employees. Siragusa and Perrone [5] relied on ChatGPT for developing a virtual assistant designed to assist secondary school students in navigating the information available on a University's institutional website. In the framework of computational social science, Shrestha et al. [6] evaluated GPT-4's proficiency in topic modeling when applied to political speeches, comparing the performance against traditional measures of coherence and human expert judgments. Rahgouy et al. [7] proposed a comprehensive evaluation of several LLMs with different training approaches using the Fermi reasoning challenge. Fierens and Jodogne [8] discussed the potential applications of LLMs in the medical field and demonstrated the successful transposition of the Cramming approach from English to French. The potential of NLP technologies in the healthcare domain is further explored in the paper by Bacco et al. [9], who provided a concise overview of current trends, available resources, and the multifaceted challenges in the field. One such challenge is automatically detecting potential misunderstandings within healthcare dialogues, as discussed in the paper by Consolandi et al. [10]. In the field of information extraction, the papers by Gatti and colleagues [11] and Mazzarino et al. [12] tackled ethical concerns related to data privacy. The former presented a full pipeline based on Frame Semantics to extract, classify and anonymize information from legal documents dealing with the divorce domain in Italian. The latter describes NERPII, a Python library that combines Named Entity Recognition (NER) and synthetic data generation techniques to identify and protect personally identifiable information.

Several authors directed their analysis toward social networks, focusing on tasks broadly related to authorship attribution and opinion mining. Eriksen et al. [13] performed a series of experiments aimed at detecting discriminatory patterns between human and AI-generated texts. Demarco et al. [14] proposed a novel approach to quantify partisan tendencies within Reddit communities. Murgai [15] extended the existing research in bias detection and mitigation methods to physical appearance in text corpora. In the domain of aspect-based sentiment analysis, Chatterjee et al. [16] investigated the usage of specialised convolutional layers in both unsupervised and weakly supervised scenarios, whereas Di Quilio and Fioravanti [17]

introduced a newly annotated dataset of user reviews to address this task. Finally, the challenge of enriching current generative language models based on text with information from other modalities is explored in the paper by Zamparelli [18], who reflected on ways to combine images and language and by Hromei et al. [19], who delved into problems related to Interactive Grounded Language Understanding to improve Human-Robot interaction.

In addition to the oral presentations of the aformentioned papers, the event featured two distinguished invited speakers who addressed crucial aspects of the latest research trends in Large Language Models (LLMs): Raffaella Bernardi [20], Associate Professor at the University of Trento (Italy), provided an academic perspective on LLMs, advocating for models driven by implicit reasoning processes; and Christos Christodoulopoulos [21], Senior Applied Scientist at Amazon (UK), shared insights on the ethical considerations and industrial applications of these models.

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