

Introduction to the Forth Workshop on Natural Language for Artificial Intelligence

Pierpaolo Basile¹, Valerio Basile², Elena Cabrio³ and Danilo Croce³

¹ University of Bari Aldo Moro, Italy

`pierpaolo.basile@uniba.it`

² University of Turin, Italy

`basile@di.unito.it`

³ Université Côte d’Azur, Inria, CNRS, I3S, France

`elena.cabrio@univ-cotedazur.fr`

⁴ University of Roma, Tor Vergata, Italy

`croce@info.uniroma2.it`

Natural Language Processing plays a fundamental role in current AI research, as target of different scientific and industrial interests. At the same time, several AI achievements have shown their beneficial impact on applications in language modelling, processing and generation. Especially the recent advancements in deep learning are drastically changing the landscape of NLP, where the continuous performance improvement on well established tasks is happening at an unprecedented speed. Therefore, Natural Language Processing is — still and once again — a rich research topic, whose cross-fertilization with AI spans a number of independent areas such as Cognitive Computing, Robotics as well as Human-Computer Interaction. For AI, natural languages are the research focus of paradigms and applications but, at the same time, they act as cornerstones of automation, autonomy and learnability for most intelligent tasks. Such tasks range from Computer Vision, to Planning and Social Behavior analysis, up to more imponderable cognitive phenomena such as creativity and human emotions. A reflection about such diverse and promising interactions is an important target for current AI studies, fully in the core mission of AI*IA. Still, we also believe this area is not only “populated” of scientific and technological challenges. In fact, we trust that at the crossroad between NLP and AI, new technological paradigms arise: the resulting methodologies and technologies can change our reality and their societal impact has not yet been fully-fledged.

Given these premises, the goal of the workshop “Natural Language for Artificial Intelligence” (NL4AI) is to provide a meeting forum for stimulating and disseminating research where researchers (especially those affiliated with Italian institutions) can network and discuss their results in an informal way. NL4AI-2020 is the 4th edition of this workshop, co-located with the 19th International Conference of the Italian Association for Artificial Intelligence, and taking place ONLINE from November 25th to 27th due to the COVID-19 pandemic. The final program is announced on the official workshop website⁵. This workshop is endorsed by the Italian Association of Computational Linguistics (AILC)⁶.

⁵ <http://sag.art.uniroma2.it/NL4AI/>

⁶ <http://www.ai-lc.it/>

The thirteen contributions accepted for presentation at the workshop cover several among the previously introduced topics, even more than one at a time, showing the inter-dependencies among them. In the following, we provide a short overview of such works, grouping them by topics.

Among the emerging topics of interest of this workshop edition there is *Dialogue* processing and generation. More specifically, Carbone and Sarti focus on language generation: they present Plug-and-play language models (PPLMs) to enable topic-conditioned natural language generation, by combining large pre-trained generators with attribute models to steer the predicted token distribution towards selected topics. The approach in Greco *et al.* investigates instead various models to unveil whether they are able to capture salient information in dialogue history.

Other works on the same topic are more specifically connected to the design of *conversational agents*. In particular, Zubani *et al.* describe a series of experiments carried out to evaluate on an Italian dataset the performance of four Natural Language Understanding platforms available on the market with reference to the intent recognition task. Xompero *et al.* present a conversational agent that integrates sequence-to-sequence models based on neural networks with hand-programmed logical rules. Moreover, Longo and Santoro present a baseline architecture (AD-CASPAR) based on NLP and First Order Logic reasoning for implementing scalable and flexible chatbots, with both goal-oriented and conversational features. Some the investigated neural approaches described in the above papers are also applied by Zhan *et al.*, which investigate how to translate a high-level sentence which contains robot pathfinding instructions in low-level programming code for the robot. In particular, the robot took into account in this work is the LEGO Mindstorms EV3.

Another line of accepted works are devoted to *knowledge extraction* from texts, with the goal of enabling complex inference tasks. In particular, Mehmood *et al.* present an approach for biomedical named entity recognition based on knowledge distillation of multi-task models. Results show that their multi-task approach overcomes a single-task approach. Nguyen *et al.* evaluate the impact of noisy inputs on the performance of an existing system for event detection. Moreover, Salvaneschi *et al.* present a working prototype for extracting frame-based entities (i.e., the main actors, their role, and the cadastral data) compliant with their real estates in property expropriation cases application scenario.

Always related to the same topic of knowledge extraction, two works focused on *diachronic analysis*. In particular, Cassotti *et al.* compare state-of-the-art approaches in computational historical linguistics to evaluate the pros and cons of each model, and present the results of an in-depth analysis conducted using an Italian diachronic corpus. Moreover, Monett *et al.* apply lexical analysis to the scientific literature on AI in order to track the characterization of the “intelligence” construct in the research field, as well as its evolution over time.

Among the other workshop topics at the intersection of NLP and AI addressed by the accepted research works there are *discourse* and *multimodality*. Concerning the former, Delobelle *et al.* describe an approach based on argu-

mentation mining for improving the analysis of fake news spreading online. The approach consists in using the predictions of a stance detection model relying on a state-of-the-art pretrained language model (BERT) to annotate a corpus of fake news previously detected by an existing tool. As for the latter, multimodal analysis is investigated in Passaro and Lenci, where a novel system for tag refinement is described, to be applied e.g., to Instagram data, for reducing the set of tags associated to an image and selecting only those which effectively describe the content of the image.

Finally, we are delighted to have Professor Philipp Cimiano (head of the Semantic Computing Group at Bielefeld University, Germany) as keynote speaker, whose research topic lie at the intersection between knowledge representation and text processing.

As a final remark, the program co-chairs would like to thank all the members of the Program Committee (listed below), as well as the organizers of the AI*IA 2020 Conference⁷.

- Giuseppe Attardi, Università di Pisa
- Aitziber Atutxa, EHU/UPV
- Roberto Basili, Dept. of Enterprise Engineering – Univ. of Roma Tor Vergata
- Cristina Bosco, University of Turin
- Dominique Brunato, Institute of Computational Linguistics “A. Zampolli” (National Council of Research), Pisa – Italy
- Francesco Cutugno, University of Naples Federico II
- Felice Dell’Orletta, Istituto di Linguistica Computazionale “Antonio Zampolli” – ILC CNR
- Mauro Dragoni, Fondazione Bruno Kessler – FBK-IRST
- Alessandro Lenci, University of Pisa
- Marco Marelli, University of Milano-Bicocca
- Tobias Mayer, Université Côte d’Azur, CNRS, Inria, I3S, France
- Barbara Mccgillivray, Alan Turing Institute/University of Cambridge
- Jelena Mitrović, University of Passau, Faculty of Computer Science and Mathematics
- Johanna Monti, University of Naples “L’Orientale”
- Daniele Nardi, Sapienza University of Rome
- Malvina Nissim, University of Groningen
- Debora Nozza, Bocconi University
- Giovanni Pilato, ICAR-CNR
- Roberto Pirrone, Università degli Studi di Palermo
- Marco Polignano, Università degli Studi di Bari Aldo Moro
- Daniele P. Radicioni, Computer Science Department, University of Turin
- Valerio Restocchi, The University of Edinburgh
- Serena Villata, CNRS – Laboratoire d’Informatique, Signaux et Systèmes de Sophia-Antipolis

⁷ <https://aixia2020.di.unito.it/>