Preface of the 1st Italian Workshop on Artificial Intelligence and Applications for Business and Industries

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1 Background and Motivations

The 1st Italian Workshop on Artificial Intelligence and Applications for Business and Industries (AIABI) is co-located and held within the 20th International Conference of the Italian Association for Artificial Intelligence (AIxIA 2021) and organized by Social Thingum, an Italian notable AI scale-up company and private research and technology-transfer center, located in Milan, Lombardy. The workshop is also sponsored by Assintel, the National Association of ICT Companies of Confcommercio, as well as by InnovUp, the Italian Innovation & Startup Ecosystem. This edition is held online due to the COVID-19 pandemics and the program of the meeting is available on the official workshop website. The workshop is focused on the current technological scenario of Artificial Intelligence (AI) for business in heterogenous fields and industries. Among the editions of the AIxIA annual International Conferences, this is the very first workshop specifically devoted to the many applications and potentialities of AI in business contexts and domains. Therefore, it represented a major official opportunity for organizations, academics, researchers and specifically firms, decision-makers and practitioners, in the Italian and international AI landscape, to share and analyze heterogenous research works and business case studies dealing with AI in business fields. Indeed, the main idea behind this workshop is creating a fruitful occasion for both the academic and the industrial world to share knowledge and experience related to how AI is actually and currently affecting business cases and companies. According to its mission, this workshop is aimed at providing participants with a broad set of insights on the several potential synergies of AI and business.

Indeed, nowadays AI is becoming crucial in every business field. AI is currently reshaping organizations and how technologies affect management and business. AI has the power to transform business and society, in a transversal and pervasive way, due to its ability to extract and manage knowledge potentially in every

industry. Researchers and scientists are aware that AI is transforming business models of all industries, by reshaping existing organizational processes. Moreover, AI has the potential to provide higher quality, greater efficiency, and better outcomes than human experts. In the organizational and business framework, AI can provide assistance to decision-makers and technicians beyond the scope of humans. Recent advances in computational power and resources, the exponential increase in data availability, and new machine-learning techniques now allow organizations to exploit AI-based solutions also for managerial tasks. It suffices to mention that AI-based solutions play important roles in Unilever's talent acquisition process, in Netflix's decision-making processes regarding movie plots, directors, and actors, and in Pfizer's drug discovery and scientific development activities.

Accordingly, the main motivation of the workshop is simple and straightforward: how can we deal with the immense potential of AI for creating the maximum possible value in business and heterogeneous industries? This question triggers several lines, that are particularly relevant for the current research in AI. The workshop tries to address these research lines and provides a forum for the Italian community to discuss problems, challenges and innovative approaches in the area. The final aim of the workshop is contributing in depicting the overall scenario and framework of the exploitation, advantages and current issues of AI in business.

2 Topics of Interest

1. AI in Business
2. Application of AI in industries and market
3. AI use-cases in heterogeneous business contexts
4. AI potential in leveraging Education and training of companies stakeholders
5. Explainable, Interpretable and Trustworthy AI in business
6. Strategies to exploit the AI potential to leverage business competitive advantages
7. Theoretical aspects of AI potentialities for business
8. Evaluating AI Systems and AI impact in real business scenarios
9. Ethics for AI in companies and industries

3 Accepted Papers

We believe that the program provides a good balance between the different topics related to the area of AI for Business and Industries. Moreover, the program is further enriched through notable invited speakers: Iuri Frosio and Piero Altoe, respectively the Principal Research Scientist and the EMEA Energy Developer Relations Manager of NVIDIA, and Alessandro Rozza, the Chief Research Officer of Lastminute, all directly coming from the intersection between the business world and the applied AI research scenario. Together with the invited speakers,

the event is enriched by all the other speakers, representing relevant companies and research centers.

It is particularly worth to notice that, among the works accepted, there is a specific focus on technology-transfer projects and positive accounts of fruitful collaborations between universities, research centers and companies. Such projects are particularly fundamental especially for the growth of companies' business, and also for the advance of innovation in the AI landscape. Then, this focus on the technology-transfer projects is also an appropriate and key reported result, especially considering public concerns by the Italian government, and specifically the Italian Ministry of Economic Development and the Italian Ministry for Technological Innovation and Digital Transition, towards valuable technology-transfer projects to foster innovation in the country, as also confirmed by the recent publication of the AI National Strategy. We are really confident that our common effort is contributing to the current evolution of the Italian AI landscape and, in general, to improving the Italian level of innovation within Europe.

The call for papers attracted 19 submissions by 45 different authors. After the review process, 17 of 19 papers were accepted for publication (acceptance rate: 89.5%): 14 as regular papers and 3 as short papers. The accepted papers range from the definition of methodologies or frameworks to apply AI systems to empowering business processes to specific machine learning or deep learning approaches for predicting relevant features in different application domains. Going into details, accepted papers address several topics from different perspectives. In the following, we provide a short overview of such works, grouping them by topics.

Many papers propose specific tools and applications related to AI in heterogeneous industrial processes. In particular, Ali Zaidi et al. presents a new framework of acquisition and data analysis to inspect and monitor power lines via UAVs and deep learning. Lazzarinetti et al. propose a framework for continuous defect prediction based on machine learning algorithms trained on a publicly available dataset. The framework is composed of a machine learning model for detecting the presence of logical bugs in code on the basis of the available data generated by DevOps tools and a dashboard to monitor the software projects status. Marzullo et al. present a comparison between traditional encoding/decoding methods for real-time video streaming and deep learning-based approaches. Massarenti et al. propose a methodology based both on deep learning algorithms and statistical tools for the creation of a digitization system capable of managing critical issues, like low scan quality and complex structure of documents. The methodology is composed of 5 modules to manage the poor quality of scanned documents, identify the template and detect tables in documents, extract and organize the text into an easy-to-query schema and perform queries on it through search patterns. The methodology is designed using real data coming from two different companies and is tested by considering the companies' real business

needs. Tegegn et al. describes a method to estimate the percentage of a given material in a mixture, given its near infrared spectrum in input, by the means of deep learning, near-infrared and derivative spectroscopy. Monticelli et. al. focuses on a model-based recommender systems for e-commerce to support the user in configuring hardware components for computer, in the context of a ICT business company. Massarenti et al. propose a methodology based both on deep learning algorithms and statistical tools for the creation of a digitization system capable of managing critical issues, like low scan quality and complex structure of documents, in the context of Robotic Process Automation. The methodology is designed using real data coming from two different companies and is tested by considering the companies' real business needs. Lazzarinetti et al. define a benchmark aiming to evaluate the performances of different machine learning algorithms in the domain of predictive maintenance and Industry 4.0.

Other contributions propose machine learning or deep learning approaches for customer services or customer process management. Specifically, Massarenti et al. report a useful process for enhancing the process of creating and analyzing text clustering algorithms and therefore improved a conversational customer service agent. Mesenzani et al. investigate how AI can create value for companies in Customer Management processes, exploring the current and future trends and the most relevant issues in AI adoption, and analysing the intersection between the technological and organizational issues. Lazzarinetti et al. introduce a conversational framework for semantic question answering. This work relies on knowledge graphs and the use of machine learning for determining the best answer given a question associated with the content of the knowledge graph. In addition, by leveraging text mining techniques authors declare to be able in identifying the best set of answers that suit the question that are further filtered by means of deep learning algorithms. Deola et al. report a first research outline to improve the performances of chatbots in different training conditions, for supporting customer management issues. Schiaffino et al. present an applied research project and a software engineering approach to integrate machine learning and AI methods with content management systems (CMS) so that their usefulness and effectiveness could be improved.

In addition, some contributions focus on AI-based systems in other heterogeneous domains, like Social Media Management and Marketing, BioTech or Education. In particular, Viola et al. exploit state-of-the-art Convolutional Neural Networks to provide a methodological tool for predicting Instagram posts popularity. Lazzarinetti et al. define an algorithm for the prediction of the glycemic index through the evaluation of two different models, evaluating and comparing their performances. Crinieri et al. present a solution to classify skin lesions images using deep learning models and support medical decision-making processes and management. Di Fraia et al. propose a first framework concept to develop AI tools to support higher education school students with specific learning disorders.

4 Committee

As a final remark, the co-chairs would like to thank all the members of the Program Committee (listed below), the organizers of the AI*IA 2021 Conference, the Italian Association for Artificial Intelligence, the University of Milano – Bicocca, as well as the sponsors, Assintel, the Italian National Association of ICT Companies, and InnovUp, the Italian Italian Innovation & Startup Ecosystem.

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