



LatinX in AI research

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We are delighted to present this special issue editorial for Neural Computing and Applications special issue on LatinX in AI research. This special issue brings together a collection of articles that explore machine learning and artificial intelligence research from various perspectives, aiming to provide a comprehensive and in-depth understanding of what LatinX researchers are working on in the field. In this editorial, we will introduce the overarching theme of the special issue, highlight the significance of the selected papers, and offer insights into the contributions made by the authors.

The LatinX in AI organization was launched in 2018, with leaders from organizations in Artificial Intelligence, Education, Research, Engineering, and Social Impact with a purpose to together create a group that would be focused on “Creating Opportunity for LatinX in AI.” The main goal is to increase the representation of LatinX professionals in the AI industry. LatinX in AI Org and programs are volunteer-run and fiscally sponsored by the Accel AI Institute, 501(c)3 Non-Profit.

State of AI Innovation in LATAM:

The field of artificial intelligence (AI) innovation in Latin America has witnessed significant growth and holds tremendous potential for the region. Governments, academic institutions, and private organizations have recognized the transformative power of AI and are investing in the research, development, and implementation of AI technologies. Latin American countries are leveraging AI in various sectors such as healthcare, agriculture, finance, and transportation to improve efficiency, enhance decision-making, and tackle complex challenges. Startups

specializing in AI are emerging across the region, attracting investment and generating innovative solutions tailored to local needs. Moreover, Latin American AI researchers are making significant contributions to the global AI community, publishing papers, participating in international conferences, and collaborating with leading AI institutions worldwide. This collaborative approach is fostering knowledge exchange and creates opportunities for Latin American AI experts to contribute to cutting-edge AI advancements.

Despite the progress made, there are still certain challenges to address in the AI landscape in Latin America. One key challenge is the need to build a robust AI talent pipeline. While there is a growing interest in AI education and training, there is a shortage of skilled professionals in the field. To bridge this gap, universities and training programs are incorporating AI into their curricula and offering specialized courses and degrees. Additionally, there is a need for increased collaboration between academia, industry, and government to facilitate technology transfer, encourage AI entrepreneurship, and provide support to startups and AI-driven ventures. Furthermore, ethical considerations surrounding AI, such as data privacy, bias, and transparency, need to be carefully addressed to ensure the responsible and equitable deployment of AI technologies in the region. By addressing these challenges and fostering a supportive ecosystem, Latin America has the potential to become a significant player in the global AI landscape, driving innovation and creating socioeconomic benefits for its population.

The works from this special issue came through the LatinX in AI research at the NeurIPS workshop in 2020. This workshop was a one-day event with invited speakers, oral presentations, and posters. The event brought together faculty, graduate students, research scientists, and engineers for an opportunity to connect and exchange ideas. While all presenters will identify primarily as LatinX, all are invited to attend. The workshop encourages students, post-docs, and researchers who primarily identify as LatinX in all areas of machine learning to submit an abstract describing new, work-in-progress, previously

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published, or concurrently published research. The workshop invites papers on a wide range of topics in machine learning, covering both general and specialized areas such as machine learning models for general sciences (biology, engineering, and physics), deep learning, discussing architectures, generative models, and optimization techniques for deep networks. Reinforcement learning, RL, is another significant focus, encompassing decision and control, planning, hierarchical RL, and robotics. Applications of machine learning in speech processing, computer vision, and natural language processing are also encouraged. Probabilistic methods, such as variational inference, causal inference, and Gaussian processes, are also of interest. The workshop also welcomes contributions on neuroscience and cognitive science, with a particular focus on neural coding and brain-computer interfaces. Theoretical aspects, such as control theory, learning theory, and algorithmic game theory, are explored as well. Lastly, the workshop encourages the social aspects of machine learning, including AI safety, fairness, privacy, interpretability, human-AI interaction, and ethics. In addition to research papers, submissions related to infrastructure, such as datasets, competitions, implementations, and libraries, are also encouraged.

The articles selected by peer review for this special issue are discussed in the following paragraphs. When training deep learning models, the input and target data distribution often changes, leading to poor generalization performance in real environments. Polo et al. introduce a unified view connecting the effective sample sizes, data dimensionality, and generalization in the context of covariate shift adaptation. The authors show that covariate shift adaptation benefits from dimensionality reduction. Similar to domain and covariate shift adaptation, transfer learning facilitates training deep learning models for downstream tasks. Selecting the right starting point for downstream tasks is often overlooked. Garcia-Ramirez et al. address this issue through a novel framework which is applied to deep reinforcement learning tasks. Another way to improve and speed up the learning process of RL models is by making use of externally sourced information, often provided by a human. Bignold et al. provide good insights into the type of human engagement that is most beneficial for interactive RL models. Similarly, the work by Cruz et al. proposes a framework to explain the decision-making process of RL agents performing robotic tasks. In a similar attempt at building explainable models, Gonzalez-Soto et al. exploit the expressibility of graphs to model uncertainty about the existence of causal relation within a given set of variables.

De la Rosa et al. apply transformer models to monolingual and multilingual tasks and demonstrate that

transformer-based models retain structural information and cross-lingual transfer learning between languages is beneficial for model performance. Other application-based works include the use of triplet loss CNNs for the forensic identification of Spanish speakers as proposed by Maqueda et al. The authors also explore different configurations of speech spectrograms to quantify the quality of embeddings and improve accuracy.

When data are limited, data synthesis may be employed to generate new samples. Ciprian-Sanchez et al. propose an approach to generate artificial infrared and fused images through the use of GANs. Ciprian-Sanchez et al. apply their proposed method to generate images for use in wildfire detection. An alternative approach to data generation is to use noisy labels. Tekumalla et al. employ weak supervision to select large amounts of data to train machine learning models. The authors show that large amounts of noisy data produce similar performance results than annotated data. An alternative approach to deal with low data regime is proposed by Hernandez-Luquin et al. They propose exploiting local information in the deeper layers of CNN-based models through the use of radial basis functions units. The authors apply this approach to facial expression recognition and show competitive results, particularly with limited data.

In this concluding section, we reiterate the significance of the special issue and express our gratitude to the authors, reviewers, and editorial team for their contributions. We emphasize the value of interdisciplinary collaborations, rigorous research, and knowledge exchange in advancing the field. We hope that this special issue serves as a valuable resource and inspiration for researchers, practitioners, and policymakers alike.

We extend our sincere appreciation to all the authors who have contributed their exceptional work to this special issue. We also express our gratitude to the reviewers for their expertise and insightful feedback that ensured the quality and rigor of the selected papers.

We encourage readers to explore the complete set of articles in this special issue and engage in ongoing discussions. We hope that this special issue will foster new ideas, collaborations, and breakthroughs, ultimately driving the progress in Artificial Intelligence research.

Thank you for your continued support of Neural Computing and Applications and for your interest in this special issue.

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