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Conference on graphics, patterns and images

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The SIBGRAPI 2021 guest editors, Hugo Proença, David Menotti, Afonso Paiva, Gladimir Baranoski.

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SIBGRAPI – Conference on Graphics, Patterns and Images is an international conference annually promoted by the Brazilian Computer Society (SBC). SIBGRAPI is one of the most traditional and important Brazilian scientific events in Computer Science. It is attended by researchers, artists, designers, and students from Colleges, Universities, Companies, and Research Centers, gathering around 200 participants from different regions of Brazil and Abroad. SIBGRAPI is the main conference of the Special Committee of Computer Graphics and Image Processing of SBC (Brazilian Computer Society).

The proceedings of the event have been published since 1997, and all the editions are available from IEEE Xplore Digital Library. In addition, Becoming a tradition and following the 2020 edition, SIBGRAPI 2021 has Special Sections in the Elsevier Computers & Graphics, IEEE Geoscience and Remote Sensing Letters and Pattern Recognition Letters journals. This text introduces the Pattern Recognition Letters SIBGRAPI 2021 Special Section.

SIBGRAPI 2021 program included 51 papers that have been accepted and presented during the conference. From these, the 3 best papers on Pattern Recognition and related fields have been selected and invited for the submission of an extended version. Three papers have been extended, submitted, and undergone the standard PRL peer-reviewing process. All three have been accepted to compose the Special Section.

The first work by Diego de Matos et al. [1] considers the information present in the video and the background music to introduce a new fast-forward method. Aiming to maximize the similarity of the induced emotions present in the video and song, automatically recognized by neural networks, a new method of frame selection yields an accelerated video by combining the content. The experiments on a large dataset with different videos and songs show that the proposed method produces the best results in terms of matching emotion similarity while keeping the video's visual quality.

The second paper by Raquel Almeida et al. [2] extends the formalism of a previously proposed graph-based image gradient method that uses edge-weighted graphs aggregated with Random Forest (RF) to create descriptive gradients. We aim to explore more extensive input image areas and make changes driven by the RF mechanics. In the paper, it was evaluated the proposals on the edge and segmentation tasks, analyzing the gradient characteristics that most impacted the final segmentation. The experiments indicated that sharp thick contours are crucial, whereas fuzzy maps yielded the worst results even when created from deep methods with more precise edge maps. Also, it was analyzed how uniform regions and small details impacted the final segmentation. Statistical analysis on the segmentation task demonstrated that the gradients created by the proposed are significantly better than most of the best edge maps methods and validated our original choices of attributes.

The third one by Eduardo Vera Souza et al. [3] extends the evaluation presented in the previous SIBGRAPI paper by showing that the processing time and CO\textsubscript{2} emission rates of

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ConformalLayers are much lower than conventional sequential CNNs with a depth greater than seven and two, respectively. It is because ConformalLayers explore the layer's association, making the processing time and memory used per batch entry independent (i.e., constant) of the network's depth. This article also evaluates the robustness of the classification of ConformalLayers-based CNNs against different kinds of corruption typically found in natural images. Results show that the mean top-1 error rates of vanilla CNNs are smaller than ConformalLayer-based CNNs on clean images. Still, ConformalLayers outperforms other optimization techniques based on network quantization, and the relative difference to vanilla networks tends to reduce in the presence of image corruptions.

We are very grateful to Prof. Maria De Marsico and all of the PRL staff for their support to the publication of this special section. We would like to thank the authors for their submissions and the reviewers who helped us with the revision of the manuscripts. We would also like to thank the SIBGRAPI organization. For further information about SIBGRAPI, please visit the official website: https://www.inf.ufrgs.br/sibgrapi2021/.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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