

Special Issue on Application of Image Processing in Medicine

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The title and theme of this Special Issue “Application of Image Processing in Medicine” is currently very popular, topical, and important. For this Special Issue, we have compiled a collection of five articles. These articles cover a broad scope of knowledge. The first article [1] is entitled “A Novel Machine Learning Approach for Tuberculosis Segmentation and Prediction Using Chest-X-Ray (CXR) Images”. This is a proposed novel method for detecting tuberculosis in chest X-ray images that uses a three-phased approach to distinguish tuberculosis through segmentation, feature extraction, and classification. For CXR images, the authors used a Weiner filter to distinguish and reduce impulse noise, and then features were extracted from the CXR images and trained using a decision tree classifier. In the second article [2], “Detection of Respiratory Phases in a Breath Sound and Their Subsequent Utilization in a Diagnosis” [2], the authors focused on the major limitations of lung auscultation and presented a new approach to analyze respiratory sounds and visualize them together with respiratory phases. The authors take respiratory sounds of many patients were recorded and filtered to eliminate the ambient noise and noise artefacts. And the next the filtered signal is processed to identify the respiratory phases. All in all, this is a very interesting and interesting article. The third article [3] proposes a system that allows for the automatic detection of individuals with an elevated body temperature and estimates the distance from their position using a smartphone-type device and a single mobile thermal camera. According to the authors, the algorithm automatically finds and selects the individuals with the highest temperatures and tracks changes in their position in an image sequence. The use of thermovision in the present stage of the COVID-19 pandemic and in the verification of human characteristics has recently increased. This important article addresses one of the possible applications of thermal imaging cameras. The fourth article [4] is entitled “Mapping of Nanomechanical Properties of Enamel Surfaces Due to Orthodontic Treatment by AFM Method” and the authors point out that etching increases enamel roughness and reduces hardness. Resin reduces the roughness of the etched surface and increases the hardness. The intact enamel has the highest hardness and the next the enamel smoothness is greater after polishing than in the intact enamel. The final paper [5], entitled “Impact of the Enamel Cleaning Procedure during Debonding on Endodontium Temperature: In Vitro Tests”, concerns in vitro studies. According to the authors [5], by using a thermal imaging camera, changes in the temperature of the vestibular wall of the pulp chamber of the incisors and premolars were assessed as a function of time under the influence of polishing the enamel with silicone rubber and under the influence of the aluminum oxides. The relationship between dentin density and enamel as a consequence of changing the chamber temperature was evaluated by using microtomography. The obtained results are very promising and interesting. Therefore, the articles presented herein concern the broadly understood analysis and processing of medical imaging in a very wide range of applications. As the Guest Editors of this Special Issue, we hope that both



Citation: Koprowski, R.; Wilczyński, S.; Lanza, M. Special Issue on Application of Image Processing in Medicine. *Appl. Sci.* **2023**, *13*, 337. <https://doi.org/10.3390/app13010337>

Received: 16 November 2022

Accepted: 26 December 2022

Published: 27 December 2022



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the authors and readers will enhance their knowledge and broaden the potential scope of research in future scientific works.

Funding: This research received no external funding.

Acknowledgments: Thanks are given to all the authors and peer reviewers for their valuable contributions to this Special Issue entitled “Application of Image Processing in Medicine”. We also thank the administration and the MDPI team for their support and assistance in the development of this Special Issue.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Inbaraj, X.A.; Villavicencio, C.; Macrohon, J.J.; Jeng, J.-H.; Hsieh, J.-G. A Novel Machine Learning Approach for Tuberculosis Segmentation and Prediction Using Chest-X-ray (CXR) Images. *Appl. Sci.* **2021**, *11*, 9057. [[CrossRef](#)]
2. Skalicky, D.; Koucky, V.; Vitezniak, M.; Dub, M.; Lopot, F. Detection of Respiratory Phases in a Breath Sound and Their Subsequent Utilization in a Diagnosis. *Appl. Sci.* **2021**, *11*, 6535. [[CrossRef](#)]
3. Marzec, M.; Wilczyński, S. Automatic Mobile Warning System against People with Elevated Body Temperature. *Appl. Sci.* **2021**, *11*, 4721. [[CrossRef](#)]
4. Machoy, M.; Wilczyński, S.; Szyszka-Sommerfeld, L.; Woźniak, K.; Deda, A.; Kulesza, S. Mapping of Nanomechanical Properties of Enamel Surfaces Due to Orthodontic Treatment by AFM Method. *Appl. Sci.* **2021**, *11*, 3918. [[CrossRef](#)]
5. Machoy, M.; Szyszka-Sommerfeld, L.; Duda, P.; Wawrzyk, A.; Woźniak, K.; Wilczyński, S. Impact of the Enamel Cleaning Procedure during Debonding on Endodontium Temperature: In Vitro Tests. *Appl. Sci.* **2020**, *10*, 8672. [[CrossRef](#)]

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