Artificial intelligence in biomedical imaging

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BACKGROUND

Biomedical imaging is a multidisciplinary branch of medical science that consists of many scientific disciplines, e.g., medicine, biology, bioinformatics, and image analysis. Moreover, it covers various medical specialties. In recent years, a huge development of this field of science has been observed. The consequence of this is a large amount of data generated (e.g. based on radiomics [1]), among others as a result of the processing, analysis, and recognition of a wide class of biomedical images obtained through increasingly advanced medical imaging devices. The analysis of these data requires the use of advanced IT methods, which include those related to the use of artificial intelligence, and in particular machine learning [2].

OBJECTIVE

This presentation summarizes the selected applications of artificial intelligence, including machine learning in the processing, analysis, and recognition of biomedical images.

METHODS

Fundamentals of various AI techniques with application to analysis of medical image data will be briefly discussed along with the basics of texture analysis approach [3,4,5].

RESULTS

Sample results regarding biomedical image segmentation, organ recognition, disease detection classification, etc., will be demonstrated and discussed [6,7,8].

CONCLUSIONS

The growing role of medical imaging requires the development of dedicated algorithms that will reveal some useful diagnostic information, often unavailable by means of simple visual assessment. It is therefore necessary to encourage doctors to use various quantitative methods of image processing and analysis and expand cooperation in this area with computer scientists and biomedical engineers. New information obtained thanks to such analyzes will enable better efficiency and repeatability of the diagnostic process.

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