Artificial Intelligence in medicine: Small Data approach *

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Abstract

This abstract summarizes the presentation of the EURIZON project titled "Artificial Intelligence in Medicine: Small Data Approach (SmallAIM)" at the 7th International Conference on Informatics & Data-Driven Medicine, held at the University of Birmingham, UK, from November 14–16, 2024. The presenters discussed the challenges of applying artificial intelligence (AI) to prediction and classification tasks using small datasets, with a particular focus on medical applications. Traditional data mining methods often struggle to achieve the necessary accuracy when working with limited data, due to issues such as overfitting, noise, and poor generalization. The presenters introduced a novel methodology that combines ensemble learning and data augmentation techniques to improve prediction accuracy in data-scarce scenarios. Specifically, they proposed a procedure based on axial symmetry to artificially expand small datasets, enabling machine learning models and artificial neural networks to generalize more effectively. By integrating ensemble learning and data augmentation within a single kernel or nonlinear model, the approach demonstrated promising results in achieving high-accuracy predictions. The presenters highlighted various real-world medical use cases where the proposed methodology can help analyze small, constrained datasets, offering potential solutions for improving diagnostic accuracy and reducing resource requirements in medical practice. This work is funded by the European Union's Horizon 2020 research and innovation program under grant agreement No 871072

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