

Analysing Techniques for Fusing Multimodal Data in Predictive Scenarios Using Convolutional Neural Networks

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Abstract : In recent years, convolutional neural networks (CNN) have demonstrated high performance in image analysis, but oftentimes, there is only structured data available regarding a specific problem. By interpreting structured data as images, CNNs can effectively learn and extract valuable insights from tabular data, leading to improved predictive accuracy and uncovering hidden patterns that may not be apparent in traditional structured data analysis. In applying a single neural network for analyzing multimodal data, e.g., both structured and unstructured information, significant advantages in terms of time complexity and energy efficiency can be achieved. Converting structured data into images and merging them with existing visual material offers a promising solution for applying CNN in multimodal datasets, as they often occur in a medical context. By employing suitable preprocessing techniques, structured data is transformed into image representations, where the respective features are expressed as different formations of colors and shapes. In an additional step, these representations are fused with existing images to incorporate both types of information. This final image is finally analyzed using a CNN.

Keywords : CNN, image processing, tabular data, mixed dataset, data transformation, multimodal fusion

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