MonuMAI: Artificial Intelligence and Mathematics working over monuments

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Abstract:

Mathematics explained about elements of everyday life or art have been a source of inspiration and educational projects in the last decade. The interest and use is growing in this field when in particular we approach the monumental heritage for its mathematical content, motivation and symbolic value. In this line we have developed our Mathematical Walks project, of which material and reference can be found at `https://paseosmatematicos.fundaciondescubre.es`.

Continuing along this line we have incorporated the tools of Artificial Intelligence in this mathematical analysis of monuments, through the techniques of Deep Learning, developing the MonuMAI app as a meeting platform for these three aspects for education or mathematical and historical- artistic dissemination `https://monumai.ugr.es`.

In MonuMAI we have applied machine learning techniques for the recognition of artistic styles in monumental architecture through training based on their defining elements. But our proposal goes further. The two directions in which we currently work at MonuMAI intertwine mathematics and A.I. more deeply. On the one hand we are implementing computer vision techniques to automatically obtain a geometric model of each monument, with which to be able to make more detailed mathematical analysis, and on the other we are improving the learning of artistic elements through geometric models for training conducted with GeoGebra. This last process can be generalizable to other fields in which Deep Learning techniques are applied.

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