



Editorial



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See the article "An Application of Artificial Intelligence to Diagnostic Imaging of Spine Disease: Estimating Spinal Alignment From Moiré Images" via <https://doi.org/10.14245/ns.1938426.213>.



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Commentary on An Application of Artificial Intelligence to Diagnostic Imaging of Spine Disease: Estimating Spinal Alignment From Moiré Images

Artificial intelligence (AI), deep learning and computer vision are terms that we constantly hear about in the popular media, as well as scientific meetings and publications. It is no doubt a rapidly developing area, and the next frontier in medical research. Readers should bear in mind that these terms are related but do have somewhat separate meanings. Computer vision is about visual pattern recognition, while AI and deep learning is about engineering computer networks that mimic the human brain with layers of neural networks. AI and deep learning can be used to learn nonvisual information, for example, genome and haematological data, and use these to predict an outcome. Sometimes this is referred to as predictive modelling or precision medicine. AI excels in areas where there are complete, large and complex datasets and clearly defined outcome, since it can make correlations and therefore prediction beyond what we currently use in disease classifications and prognosis prediction. Current classifications are based on a learned or best guess approach, whereby we, as experienced clinicians, identify what we consider are important parameters, and include them in the model. Whereas with AI, it has the ability to make unbiased correlations, looking at and comparing all parameters and to identify the best combination that predicts outcome. Computer vision collects visual data and for AI analytics. In this study Watanabe et al.¹ makes use of computer vision to capture back morphometric data, and to correlate this with radiologic data, to help predict outcome, which in this case is coronal Cobb angle and axial rotation on radiographs. The mean error for Cobb angle is $3.42^\circ \pm 2.64^\circ$, which in the setting of screening would seem acceptable, since it is probably more important to use this information to determine a minimum cutoff value beyond which subjects should be sent for radiograph for definitive diagnosis. The error in prediction of axial rotation is higher and more refinement will be needed, in particular with larger datasets and wider range of values.

Use of AI and computer vision in management of adolescent idiopathic scoliosis will no doubt expand, from automated measurements of radiographs, to predictive modelling for likelihood of progression both during the rapid growth spurt and also after maturity. Such information can be used to better inform treatment and to predict treatment success. In future, such algorithms could involve not only radiographic data but also clinical epidemiological, genomics, proteomics, and serum biomarkers to help enhance prediction accuracy.

Despite the optimism, a lot of work remains to be done, and readers should bear in mind

potential limitations. Firstly, the prediction is only as good as the data collected and provided for training and verification, and ideally the larger the datasets the better, likely this number should be tens of thousands or even larger. Secondly, there could be ethnic variations and thus the validity of models needs to be compared across racial groups. Thirdly, new algorithms and deep learning programs are continuously being developed and refined, and no doubt will further enhance accuracy. Nevertheless, the authors should be congratulated to have made a good start and we should look forward to more to come in this new frontier in future.

CONFLICT OF INTEREST

The author has nothing to disclose.

REFERENCE

1. Watanabe K, Aoki Y, Matsumoto M. An application of artificial intelligence to diagnostic imaging of spine disease: estimating spinal alignment from Moiré images. *Neurospine* 2019;16:697-702.



Title: Guernica
Artist: Pablo Picasso
Year: 1937

Guernica was Picasso's response to the bombing of the Basque town of the same name on April 26, 1937 during the Spanish Civil War. Picasso was commissioned by the republican government of Spain to produce a mural painting for the Spanish Pavilion at the World Fair in Paris. Painted in one month - from May to June 1937 - *Guernica* became the centerpiece of the Spanish pavilion and a sensation at the Fair, but it was consequently banned from exhibition in Spain until military dictator Franco fell from power in 1975.

Picasso had studied dramatic photographs of bombing published in various periodicals. Despite that, neither the studies nor the finished picture contain a single allusion to a specific event, constituting instead a generic plea against the barbarity and terror of war. The scene depicted in *Guernica* is a room full of moving, screaming and dying adults, children and animals. Most of the individual images are also symbols: a bull (virility of man), a woman with a dead child (pieta image), a horse (innocent people), a dead soldier with stigmata (martyrdom), a blazing light (bombs), a prison cell (torture), a dove (peace).

More information: <https://www.pablo-ruiz-picasso.net/work-170.php>

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