3D-IMAGE PROCESSING SYSTEM FOR HELPING PHYSICIANS IN THE DIAGNOSIS AND MONITORING OF SCOLIOSIS

Results in Brief

Scoliosis in 3D

Scoliosis affects millions of people throughout the EU, significantly impacting their health and self-esteem. EU-funded researchers have developed a 3D image processing system for diagnosing and monitoring scoliosis with reduced X-ray intervention.

HEALTH

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An abnormal spinal curvature, scoliosis is most often treated using a combination of bracing, exercise and surgery based on severity. Current diagnostic and monitoring protocols involve the use of an inclinometer followed by X-rays to measure and quantify the severity of spinal curvature. Both the complexity of quantifying scoliosis grade and the necessity of frequent X-rays during treatment have highlighted the need for better techniques.

Research organisations and small and medium-sized enterprises (SMEs) joined forces under the SCOLIO-SEE (3D-image processing system for helping

physicians in the diagnosis and monitoring of scoliosis) project. They have successfully developed an integrated software and hardware system for 3D image processing of the spine using machine learning to connect internal and external spinal deformation. 3D images are compared from two successive visits to show changes in the whole back surface.

Project members worked on determining the SCOLIO-SEE system specifications and relevant parameters. Artificial neural network (ANN) algorithms were applied to this data for accurate estimation and prediction of spinal curvature using the Cobb angle for diagnosis and treatment.

Significant progress has been achieved with regard to database development, as well as collecting and combining surface topographic and radiographic spinal measurements using ANN methodology. A Formetric measurement technology prototype was evaluated during the project's lifetime using data from over 150 patients recruited for the study. There are future plans for a second prototype to correct lack of agility in the rotating arm.

A promotional video can be found in the project Youtube channel. This clearly explains the advantages of using the improved SCOLIO-SEE system - more accurate measurements and correspondingly less need for many X-rays.

Although the need for X-ray is not eliminated, project results will improve the quality of life for patients. Furthermore, this system could also be adapted for other parts of the body and the competitiveness of consortium SMEs would thus be enhanced.

Keywords

Scoliosis, 3D image processing, algorithms, Cobb angle, quality of life

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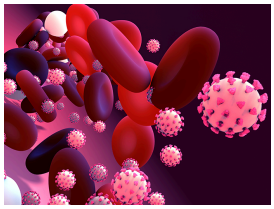

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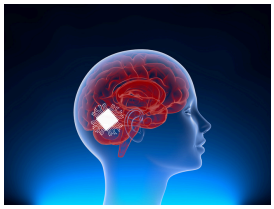

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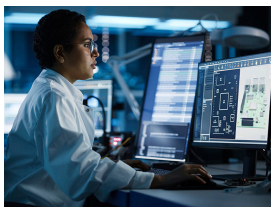

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Project Information

SCOLIO-SEE

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Project website

Project closed

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