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A review of the application of image processing in porous media

Nowadays, the study of fluid flow and transfer phenomena in porous media has received much attention due to its importance in industrial, engineering, biological and environmental applications. Geometry, cavity space and topology are among the key characteristics of porous media. These components play an important role in determining the characteristics of the porous medium. Image processing, as one of the sub-branches of artificial intelligence and machine learning, has unique capabilities in image analysis. Image recognition is becoming a very important step in most problem solving systems in the modern world. There are many methods of image acquisition, analysis and classification available. Image processing methods and algorithms are satellite and remote imaging, video images, 3D images. In porous environments, image processing can help to separate and identify materials in the environment, calculate physical parameters such as density, weather in the environment, improve processes related to porous environments, etc. Image processing in porous environments is a powerful tool for analyzing and recognizing the characteristics of the environment. In this research, the studies conducted in the field of porous media and various applications of image processing in porous media have been discussed. Image processing-based measurement techniques have the advantages of non-destructive, easy operation, deep 3D visibility and high resolution. The application area of porous materials can be extended by using suitable imaging techniques. Image processing techniques include image alignment, image stitching, contrast enhancement, thresholding, image separation, 3D reconstruction, etc. The use of these materials is strongly influenced by the properties of the measured materials. Image processing methods can be transferred to other areas with similar image characteristics. To achieve accurate results, image processing-based measurement needs to be improved in terms of hardware, testing, and image processing algorithms.

Student presentation contest

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