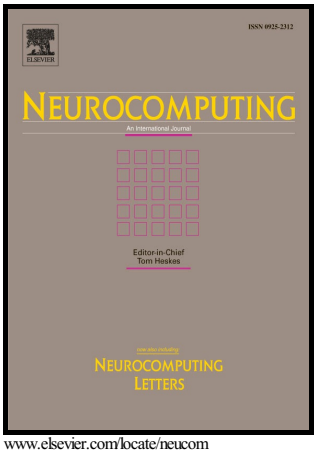

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Medical Diagnosis of Rheumatoid Arthritis using Data driven PSO-FCM with scarce datasets

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Abstract

Rheumatoid Arthritis (RA) is a chronic autoimmune disease that affect joints and muscles, and can result in noticeable disruption of joint structure and function. Early diagnosis of RA is very crucial in preventing disease's progression. However, it is complicated task for General Practitioners (GPs) due to a wide spectrum of symptoms, and progressive changes in disease's direction over time. Thus this research work aims in early identification of patients with Rheumatoid Arthritis (RA) using soft computing method of Fuzzy Cognitive Maps (FCMs). First, a set of criteria for diagnosis of RA, based on literature review and consultation with a group of medical professionals (including orthopedic surgeons and rheumatologists) have been identified. Then, Particle Swarm Optimization (PSO) and FCMs were used to model this problem and calculate the severity of the RA disease. Finally, an electronic survey has been conducted in Shohada University Hospital,Iran for evaluating accuracy of the proposed model. Accuracy level of the model reached to 90% and the results closely matched the medical professionals' opinions. In the future, the results of this study are likely to assist GPs in earlier detection and diagnosis of patients with RA. Consequently, patients' disease may be prevented from moving through advanced stages, and their quality of life will be improved.

Keywords: Diagnosis; Rheumatoid Arthritis disease; Decision Support; Fuzzy Cognitive Maps; Particle Swarm Optimization; Machine Learning

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