

# AI model can quantify radiographic joint damage in rheumatoid arthritis

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An international competition resulted in the development of algorithms

that provide feasible, quick, and accurate methods to quantify joint damage in rheumatoid arthritis (RA), according to a study published online Aug. 29 in *JAMA Network Open*.

Dongmei Sun, Ph.D., M.S.P.H., from the University of Alabama at Birmingham, and colleagues designed and implemented an international crowdsourcing competition to catalyze the development of machine learning methods to quantify radiographic damage in RA. Data from two [clinical studies](#) (674 radiographic sets from 562 patients) were used for training (367 sets), leaderboard (119 sets), and final evaluation (188 sets).

The researchers found that the winning algorithms produced scores that were very close to the expert-curated Sharp-van der Heijde scores. This finding was based on the weighted root mean square error (RMSE) metric using 173 submissions from 26 participants (teams in seven countries) for the leaderboard round and 13 submissions for the final evaluation. Top teams for the three subchallenges achieved weighted RMSEs of 0.44, 0.38, and 0.43. Postchallenge independent validation confirmed reproducibility with estimation concordance indices of 0.71, 0.78, and 0.82 for the top team from each of the three subchallenges.

"These findings suggest that after refining and validating with larger cohorts, these algorithms alone or in combination could be incorporated into [electronic health records](#), contributing to more informed and precise management of RA," the authors write.

**More information:** Dongmei Sun et al, A Crowdsourcing Approach to Develop Machine Learning Models to Quantify Radiographic Joint Damage in Rheumatoid Arthritis, *JAMA Network Open* (2022). [DOI: 10.1001/jamanetworkopen.2022.27423](#)

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