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IIT-G develops AI-based model to predict knee osteoarthritis severity from X-ray images

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Knee osteoarthritis is the most common musculoskeletal disorder in the world



Researchers from the Indian Institute of Technology Guwahati (IIT-G) have developed a Deep Learning (DL)-based framework, namely OsteoHRNet, that automatically assesses the Knee Osteoarthritis (OA) severity from X-rays images. This artificial intelligence (AI)-based model can be used to detect the severity level of the disease and assist medical practitioners remotely for a more accurate diagnosis.

Knee Osteoarthritis is the most common musculoskeletal disorder in the world and has a prevalence of 28% in India. There is no possible cure for Knee OA except total joint replacement at an advanced stage hence an early diagnosis is essential for pain management and behavioral corrections. MRI and CT scans provide a 3-D image of the knee joints for effective diagnosis of Knee OA but their availability is limited and expensive. For routine diagnosis X-Ray imaging is very effective and more economically feasible.

Researchers have been working to enhance automatic knee osteoarthritis detection from X-Ray images or radiographs to assist clinical evaluation. In this direction, the IIT-G team has developed an AI-based model to automatically assess the severity of Knee OA.

This model predicts knee OA severity according to the World Health Organization (WHO) approved Kellgren and Lawrence (KL) grading scale that ranges from grade 0 (low severity) to 4 (high severity). It is built upon one of the most recent deep models, called the High-Resolution Network (HRNet), to capture the multi-scale features of knee X-rays.

The team is further working to reconfigure these models in such a way that they can be deployed in resource-constrained devices so that medical professionals can easily get an initial but accurate guess for the diagnosis. This work has the potential to mitigate the severe shortage of skilled personnel in this field, especially in rural India.