UNIVERSITY of WISCONSIN
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Special Interest Group
on Big Data

Weekly Seminar

12pm - 1pm, Friday, October 25, 2019
UWM EMS E237

Deep Learning Computational Vision to Advance Knee Total Joint Arthroplasty Research

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Abstract:

Total joint arthroplasty (TJA), as the most common and fastest growing surgery nationwide, has been an area of increased attention in healthcare. Almost 1.3 million TJA procedures occur on a yearly basis and more than 7 million Americans are currently living with artificial hip and/or knee joints. The widespread adoption of x-ray radiography and their availability at low cost, make them the principle method in assessing TJA and subtle TJA complications, such as osteolysis, implant loosening or infection over time, enabling surgeons to rule out complications and possible needs for revision.

Nationwide statistics estimates that about 10 million TJA follow-up radiographs are performed annually in the United States. Rapid yet, with the growing number of TJA patients, the routine clinical and radiograph follow-up remain a daunting task for most orthopedic centers. It becomes an overwhelming amount of work, on a human scale, when we consider a radiologist or surgeon presented with the vast amount of medical images daily. Smart computational strategies, such as artificial intelligence and deep learning computational vision are thus required to automatically analyze arthroplasty radiographs, enabling both naive and experienced practitioners to perform radiographic follow-up with greater ease and speed. In this talk, I will be discussing the effectiveness of smart computational methods, in particular deep learning convolutional neural networks to advance knee TJA research using plain radiographs.