

ISYS3888: Information System Capstone Project (Semester 2, 2022)

Project ID: P56

Project Title: Benchmark Commercial AI product for Medical Imaging Services Provider

Company and Needs: ABC is a nation-wide medical imaging services provider offering a wider range of medical imaging services including Angiography, CT, Echocardiogram, Fluoroscopy, Mammography, MRI, Nuclear Medicine, PET/CT, Ultrasound, X-Ray, and more.... With the development of artificial intelligence (AI) products to produce promising results in image processing and image analysis for medical diagnoses, ABC would like to prepare for integrating these technological advances to enhance and support radiologists in optimizing their workflow efficiency and improve patient care. At this beginning stage, ABC would like to identify and benchmark several computer-aided detection (CAD) commercial products that could provide an automated and standardized interpretation of digital chest X-rays based on artificial intelligence for the diagnosis of the tuberculosis (TB).

Project Team and Goal: You are a team of young trainees pursuing a career of Health Technology Assessment Consultant. Some of your team members might have received preliminary training unit ISYS3401 in semester 1 (2022) prior coming to this project. Your goal is to identify several certified CAD products that may be used for TB detection and make professional recommendations to ABC for consideration. Your team has been tasked to deliver a detailed recommendation report based on systematic and in-depth analyses by the end of this project UoS and a powerpoint presentation to ABC's Chief Radiologist Information Officer (CRIO), Dr. Xavier Ray and Chief Technology Officer (CTO), Mr. Chuck To.

Preliminary Brief: After consulting with an HTA expert at HTAnalyst consulting firm, your team has been directed to a list of commercial CAD products that could be considered for TB detection published on the AI4HLTH resource centre website (<https://www.ai4hlth.org/>). For the remainder of the project, your team is commissioned to:

1. benchmark across as many certified products like CAD4TB, envisionit, InterRead DR Chest, JF CXR, JLD-02k, INSIGHT CXR, ChestEye, Lunit, qXR, AXIR, VUNO, etc..
2. Perform systematic reviews on all diagnostic test accuracy (DTA) studies of each product
3. Perform meta-analysis as a benchmarking method to compare each CAD product's DTA against other CAD products
4. Produce a professional report to present your recommendations with detailed analyses based on your investigation and extensive benchmarking effort
5. Seek assistance from university librarian to perform systematic reviews and self-learn to perform evaluation using diagnostic testing accuracy measures, and meta-analysis (you may be able to seek Sydney Informatics Hub for advice).

References:

Health Technology Assessment: <https://www.nlm.nih.gov/nichsr/hta101/ta10103.html>

Systematic Reviews & Meta-Analyses: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3024725/>

Meta-Analysis: <https://en.wikipedia.org/wiki/Meta-analysis>

Diagnostic Testing Accuracy: <https://www.ncbi.nlm.nih.gov/books/NBK557491/>

AI4HLTH resource centre website: <https://www.ai4hlth.org/>

Sydney Informatics Hub: <https://www.sydney.edu.au/research/facilities/sydney-informatics-hub.html>