Aishwarya Vedula
aishsvedula@gmail.com

March 01, 2024

Dear Judges,

I am writing to submit our research paper entitled " Combining Image similarity and Predictive AI Models to Decrease Subjectivity in Thyroid Nodule Diagnosis and Improve Malignancy Prediction" or consideration for Mercer Science and Engineering Fair. This paper presents a comprehensive study that introduces a novel approach for the non-invasive evaluation of thyroid nodules, which combines artificial intelligence (AI) with image similarity assessment techniques.

This research addresses the significant challenge of accurately distinguishing between benign and malignant thyroid nodules. By leveraging AI-driven predictive models alongside image similarity assessments, the study not only proposes a less invasive methodology but also enhances diagnostic accuracy. This dual approach allows for a more refined analysis of thyroid nodules, potentially reducing healthcare costs through a reduction in unnecessary procedures.

Key highlights of our study include:

- The development and validation of a software that integrates AI predictive models with image similarity assessment, also incorporating ACR TI-RADS scoring for comprehensive risk stratification.
- Extensive testing across diverse datasets, demonstrating high sensitivity, and negative predictive value.
- A potential 60% reduction in the need for biopsies, underscoring significant clinical implications for patient care and resource allocation.

The findings of the study represent a significant advancement in the field of thyroid nodule risk stratification. The integration of image similarity and AI-driven predictive models not only paves the way for more efficient and patient-friendly screening methods but also aligns with the ongoing efforts to incorporate explainable artificial intelligence in medical practice.

A portion of the data in this manuscript was reported as a poster in CMIMI22 (Conference on Machine Intelligence and Medical Imaging 2022). One of the authors, Johnson Thomas owns intellectual property rights for the AI software used in this study. This is the only possible conflict of interest that could be identified.

All authors have approved the research paper and consent to its submission to the Mercer Science and Engineering Fair.

Thank you for considering my submission.

Sincerely,
Aishwarya Vedula