

Introduction:

Artificial Intelligence (AI) is a rapidly growing technology that has shown the potential to be integrated into various fields. The field of medicine is beginning to see implementations of AI, specifically in radiology. With the existing methodology of medical image evaluation, there is an insufficient number of radiologists to read through the countless images scans available. Due to this, radiologists can only afford a fraction of a second to review a single image within an image set. This problem inspired the use of machine learning to address the current struggles of radiologists.

The technical portion of the completed work is an effort to integrate machine learning capabilities into the workflow of radiologists. Specifically, a model for the classification of malignant tumors in medical images was created. The STS portion of this work is a case study of newly innovated technologies and the societal changes that followed. Two key technological innovations, the assembly line and personal computer, were analyzed and then used to support speculations of the societal effects AI may have. The STS work was inspired by the technical project, primarily on how radiologists' work-life balance may be affected and if AI technology will displace radiologists or enhance their work to improve diagnosis.

Technical:

Utilizing CT and MRI scans of breast/lung nodules, research was conducted on multiple methods of machine learning model building for malignancy classification in the nodules. For the breast images, various versions of the EfficientNet neural network were tested for performance evaluation. For the lung nodule images, the performance of a 2D image approach and 2.5D image approach were compared to determine what methodology demonstrated higher performance. Within the 2.5D approach, various methods of image preparation were also

compared to discover the best performing method. Lastly, methods focused on radiomics were performed on the lung nodule images to determine the highest-performing indicator for malignant nodule classification.

STS:

From the assembly line to the personal computer, societal change has promptly followed these revolutionary changes in technology. Artificial Intelligence (AI) holds the potential to prompt societal change and has already been applied in various fields. This section of the research paper focuses on AI and explores its societal effect on the future of work. Supported by the Technological Determinism framework, a case study was conducted analyzing the social impacts past technological advancements have made. Following the case study, existing advancements in AI technology were evaluated. Through this research, the potential social impacts of AI are identified. The significance of these impacts are the insights that show the changes in required skill sets and jobs once AI becomes central to human life. Ultimately, this displays the potential societal impacts that may result from the advancement of AI technology.

Reflection:

The Technical and STS portions of this work has provided insight and inspiration into both sides of work as research was conducted. When performing research in the technical work, the knowledge gained from the STS research allowed for the technical solution to be one that enhances the radiologists work experience rather than a solution that replaces a radiologist. The notion that AI technology will replace many existing jobs introduces a fear and rejection of AI technology in fields of work. Thus, introducing a solution that will be assistive to the worker rather than replacing them allows for a wider acceptance of change. Meanwhile, the STS portion of work benefited from the technical work as it provided an example of one field that is currently

being impacted by the advancement of AI technologies. This allowed for a better understanding of the societal impacts that may occur from AI's integration into professional fields as it may either enhance the job leading to greater productivity or completely replace jobs that require low skill work.