Preliminary Pancreatic Cancer Screening: A Cheap and Efficient Approach Employing Convolutional Neural Networks on CT Scans

Park, Jun (School: Rider High School)
Liang, Evan (School: Rider High School)
Farooq, Zara (School: Rider High School)

With over 18 million new cancer diagnoses and nearly 10 million associated deaths per year, cancer remains a significant global health challenge. Pancreatic cancer is one of the deadliest forms of cancer, with a dismal prognosis due to late-stage detection and limited treatment options. Traditional diagnostic methods suffer from subjectivity and variability in accuracy. In this study, we address the pressing need for more accurate and efficient cancer diagnosis by leveraging machine learning (ML) image detection programs, specifically convolutional neural networks (CNNs), to predict pancreatic cancer from medical imaging data. We utilized a dataset comprising medical images of pancreatic CT scans. Our base CNN model consisted of 2 convolutional layers followed by fully connected layers for classification. We employed a systematic approach to iteratively add layers and adjust hyper parameters to optimize model performance. Our experiments yielded promising results, with the optimized CNN model achieving a classification accuracy of 96% on the test dataset. The success of our CNN model highlights the potential of ML-based approaches in revolutionizing cancer diagnosis. By automating the process and reducing reliance on subjective human diagnosis, ML algorithms can expedite diagnosis and improve patient outcomes. However, challenges such as dataset size, model interpretability, lack of resources, and generalizability warrant further investigation. In conclusion, our study highlights the efficacy of CNNs in pancreatic cancer diagnosis and highlights the transformative potential of ML in improving healthcare outcomes. Continued research and collaboration are essential to harnessing the full potential of ML algorithms in oncology and beyond.