Combining Accessibility With Machine Learning: Utilizing Machine Learning to Create a User-Friendly Medical Application to Process and Detect Histopathological Images of Oral Squamous Cell Carcinoma

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Oral cancer kills over 300,000 lives across the world every year, and oral squamous cell carcinoma (OSCC) is a dominant type of oral cancer. Current diagnosis steps for OSCC typically involve biopsy images of oral tissue, where pathologists examine the biopsy for signs of OSCC. Machine learning has been proven to play an essential role in the diagnosis of cancers, however the technology has typically been difficult to use and inaccessible to normal pathologists. We sought to bridge the gap between these two problems by designing a novel web application that integrates a machine learning model for histopathological image classification of OSCC images, in a manner that is easy to use for pathologists. We created a tool that is designed to be an assistance for pathologists to determine if a patient needs to be more closely examined for OSCC screening. Our model yields a validation accuracy of 95.84 percent validation accuracy, rivaling the top OSCC image classification models. Manual testing revealed that the web application accurately classified histopathological images 26 out of 30 times, with 1 image tested being a false negative, demonstrating the outstanding performance of our machine learning model. With this radical and novel application, we hope to bring the benefits of machine learning to everyday doctors and pathologists, and aid in the proactive screening and diagnosis of OSCC.

Awards Won: