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Oral tongue cancer mortality prediction using Artificial Neural Network (ANN)

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The prognosis in the early stage of oral tongue cancer is highly variable. It takes time and efforts to get the values of various prognostic factors used in cancer management. Furthermore, the fact that different markers are introduced at interval makes it more challenging. The ability to predict mortality in cases of oral tongue cancer based on the data obtained from the known cases using the common prognostic markers would represent a major advancement in oral tongue cancer management. The purpose of this study is to use an Artificial Neural Network (ANN) to predict mortality in oral tongue cancer. It also examines each of the prognostic markers to determine the prognostic markers that are needed for effective prediction by the ANN. Layer recurrent neural network was used in this study. The network was trained using cases of T1/T2 N0M0 Oral Tongue Squamous Cell Carcinoma (OTSCC) obtained from five different teaching hospitals in Finland and 1 (one) hospital in Sao Paulo in Brazil. It was found that Layer recurrent neural network effectively predicted mortality with a reasonable performance error between the target and neural outputs respectively. With this error performance, the trained network was able to effectively predict the new cases of patients with OTSCC. When new cohort of cases was tested with the trained neural network, a significant accuracy was recorded. Additionally, prognostic parameters such as depth of invasion and tumor budding were identified as important to effectively predict mortality. Therefore, ANN provides a unique decision making assistant to the clinicians in the effective management of oral tongue cancer through the prediction of mortality.

Biography

Alabi Rasheed Omobolaji has his expertise in communication and systems engineering. Presently, he is pursuing PhD from the University of Vaasa, Vaasa, Finland. His research interest includes data science, machine learning and artificial intelligence. At the moment, he is working on a machine learning application: Organs-on-a-chip. He is actively involved in research related to the application of artificial intelligence and machine learning in medical applications.

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