



MACHINE LEARNING PREDICTION OF ENDO-PERIO LESIONS USING RADIOGRAPHIC IMAGES

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INTRODUCTION:

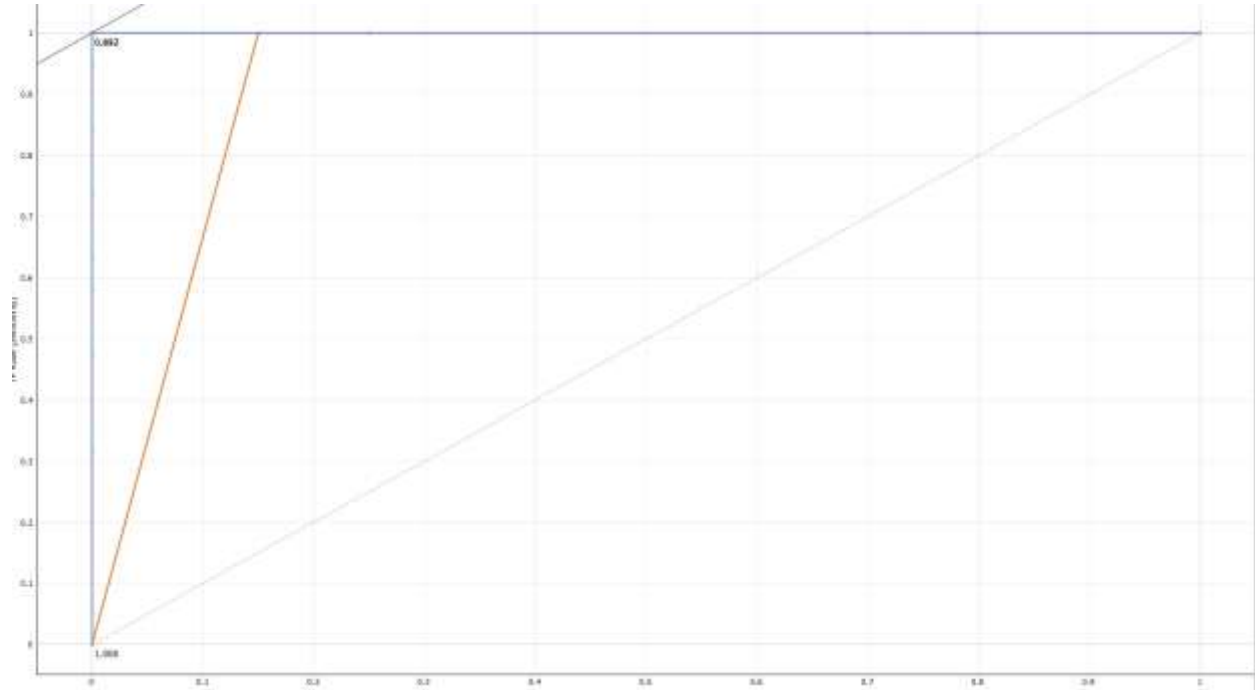
The introduction to a machine learning prediction study on endo-perio lesions using radiographic images should outline the significance of the problem, current challenges in diagnosis, and the potential impact of predictive models. It's crucial to establish the context, highlight the importance of early detection, and briefly mention the role of machine learning in addressing these issues. The interrelationship between periodontal and endodontic disease has aroused confusion, queries and controversy. Differentiating between periodontal and endodontic problems can be. To improve diagnostic accuracy and enhance various treatment strategies for endo-perio lesions, prediction models based on non-invasive measures have been proposed. Additionally, you can introduce the prevalence of endo-perio lesions, emphasizing the need for accurate and timely diagnosis. Discuss the limitations of traditional diagnostic methods and underscore how machine learning offers a promising avenue for enhancing diagnostic accuracy. Briefly touch upon the objectives of your study and the methodology employed to train and validate the predictive model using radiographic data. Furthermore, it is important to review existing literature on machine learning applications in dental radiography and endodontics. Highlight gaps in current research and articulate how your study contributes to filling these gaps. Establish the novelty of your approach, whether through the use of specific algorithms, dataset characteristics, or innovative features in the prediction model. This sets the stage for readers to understand the unique value your research brings to the field.

MATERIALS AND METHODS:

Using a dataset obtained from DIAS, 40 samples were obtained (endo-perio lesion-20, non-disease-20), and the data was preprocessed, customised and segmented. Using Orange, a machine learning squeeze net embedding models with Random Forest, and data . Naive Bayes and Logistic Regression algorithms were used to study the accuracy of prediction. Data was split into 80% training and 20% test data. Cross validation. Confusion matrix and an ROC analysis was done for evaluating and assessing the performance of the model. Precision and recall were also analysed in this study.



RESULTS:



ROC analysis of endo-perio lesion



ROC analysis of non- lesion



Table 1: Accuracy of Algorithms of logistic regression, Random Forest, Naive bayes

Model	AUC	CA	F1	Precision	Recall
Random Forest	1.000	1.000	1.000	1.000	1.000
Naive Bayes	0.995	0.923	0.923	0.934	0.923
Logistic Regression	1.000	1.000	1.000	1.000	1.000

Table 2: Confusion matrix of Naive Bayes

	Endo perio lesion\ Endo perio lesions	Endo perio lesion\No lesion	Σ
Endo perio lesion\ Endo perio all lesions	86.4%	0.0%	19
Endo perio lesion\ No lesion	13.6%	100.0%	20
Σ	22	17	39

Table 3: Confusion matrix of Random Forest

	Endo perio lesion\ Endo perio lesions	Endo perio lesion\No lesion	Σ
Endo perio lesion\ Endo perio all lesions	100.0%	0.0%	19
Endo perio lesion\ No lesion	0.0%	100.0%	20
Σ	19	20	39

Table 4: Confusion matrix of logistic regression

	Endo perio lesion\ Endo perio lesions	Endo perio lesion\ No lesion	Σ
Endo perio lesion\ Endo perio all lesions	100.0%	0.0%	19



Endo perio all lesions			
Endo perio lesion\ No lesion	0.0%	100.0%	20
Σ	19	20	39

DISCUSSION: The study focused on the detection and identification of endo perio lesion in radiographic images using deep learning techniques. The deep learning model demonstrated high accuracy and reliability in detecting and identifying the presence and absence of endo perio lesion (AUC obtained were 100%, 99.5%, 100%). The model's ability to analyze and classify radiographic images allowed for automated detection of lesions reducing the reliance on manual examination. The high accuracy and efficiency of the deep learning model can enhance diagnostic accuracy, save time, and potentially reduce costs in clinical practice. The study's findings suggest that the deep learning model can be generalizable across a variety of dental images.

CONCLUSION: Usage of artificial intelligence for the detection of attrition and abrasion provides multiple advantage. It prevents false positive and false negative detection and errors caused by humans. It provides better detection and identification and hence prevents oral health problems.

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