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Prediction of High-Power Hearing Aid for Audiology Patients Using Data Mining Techniques

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ABSTRACT

Our research examined two of unsupervised Data Mining algorithms for both comparison and prediction to predict the High-Power Hearing Aid for audiology patients who suffer from hearing impairment. These Data Mining techniques are Manifold Learning and Multidimensional Scaling. Both algorithms define specific rules to choose the linear projection of the data. These methods can be effective, but sometimes miss the structure of non-linear data. Our research deals with new specific data set which collects and analyses depends on Audiology information and Patient's diagnosis. Note that the data set selected must be subject to accurate data analysis with pre-processing of data. It should be applicable and authoritative because these factors are very important to obtain the highest degree of prediction possible, as long, some data types are not appropriate for decision tree or some methods of classification. The data set we created consists of seventy-two fields distributed on seventy-one fields for data details and one further for class. All data set fields are categorical, and it contains some of missing values. The fact that our data was subjected to a very accurate analysis (before cleaning) based on the correct medical diagnosis and comprehensive information of the most important points that directly affect the selection of appropriate hearing aid for audiology patient, and via applying data mining techniques, we obtained a prediction of 100% for hearing aid selection, and 98% to determine which power type of hearing aid that those patients should use. To reach our goal, we examined Data Mining techniques utilizing Python for coding and modelling.

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1. INTRODUCTION

Our research purpose is to comprehend the importance that Data Mining (DM) is having when the algorithms and processes have been optimized and improving for healthcare, also how we can utilize data to assist doctor's diagnosis their patients who suffer from hearing problems correctly.

"Data mining is the nontrivial extraction of implicit previously unknown and potentially useful information about data" **[1]**.

In the field of healthcare medicine, DM transacts with models of learning to predict the diverse diseases of patients. The applications of DM can assist all parties associated with the industry of healthcare [2]. Clinical resolutions are often based on the intuition of doctors and their expertise instead of the knowledge