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Infocepts

Age of abalone from physical measurements

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# 1 Abstract

Our main objective in doing this project is to apply machine learning algorithms to predict the age of abalone from physical measurements. This model will provide the appropriate age of the abalone on the multiple input parameters.

# 2 Introduction

Marine snails are abalone. According to taxonomy, they belong to the Haliotid family, which now simplest consists of the unmarried genus Haloti’s and its former six subgenera. These subgenres have advanced into specific depictions of Haloti’s. Over 230 species-stage taxa had been described, and there are between 30 and one hundred thirty identified species worldwide. According to the family's maximum thorough analysis, fifty-six identified species and 18 specific subspecies exist.

Abalones have low, open spiral structures with many open metabolism pores organized in an exceeding row near the shell's edge. shell (mother-of-pearl), which builds up the thick inner layer of the shell and is found in several species, is extremely iridescent and produces a spectrum of vivacious, changeable colors. These characteristics make the shells appealing to humans as ornamental items, jewelry, and a supply of vibrant mother-of-pearl.

The flesh of abalones is widely considered to be a desirable food and is consumed raw or cooked by a variety of cultures. Abalone varies in size from 20 mm (0.79 in) (Haliotis pulcherrima) to 200 mm (7.9 in) while Haliotis rufescent is the largest of the genus at 12 in (30 cm)

# 3 Related Work

* Predicting the Age of Abalone from Physical Measurements Using Artificial Neural Network:

Abalone has long been a valuable food source for people in all parts of the world, rich in seeds. Prediction of abalone age is based on physical measurements. The age of abalone is determined by cutting a conical shell, staining it, and counting the number of rings under a microscope. This is a tedious and time-consuming task. others Easy-to-acquire measurements are used to predict abalone age using an artificial neural network (ANN), a branch of artificial intelligence. The dataset was collected from the UCI machine learning repository. To predict the age of abalone from physical measurements, ANN with a multi-layered model using the Just (JNN) tool has been proposed.

* Machine Learning Project - Predict the Age of Abalone:

In this paper, the author has applied the KNN algorithm to predict the age of abalone. The Experiment result showed a 26.71 accuracy when k = 64.

# 4 Dataset and Features

Estimating an abalone's age is primarily based totally on its morphological characteristics. Cutting the shell via the cone, staining it, and counting the wide variety of earrings beneath neath a microscope are the tedious and time-ingesting steps worried in figuring out the age of an abalone. The age is expected the use different metrics which might be easier to get. The stages of the non-stop values had been adjusted for utilization with an ANN, and the authentic information samples with lacking values had been eliminated (the majority of which had the projected cost lacking) (with the aid of using dividing with the aid of using 200).

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| --- | --- | --- | --- | --- | --- |
| # | Name | Data Type | Measurement unit | Description | Attribute type |
|  | Sex | Categorical | mm | M, F, and I (infant) | Input |
|  | Length | Continuous | mm | Longest shell measurement | Input |
|  | Diameter | Continuous | mm | perpendicular to length | Input |
|  | Height | Continuous | mm | with meat in the shell | Input |
|  | Whole weight | Continuous | mm | whole abalone | Input |
|  | Shucked weight | Continuous | mm | weight of meat | Input |
|  | Viscera weight | Continuous | mm | Gut-weight (after bleeding) | Input |
|  | Shell weight | Continuous | mm | after being dried | Input |
|  | Rings | Continuous |  | +1.5 gives the age in years | Output |

Table 1. content of dataset

# 5 Methods

We have used different Classification algorithms such as K-nearest neighbors, Random Forest Classifier, and Support vector machine to implement this prediction system. In KNN some prior data (also called training data) classifies coordinates identified by an attribute. Now given another set of data points also called testing data, allocate these points to a group by analyzing the training set. Then an unclassified point is assigned to a group by observing what group its nearest neighbors belong to.

In Random Forest it selects data points from a training set and each data point is given a decision tree. Then each decision tree produces a prediction result, and then on a majority basis, the random Forest Classifier predicts the final decision.

On the other hand, it performs internal testing on 2/3rd of the available training data to assess the accuracy of the model.

MLPClassifier stands for Multi-layer Perceptron classifier which in the name itself connects to a Neural Network. Unlike other classification algorithms such as Support Vectors or Naive Bayes Classifier, MLPClassifier relies on an underlying Neural Network to perform the task of classification.

# 6 Result

i) Using KNN when we trained our model, and I get the accuracy of 80% of accuracy

ii) While training our model using Random Forest, i get the root mean square error of 4% means I get the accuracy of 96% accuracy

iii) While training our model using Support using MLP classifier, we get the accuracy of 82%.