



How to Model in Zoology: Basic Concepts and Explanations

Peiro IG*

Department of Ecology & Hydrology, University of Murcia, Spain

*Corresponding author: Ignacio Garcia Peiro, Department of Ecology & Hydrology, University of Murcia, Spain, Email: ignacio.peiro@yahoo.es

Short Communication

Volume 7 Issue 1

Received Date: January 22, 2024

Published Date: February 07, 2024

DOI: 10.23880/izab-16000556

Abstract

The information criteria used for biologists-zoologists when comparing statistical models are summarized. The three criteria summarizes the quality (Akaike Information Criterion, AIC), complexity (Bayesian Information Criterion, BIC) and finally the reliability, fiability or accuracy (Deviance Information Criterion, DIC) of a model.

Keywords: Akaike's Information Criteria; Bayesian Information Criteria; Deviance Information Criteria

Abbreviations: AIC: Akaike Information Criterion; BIC: Bayesian Information Criterion; DIC: Deviance Information Criterion.

Introduction

When a biologist-zoologist tries to compare models he/she needs to know the primers of information criteria, in order to select the best model. They are numerical indicators resulting from complex mathematical equations that inform us of the trade-off between the complexity and predictive capacity of the model. A complex model is one that contains more variables and more interrelationships between variables. In other words, the more complex the model, the less generalizable it is and the less predictive it is. If a model is simple, it only includes the most important components in the system or equation, i.e. it will be able to predict a greater number of scenarios, so a model that explains the maximum with the least number of variables is considered parsimonious.

Methods

For this purpose, statisticians offer us the three most important model's criteria for modeling the Akaike's

Information Criteria (AIC [1]), the Bayesian Information Criteria (BIC [2]) and the Deviance Information Criteria (DIC [3]).

Discussion

Which is the information that they measure? The AIC selects the model that best makes small-scale predictions within the data. In short, it measures the quality of the model. The lower the AIC value, the higher the quality of the model and the more pragmatic it is, making predictions in greater detail. The BAIC selects the most abstract model, which makes predictions in less detail. In short, it measures the complexity of the model. When a model has a large BIC value, it is more abstract, makes predictions in less detail, in short, it is less pragmatic. Finally, the DIC is the summary of the earliest measures and points to the model's likelihood. The higher the DIC, the more value of the model is and the more explanatory power it has, more accurate. It is similar to the determination coefficient (r^2) used in simple linear regressions. The best criteria index used when we try to select a model is the AIC.

References

1. Akaike H (1974) A new look at the statistical identification. IEEE Transactions on Automatic Control 19(6): 716-723.
2. Schwarz G (1978) Estimating the Dimension of a Model. The Annals of Statistics 6(2): 461-464.
3. Spiegelhalter D, Thomas A, Best N, Gilks W (1996) BUGS 0.5: Bayesian inference using Gibbs sampling manual (version ii). MRC Biostatistics Unit, Institute of Public Health, Cambridge, USA, pp: 1-59.

