Package ‘BaSkePro’

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Type Package

Title Bayesian Model to Archaeological Faunal Skeletal Profiles

Version 1.1.1

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Description Tool to perform Bayesian inference of carcass processing/transport strategy and bone attrition from archaeofaunal skeletal profiles characterized by percentages of MAU (Minimum Anatomical Units). The approach is based on a generative model for skeletal profiles that replicates the two phases of formation of any faunal assemblage: initial accumulation as a function of human transport strategies and subsequent attrition.Two parameters define this model: 1) the transport preference (alpha), which can take any value between -1 (mostly axial contribution) and 1 (mostly appendicular contribution) following strategies constructed as a function of butchering efficiency of different anatomical elements and the results of ethnographic studies, and 2) degree of attrition (beta), which can vary between 0 (no attrition) and 10 (maximum attrition) and relates the survivorship of bone elements to their maximum bone density. Starting from uniform prior probability distribution functions of alpha and beta, a Monte Carlo Markov Chain sampling based on a random walk Metropolis-Hasting algorithm is adopted to derive the posterior probability distribution functions, which are then available for interpretation. During this process, the likelihood of obtaining the observed percentages of MAU given a pair of parameter values is estimated by the inverse of the Chi2 statistic, multiplied by the proportion of elements within a 1 percent of the observed value. See Ana B. Marin-Arroyo, David Ocio (2018).<doi:10.1080/08912963.2017.1336620>.

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`BaSkePro` *Bayesian Model to Archaeological Faunal Skeletal Profiles*

Description

Tool to perform Bayesian inference of carcass processing/transport strategy and bone attrition from archaeological faunal skeletal profiles characterized by percentages of MAU (Minimum Anatomical Units). The approach is based on a generative model for skeletal profiles that replicates the two phases of formation of any archaeofaunal assemblage: initial accumulation as a function of human transport strategies and subsequent attrition.

Usage

```
BaSkePro(x)
```

Arguments

`x`	A data frame object with the MAU (Minimum Anatomical Unit) percentage of one species in this specific order: Mandible, Atlas, Axis, Cervical vertebra, Thoracic vertebra, Lumbar vertebra, Rib, Sacrum, Scapula, Humerus, Radius (or radio-ulna), Metacarpal, Pelvis, Femur, Tibia, Metatarsal.

Details

Two parameters define this model: 1) the transport preference (alpha), which can take any value between - 1 (mostly axial contribution) and 1 (mostly appendicular contribution) following strategies constructed as a function of butchering efficiency of different anatomical elements and the results of ethnographic studies, and 2) degree of attrition (beta), which can vary between 0 (no attrition) and 10 (maximum attrition) and relates the survivorship of bone elements to their maximum bone density. Starting from uniform prior probability distribution functions of alpha and beta, a Monte Carlo Markov Chain sampling based on a random walk Metropolis-Hasting algorithm is adopted to derive the posterior probability distribution functions, which are then available for interpretation. During this process, the likelihood of obtaining the observed percentages of MAU given a pair of parameter values is estimated by the inverse of the Chi2 statistic, multiplied by the proportion of elements within a 1 percent of the observed value.

Value

A table and histograms with posterior probability distribution functions of alpha and beta parameters (the first and fourth quartiles).

Author(s)

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References

Marín-Arroyo, A. B., & Ocio, D. (2018). Disentangling faunal skeletal profiles. A new probabilistic framework. Historical Biology, 30(6), 720-729. DOI:https://doi.org/10.1080/08912963.2017.1336620

Examples

```
PMAU <- as.data.frame(c(7,0,0,0,0,0,0,0,0,36,14,0,71,71,57,100))

BaSkePro (PMAU)
```

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