

Package: birthdayproblem (via r-universe)

September 15, 2024

Title Functionality for handling the birthday problem with unequal probabilities

Version 0.0.0.9000

Description The package contains a simple function for computing the probability that in a group of n people, with ppl originating from one of N classes, that two or more people in the group are of the same class.

Imports Rcpp

Depends R ($\geq 3.3.2$)

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Repository <https://mhoehle.r-universe.dev>

RemoteUrl <https://github.com/mhoehle/birthdayproblem>

RemoteRef HEAD

RemoteSha 1335a33012925f293943664d1037ecd514ed92ad

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pbirthday_up	<i>Variant of pbirthday, which handles unequal occurrence probabilities</i>
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Description

This function calculates the probability for at least one collision in a set of n individuals sampled iid. from a vector of length N with occurrence probabilities as given by the vector p . This is an instance of the birthday problem with unequal occurrence probabilities.

Usage

```
pbirthday_up(n, prob, method = c("R", "Rcpp", "mase1992"))
```

Arguments

n	Size of the set
prob	Vector containing the occurrence probabilities. The length of prob determines N.
method	A string describing which computational method to use. "R" (the default) works in acceptable time up to n's of about 30. The "Rcpp" options works for larger n of moderate size, e.g., n=60 takes about 3 minutes. For larger n or faster computation one can use the "mase1992" approximation, which is surprisingly accurate.

Value

A list containing the following elements:

prob (numeric) The probability for at least one collision

tList A matrix containing all compositions of singletons, doubletons, each row has the property $\text{sum}(\text{row} * 1:n) == n$.

...

References

Mase, S. 1992. "Approximations to the Birthday Problem with Unequal Occurrence Probabilities and Their Application to the Surname Problem in Japan." Ann. Inst. Stat. Math. 44 (3): 479–99. http://www.ism.ac.jp/editsec/aism/pdf/044_3_0479.pdf.

Höhle, M., Happy pbirthday class of 2016, <http://staff.math.su.se/hoehle/blog/2017/02/13/bday.html>.

Höhle, M., US Babynames Collisions 1880-2014, <http://staff.math.su.se/hoehle/blog/2017/03/01/morebabynames.html>.

Examples

```
pbirthday(n=26, classes=365, coincident=2)
pbirthday_up(n=26L, prob=rep(1/365,365), method="R")$prob
pbirthday_up(n=26L, prob=rep(1/365,365), method="Rcpp")$prob
```

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