

# Package ‘funIHC’

January 9, 2026

**Type** Package

**Title** Functional Iterative Hierarchical Clustering

**Version** 0.1.0

**Description** Functional clustering aims to group curves exhibiting similar temporal behaviour and to obtain representative curves summarising the typical dynamics within each cluster. A key challenge in this setting is class imbalance, where some clusters contain substantially more curves than others, which can adversely affect clustering performance. While class imbalance has been extensively studied in supervised classification, it has received comparatively little attention in unsupervised clustering. This package implements functional iterative hierarchical clustering ('funIHC'), an adaptation of the iterative hierarchical clustering method originally developed for multivariate data, to the functional data setting. For further details, please see Higgins and Carey (2024) <[doi:10.1007/s11634-024-00611-8](https://doi.org/10.1007/s11634-024-00611-8)>.

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**Encoding** UTF-8

**Depends** R (>= 4.0.0)

**Imports** fda, stats, cluster, mclust

**Suggests** testthat (>= 3.0.0), knitr, rmarkdown, covr

**RoxygenNote** 7.3.3

**Config/testthat.edition** 3

**VignetteBuilder** knitr

**NeedsCompilation** no

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**Repository** CRAN

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## Contents

|              |   |
|--------------|---|
| funIHC       | 2 |
| <b>Index</b> | 3 |

**Description**

Performs Functional Iterative Hierarchical Clustering (funIHC) as described in the paper: Higgins, C., Carey, M. Addressing class imbalance in functional data clustering. *Adv Data Anal Classif* (2024). <https://doi.org/10.1007/s11634-024-00611-8>

**Usage**

```
funIHC(x, Data, type = 0)
```

**Arguments**

|      |  |
|------|--|
| x    | Numeric vector of time points.   |
| Data | Numeric matrix with rows corresponding to time points and columns to individual curves.                |
| type | Integer specifying representation: 0 = curves (default), 1 = first derivative, 2 = basis coefficients. |

**Value**

A list containing:

|                   |                                   |
|-------------------|-----------------------------------|
| label             | Integer vector of cluster labels. |
| clusters          | Clustered observations.           |
| fd                | Functional data object.           |
| mean_clusters_mat | Cluster means.                    |

**Examples**

```
## Load example data within the package
rds_path <- system.file("extdata", "U1505.rds", package = "funIHC")
example_data <- readRDS(rds_path)

## Extract curves
Data <- example_data$Data
Data <- t(Data)
x = 1:15 #number of time points

## Run functional iterative hierarchical clustering
res <- funIHC(x, Data)

## Inspect cluster assignments
table(res$label)
```

# Index

funIHC, [2](#)