

# > De la nécessité d'un code structuré au package R

`packageR::packing()`

Louis Héraut

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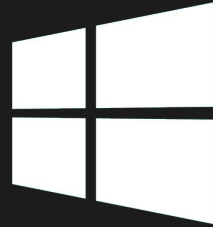
🐙 [github.com/super-lou](https://github.com/super-lou)

Pourquoi\* ?

# Pourquoi\* ?

\*est ce que l'on passe notre temps sur des ordinateurs à chercher des choses visuellement à la main dans nos dossiers parmi des centaines de fichiers mal rangés alors que les ordinateurs ont été spécifiquement créé pour ça

Parce que



C'est quoi le rapport ?  
**On ne prend pas le temps d'apprendre**

# POURQUOI OUI

## Technique

- La meilleure façon de **distribuer** du code (et que les autres l'utilise)
- Se forcer à rendre un code **fonctionnel**
- Arrêter de **dupliquer ses erreurs** avec les copies du code
- **Gagner du temps** et arrêter de **refaire** ce que son voisin a déjà fait

## Scientifique

- Garder une **trace pérenne** de son **propre** code (documentation)
  - **Léguer** du code qui ne sera pas perdu
  - **Distribuer** du code avec un **papier** (réduire la crise de la reproductibilité)
- 
- c'est sexy de dire qu'on a un package ...

# POURQUOI NON

# Technique

- Ça prend un peu de temps au début
- C'est difficile d'être développeur et utilisateur d'un package
- Ça fait peur



Hadley Wickham

Twitter

GitHub

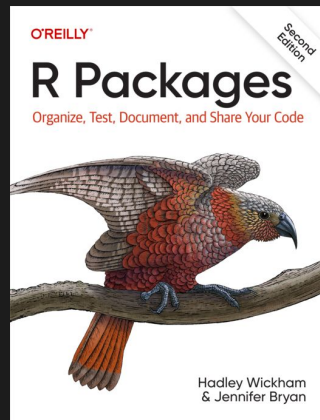
Email

Hi! I'm Hadley Wickham, Chief Scientist at [RStudio](#), and an Adjunct Professor of Statistics at the University of Auckland, Stanford University, and Rice University. I build tools (computational and cognitive) that make data science easier, faster, and more fun. I'm from New Zealand but I currently live in Houston, TX with my husband and dogs.

If you'd like to learn more about what I do, and how to use R effectively, you might enjoy one of my books (which are all free to read on the web):

- **R for Data Science**, with Garrett Golemund, is the place to start if you want to learn how to do data science with R.
- **ggplot2: elegant graphics for data analysis** shows you how to use ggplot2 to create graphics that help you understand your data.
- **Advanced R** helps you master R as a programming language, teaching you what makes R tick.
- **R packages** teaches good software engineering practices for R, using packages for bundling, documenting, and testing your code.

Outside of work, I love to **bake** and make **cocktails**. My sister **Charlotte** is a Assistant Professor of Statistics at Oregon State University.



## “R Packages” by Hadley Wickham and Jennifer Bryan

## Sommaire de la doc R

Les packages R peuvent être **volumineux et importants**, mais cela ne devrait pas vous décourager. Je ne peux pas trop insister là-dessus : **regrouper quelques fonctions R** au sein d'un package facilitera grandement leur utilisation régulière. **Vous n'avez pas besoin de distribuer le package à quiconque.**

ChatGPT



Les packages R peuvent être **volumineux et importants**, mais cela ne devrait pas vous décourager. Je ne peux pas trop insister là-dessus : **regrouper quelques fonctions R** au sein d'un package facilitera grandement leur utilisation régulière. **Vous n'avez pas besoin de distribuer le package à quiconque.**

Karl Broman  
Department of Biostatistics & Medical Informatics  
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1300 University Avenue  
Madison, Wisconsin 53706  
USA



Email: [broman@wisc.edu](mailto:broman@wisc.edu)

[https://kbroman.org/pkg\\_primer/](https://kbroman.org/pkg_primer/)

# 1. C'EST QUOI UN PACKAGE

```
> library(CheshiRCat)
```

## Une structure *nécessaire*

```
CheshiRCat
├── DESCRIPTION
├── R
│   └── smile.R
```

## Un formatage *nécessaire*

### DESCRIPTION

```
Package: CheshiRCat
Version: 0.0.1
```

### R/smile.R

```
smile = function (teeth) {
  return (teeth + 1)
}
```

## 2.1. C'EST QUOI UN PACKAGE (vraiment)

Un peu plus de **DESCRIPTION** *nécessaire*

### DESCRIPTION

```
Package: CheshiRCat
```

```
Version: 0.0.1
```

```
Date: 1865-11-01
```

```
Title: CheshiRCat
```

```
Description: Twas brillig, and the slithy toves.
```

```
    Did gyre and gimble in the wabe; All mimsy were  
    the borogoves, And the mome raths outgrabe.
```

```
Author: Alice <alice@wonderland.uk>
```

```
Maintainer: Alice <alice@wonderland.uk>
```

## 2.2. C'EST QUOI UN PACKAGE (vraiment)

**Un fichier NAMESPACE** *nécessaire*

**NAMESPACE**

```
| export(smile) # Déclarer les fonctions  
# disponibles à l'utilisateur
```

**Une documentation de fonction** *recommandée*

**man/smile.Rd**

```
| \name{smile}  
| \alias{smile}  
| \title{smile}  
| \usage{  
| smile(teeth)  
| }  
| ...
```

```
CheshiRCat  
├── DESCRIPTION  
├── man  
│   └── smile.Rd  
└── R  
    └── smile.R
```

## 2.3. C'EST QUOI UN PACKAGE (vraiment)

**Un fichier de licence** *(fortement) recommandé*

### LICENSE

```
GNU GENERAL PUBLIC LICENSE
Version 3, 29 June 2007
```

```
Copyright (C) 2007 Free Software Foundation, Inc. <https://fsf.org/>
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.
```

```
Preamble
```

```
...
```



Licence ouverte

<https://code.gouv.fr/fr/>

<https://www.etalab.gouv.fr/partenariat-pour-un-gouvernement-ouvert-quels-engagements-autour-des-logiciels-libres/>

Choisissez une licence (cohérente) même **n'importe laquelle** → avoir un message clair

<https://blog.codinghorror.com/pick-a-license-any-license/>

### 3. COMMENT DISTRIBUER SON PACKAGE (même à soi-même)

**Le dépôt officiel R** *très compliqué*



Comprehensive R Archive Network (CRAN)

<https://cran.r-project.org/>

```
> install.packages( "CheshiRCat" )
```

**Le dépôt Git** *accessible et souhaitable*



# GitHub (grande visibilité)

<https://github.com/>

```
> remotes::install_github( "alice_adventures/CheshiRCat" )
```



# Forge INRA(E) actuelle basée sur GitLab (solution institutionnelle)

<https://forgemia.inra.fr/>

```
> remotes::install_gitlab( "alice_adventures/CheshiRCat" )
```

C'est gentil mais ça fait beaucoup de chose

# packageR

Lifecycle

Stable

last commit

today

Contributor Covenant

2.1



A simple R package that help to create simple R package.

This project was carried out for National Research Institute for Agriculture, Food and the Environment (Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, [INRAE](#) in french).

[github.com/super-lou/packageR](https://github.com/super-lou/packageR)



## Installation

```
> remotes::install_github( "super-lou/packageR" )
```

## Aide

```
> ?packageR::packing
```

## Fichiers de départ

Ensemble de fichier .R ne contenant **que** des fonctions

# Commentaires **OK**

# Ligne de code hors fonction **PAS OK**

# `library` ou `source` **PAS OK**

## Exécution

```
> packageR::packing(
  package_path = "alice",
  Rfile_pattern = ".*[.]R$",
  name = "CheshiRCat",
  date = "1865-11-01",
  description =
    "Twas brillig, and the slithy toves. Did gyre and gimble in the wabe;
    All mimsy were the borogoves, And the mome raths outgrabe.",
  documentation =
    "Beware the [*Jabberwock*] (https://en.wikipedia.org/wiki/Jabberwocky),
    my son! The jaws that bite, the claws that catch!</br> Beware the *Jubjub
    bird*, and shun The frumious *Bandersnatch*!</br> He took his **vorpalsword** in hand:</br></br> - Long time the manxome foe he sought </br> - So
    rested he by the Tumtum tree, And stood awhile in thought.</br></br> And as
    in uffish thought he stood `?CheshiRCat::smile`",
  author = "Alice",
  email = "alice@wonderland.uk",
  imports = c("forcats", "pillar"),
  git_install = "remotes::install_github('alice_adventures/CheshiRCat')",
  figure_path = NULL,
  lifecycle = "Dormant",
  add_file = c("CODE_OF_CONDUCT.md", "LICENSE", "Makefile", "README.md")
)
```

## Exécution

```
> packageR::packing( # fonction de création de package à partir de fichiers R
  package_path = "alice",
  Rfile_pattern = ".*[.]R$",
  name = "CheshiRCat",
  date = "1865-11-01",
  description =
    "Twas brillig, and the slithy toves. Did gyre and gimble in the wabe;
    All mimsy were the borogoves, And the mome raths outgrabe."
  documentation =
    "Beware the [*Jabberwock*] (https://en.wikipedia.org/wiki/Jabberwocky),
    my son! The jaws that bite, the claws that catch!</br> Beware the *Jubjub
    bird*, and shun The frumious *Bandersnatch*!</br> He took his **vorpals
    sword** in hand:</br></br> - Long time the manxome foe he sought </br> - So
    rested he by the Tumtum tree, And stood awhile in thought.</br></br> And as
    in uffish thought he stood `?CheshiRCat::smile`"
  author = "Alice",
  email = "alice@wonderland.uk",
  imports = c("forcats", "pillar"),
  git_install = "remotes::install_github('alice_adventures/CheshiRCat')",
  figure_path = NULL,
  lifecycle = "Dormant",
  add_file = c("CODE_OF_CONDUCT.md", "LICENSE", "Makefile", "README.md")
)
```























## Exécution

```
> packageR::packing(
  package_path = "alice",
  Rfile_pattern = ".*[.]R$",
  name = "CheshiRCat",
  date = "1865-11-01",
  description =
    "Twas brillig, and the slithy toves. Did gyre and gimble in the wabe;
    All mimsy were the borogoves, And the mome raths outgrabe.",
  documentation =
    "Beware the [*Jabberwock*] (https://en.wikipedia.org/wiki/Jabberwocky),
    my son! The jaws that bite, the claws that catch!</br> Beware the *Jubjub
    bird*, and shun The frumious *Bandersnatch*!</br> He took his **vorpals
    sword** in hand:</br></br> - Long time the manxome foe he sought </br> - So
    rested he by the Tumtum tree, And stood awhile in thought.</br></br> And as
    in uffish thought he stood `?CheshiRCat::smile`",
  author = "Alice",
  email = "alice@wonderland.uk",
  imports = c("forcats", "pillar"),
  git_install = "remotes::install_github('alice_adventures/CheshiRCat')",
  figure_path = NULL, # chemin vers la figure d'illustration du package
  lifecycle = "Dormant",
  add_file = c("CODE_OF_CONDUCT.md", "LICENSE", "Makefile", "README.md")
)
```



## Exécution

```
> packageR::packing(
  package_path = "alice",
  Rfile_pattern = ".*[.]R$",
  name = "CheshiRCat",
  date = "1865-11-01",
  description =
    "Twas brillig, and the slithy toves. Did gyre and gimble in the wabe;
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  documentation =
    "Beware the [*Jabberwock*] (https://en.wikipedia.org/wiki/Jabberwocky),
    my son! The jaws that bite, the claws that catch!</br> Beware the *Jubjub
    bird*, and shun The frumious *Bandersnatch*!</br> He took his **vorpalsword** in hand:</br></br> - Long time the manxome foe he sought </br> - So
    rested he by the Tumtum tree, And stood awhile in thought.</br></br> And as
    in uffish thought he stood `?CheshiRCat::smile`";
  author = "Alice",
  email = "alice@wonderland.uk",
  imports = c("forcats", "pillar"),
  git_install = "remotes::install_github('alice_adventures/CheshiRCat')",
  figure_path = NULL,
  lifecycle = "Dormant",
  add_file = c("CODE_OF_CONDUCT.md", "LICENSE", "Makefile", "README.md")
) # fichiers à ajouter recommandés mais non nécessaires au package
```



alice  
└─ smile.R

→

alice  
├─ smile.R  
└─ CheshiRCat  
    ├─ CODE\_OF\_CONDUCT.md  
    ├─ DESCRIPTION  
    ├─ LICENSE  
    ├─ Makefile  
    ├─ NAMESPACE  
    ├─ README.md  
    ├─ man  
    │   └─ smile.Rd  
    └─ R  
        └─ smile.R

alice  
└─ smile.R



alice  
├─ smile.R  
└─ CheshiRCat  
    ├─ CODE\_OF\_CONDUCT.md  
    ├─ **DESCRIPTION**  
    ├─ LICENSE  
    ├─ Makefile  
    ├─ NAMESPACE  
    ├─ README.md  
    ├─ man  
        └─ smile.Rd  
    └─ R  
        └─ smile.R

## DESCRIPTION

```
Package: CheshiRCat
Version: 0.0.1
Date: 1865-11-01
Title: CheshiRCat
Description: Twas brillig, and the slithy toves.
             Did gyre and gimble in the wabe; All mimsy were
             the borogoves, And the mome raths outgrabe.
Authors@R: c(
  person(given = "Alice",
         family = "Alice",
         role = c("cre", "aut"),
         email = "alice@wonderland.uk")
)
Encoding: UTF-8
License: GPL-3 + file LICENSE
Imports:
  forcats,
  pillar
RoxygenNote: 7.2.3
```

alice  
└─ smile.R



alice  
├─ smile.R  
└─ CheshiRCat  
    ├─ CODE\_OF\_CONDUCT.md  
    ├─ DESCRIPTION  
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    ├─ NAMESPACE  
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    └─ R  
        └─ smile.R

alice  
└─ smile.R

→

alice  
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    ├─ README.md  
    ├─ man  
    │   └─ smile.Rd  
    └─ R  
        └─ smile.R

## LICENSE

### GNU GENERAL PUBLIC LICENSE Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <<https://fsf.org/>>  
Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

Preamble

...

alice  
└─ smile.R

→

alice  
├─ smile.R  
└─ CheshiRCat  
    ├─ CODE\_OF\_CONDUCT.md  
    ├─ DESCRIPTION  
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    └─ R  
        └─ smile.R

alice  
└─ smile.R



alice  
├─ smile.R  
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    ├─ man  
    │   └─ smile.Rd  
    └─ R  
        └─ smile.R



## CODE\_OF\_CONDUCT.md

### # Contributor Code of Conduct

As contributors and maintainers of this project, we pledge to respect all people who contribute through reporting issues, posting feature requests, updating documentation, submitting pull requests or patches, and other activities.

We are committed to making participation in this project a harassment-free experience for everyone, regardless of level of experience, gender, gender identity and expression, sexual orientation, disability, personal appearance, body size, race, ethnicity, age, or religion.

Examples of unacceptable behavior by participants include the use of sexual language or imagery, derogatory comments or personal attacks, trolling, public or private harassment, insults, or other unprofessional conduct.

Project maintainers have the right and responsibility to remove, edit, or reject comments, commits, code, wiki edits, issues, and other contributions that are not aligned to this Code of Conduct. Project maintainers who do not follow the Code of Conduct may be removed from the project team.

Instances of abusive, harassing, or otherwise unacceptable behavior may be reported by opening an issue or contacting one or more of the project maintainers.

This Code of Conduct is adapted from the Contributor Covenant (<https://www.contributor-covenant.org>), version 1.0.0, available at <https://contributor-covenant.org/version/1/0/0/>.

alice  
└─ smile.R



alice  
├─ smile.R  
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    ├─ man  
        └─ smile.Rd  
    └─ R  
        └─ smile.R

## README.md

```
# CheshiRCat [] (https://www.inrae.fr/en)
```

```
<!-- badges: start -->
```

```
[[Lifecycle:Dormant] (https://img.shields.io/badge/Lifecycle-Dormant-ff7f2a)] (<Redirect-URL>)
```

```

```

```
[[Contributor Covenant] (https://img.shields.io/badge/Contributor%20Covenant-2.1-4baaaa.svg)]
(code_of_conduct.md)
```

```
<!-- badges: end -->
```

Twas brillig, and the slithy toves. Did gyre and gimble in the wabe; All mimsy were the borogoves, And the mome raths outgrabe.

This project was carried out for National Research Institute for Agriculture, Food and the Environment (Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, [INRAE] (<https://agriculture.gouv.fr/inrae-linstitut-national-de-recherche-pour-lagriculture-lalimentation-et-lenvironnement>) in french).

### ## Installation

For latest development version

```
` `` r
```

```
remotes::install_github('alice_adventures/CheshiRCat')
```

```
` ``
```

```
...
```

alice  
└─ smile.R

→

alice  
├─ smile.R  
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    ├─ CODE\_OF\_CONDUCT.md  
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    ├─ man  
    │   └─ smile.Rd  
    └─ R  
        └─ smile.R

## smile.R

introduction de la  
**LICENSE GPLv3**

documentation au  
format **roxygen2**

les fonctions R

```
# Copyright 1865 Alice (alice@wonderland.uk)*1
#
# *1    INRAE, France
#
# This file is part of CheshiRCat R package.
#
# CheshiRCat R package is free software: you can redistribute it and/or
# modify it under the terms of the GNU General Public License as
# published by the Free Software Foundation, either version 3 of the
# License, or (at your option) any later version.
#
# CheshiRCat R package is distributed in the hope that it will be useful, but
# WITHOUT ANY WARRANTY; without even the implied warranty of
# MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the GNU
# General Public License for more details.
#
# You should have received a copy of the GNU General Public License
# along with CheshiRCat R package.
# If not, see <https://www.gnu.org/licenses/>.

#' @title smile
#' @description ...
#' @param teeth ...
#' @return ...
#' @examples
#' ...
#' @export
#' @md
smile = function (teeth) {
  return (teeth + 1)
}
```



défini si la fonction en  
question est disponible à  
l'utilisateur du package

→ gère **NAMESPACE**  
et **man/smile.Rd**

alice  
└─ smile.R



alice  
├─ smile.R  
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    └─ R  
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alice  
└─ smile.R



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alice  
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    ├─ NAMESPACE  
    ├─ README.md  
    ├─ man  
    │   └─ smile.Rd  
    └─ R  
        └─ smile.R

## Makefile

```
all: doc
.PHONY: doc install check

doc:
    R -e 'devtools::document()'

install:
    R -e "remotes::install_github('alice_adventures/CheshiRCat')"

check:
    R -e 'devtools::check()'
```

## Côté développeur - mise en forme du package

```
alice@wonderland:~$ Rscript -e "packageR::packing(...)"
alice@wonderland:~$ cd alice/CheshiRCat/
```

\*\*\* remplir la documentation des fonctions, modifier le README.md, vérifier DESCRIPTION \*\*\*

```
alice@wonderland:~/alice/CheshiRCat$ make doc
alice@wonderland:~/alice/CheshiRCat$ git init
alice@wonderland:~/alice/CheshiRCat$ git add .
alice@wonderland:~/alice/CheshiRCat$ git commit -am "initialisation"
alice@wonderland:~/alice/CheshiRCat$ git branch -M main
```

\*\*\* créer un nouveau répertoire GitHub ou GitLab (sur internet) et copier coller le lien SSH du repo \*\*\*

```
alice@wonderland:~/alice/CheshiRCat$ git remote add origin
git@github.com:alice_adventures/CheshiRCat.git
alice@wonderland:~/alice/CheshiRCat$ git push -u origin main
alice@wonderland:~/alice/CheshiRCat$ make install
```

## Côté développeur - mise à jour du package

```
alice@wonderland:~/alice/CheshiRCat$ make doc
alice@wonderland:~/alice/CheshiRCat$ git add run.R
alice@wonderland:~/alice/CheshiRCat$ git commit -am "add run function"
alice@wonderland:~/alice/CheshiRCat$ git push
```

\*\*\* si vous vous sentez aventureux, se vous pouvez "checker" votre package R (première étape pour CRAN) \*\*\*

```
alice@wonderland:~/alice/CheshiRCat$ make check
```

## Côté utilisateur - installation et utilisation du package

```
alice@wonderland:~$ R
```

```
> remotes::install_github('alice_adventures/CheshiRCat')
```

```
> library(CheshiRCat)
```

```
> smile(1)
```

```
[1] 2
```