

Package: cfb4th (via r-universe)

October 18, 2026

Type Package

Title Optimal Fourth Down Decisions in College Football

Version 0.2.0

Description Estimate the outcomes of fourth down plays in National Collegiate Athletic Association (NCAA) football and compare the win probability of going for it, attempting a field goal and punting. Each option is scored with expected points, field goal, fourth down conversion and win probability models fitted on 'cfbfastR' play-by-play data, following the approach of 'nfl4th' for the National Football League. Fourth down plays from a single game can be pulled from 'ESPN' and prepared for scoring, and whole seasons of 'cfbfastR' play-by-play can be loaded with the decision columns added.

License MIT + file LICENSE

URL <https://cfb4th.sportsdataverse.org/>,
<https://github.com/sportsdataverse/cfb4th>

BugReports <https://github.com/sportsdataverse/cfb4th/issues>

Depends R (>= 4.1.0)

Imports cfbfastR (>= 1.4.0), dplyr, glue, httr, janitor, jsonlite, magrittr, mgcv, nnet, purrr, stringr, tibble, tidyr, tools, xgboost (>= 2.0.0)

Suggests future, gt, rmarkdown, testthat (>= 3.0.0), tictoc, tidyselect, tidyverse

Config/testthat/edition 3

Encoding UTF-8

Language en-US

LazyData true

Roxygen list(markdown = TRUE)

Config/roxygen2/version 8.1.0

Config/pak/sysreqs cmake make libicu-dev libssl-dev

Repository <https://sportsdataverse.r-universe.dev>
Date/Publication 2026-10-18 11:41:04 UTC
RemoteUrl <https://github.com/sportsdataverse/cfb4th>
RemoteRef HEAD
RemoteSha f20088eacb8bf68750f454d1e272a62f614ae1fc

Contents

add_4th_probs	2
cfb4th_clear_cache	3
get_4th_plays	4
load_4th_pbp	5
make_table_data	6
Index	8

add_4th_probs	<i>Get 4th down decision probabilities</i>
---------------	--

Description

Get various probabilities associated with each option on 4th downs (go for it, kick field goal, punt).

Usage

add_4th_probs(df)

Arguments

df A data frame of decisions to be computed for.

Value

- The input data frame with the following columns added:
- go_boost** Gain (or loss) in win prob associated with choosing to go for it (percentage points).
 - first_down_prob** Probability of earning a first down if going for it on 4th down.
 - wp_fail** Win probability in the event of a failed 4th down attempt.
 - wp_succeed** Win probability in the event of a successful 4th down attempt.
 - go_wp** Average win probability when going for it on 4th down.
 - fg_make_prob** Probability of making field goal.
 - miss_fg_wp** Win probability in the event of a missed field goal.
 - make_fg_wp** Win probability in the event of a made field goal.
 - fg_wp** Average win probability when attempting field goal.
 - punt_wp** Average win probability when punting.

Examples

```

play <-
  tibble::tibble(
    # Game Info
    home = "Utah",
    away = "BYU",
    pos_team = "Utah",
    def_pos_team = "BYU",
    spread = -7,
    over_under = 55,

    # Situation Info
    half = 2,
    period = 3, # Quarter
    TimeSecsRem = 900, # Half Seconds Remaining
    adj_TimeSecsRem = 900, # Game Seconds Remaining
    down = 4,
    distance = 4,
    yards_to_goal = 40,
    pos_score_diff_start = 7,

    pos_team_receives_2H_kickoff = 1,
    pos_team_timeouts_rem_before = 3,
    def_pos_team_timeouts_rem_before = 3

  )

# the fourth-down and win-probability models are downloaded the first time
# they are needed; try() keeps the example from failing without network
try(cfb4th::add_4th_probs(play))

```

cfb4th_clear_cache	<i>Reset the cfb4th model cache</i>
--------------------	-------------------------------------

Description

The fourth-down conversion and win-probability models are downloaded the first time they are needed and cached under `tools::R_user_dir("cfb4th", "cache")`. Clear the cache to force a fresh download, for example after a model update.

Usage

```
cfb4th_clear_cache(type = c("all", "fd_model", "wp_model"))
```

Arguments

`type` One of "all" (the default), "fd_model" or "wp_model".

Value

Returns TRUE invisibly once the cache has been cleared.

Examples

```
cfb4th_clear_cache()
```

```
get_4th_plays
```

```
Get 4th down plays from a game
```

Description

Get 4th down plays from a game.

Usage

```
get_4th_plays(df)
```

Arguments

`df` A data frame of a game to get 4th down decisions of.

Details

Obtains a data frame that can be used with `add_4th_probs()`. The following columns must be present:

- `game_id` : ESPN game ID from ESPN or `cfbfastR` (e.g. '401114223')
- `home_team` : Name of the home team
- `away_team` : Name of the away team

Value

A data frame of the game's fourth down plays, one row per play (the input data frame is only used to identify the game), with the columns:

desc Play description from ESPN.

type_text Play type text from ESPN.

index Index number of play from a given game. Useful for tracking plays (e.g. for 4th down bot).

The rest All the columns needed for `add_4th_probs()`.

Examples

```
## Not run:

game <- cfbfastR::cfbd_game_info(2019, team = "Utah", week = 3)
plays <- cfb4th::get_4th_plays(game)

dplyr::glimpse(plays)

## End(Not run)
```

load_4th_pbp

Load calculated 4th down probabilities from cfbfastR data

Description

Load calculated 4th down probabilities from cfbfastR data.

Usage

```
load_4th_pbp(seasons)
```

Arguments

seasons Seasons to load. Must be 2014 and later.

Value

cfbfastR data on 4th downs with the add_4th_probs() columns added and also the following:

go 100 if a team went for it on 4th down, 0 otherwise. It's 100 and 0 as a convenience for obtaining percent of times going for it.

Examples

```
## Not run:
  cfb4th::load_4th_pbp(2020)

## End(Not run)
```

make_table_data

Get 4th down decision probabilities

Description

Get a table with the probabilities on 4th down.

Usage

```
make_table_data(df)
```

Arguments

df A data frame consisting of one play that has had `add_4th_probs()` already run on it.

Value

A table showing the probabilities associated with each possible choice.

Examples

```
play <-
  tibble::tibble(
    # Game Info
    home = "Utah",
    away = "BYU",
    pos_team = "Utah",
    def_pos_team = "BYU",
    spread = -7,
    over_under = 55,

    # Situation Info
    half = 2,
    period = 3, # Quarter
    TimeSecsRem = 900, # Half Seconds Remaining
    adj_TimeSecsRem = 900, # Game Seconds Remaining
    down = 4,
    distance = 4,
    yards_to_goal = 40,
    pos_score_diff_start = 7,

    pos_team_receives_2H_kickoff = 1,
    pos_team_timeouts_rem_before = 3,
    def_pos_team_timeouts_rem_before = 3

  )

# the fourth-down and win-probability models are downloaded the first time
# they are needed; try() keeps the example from failing without network
```

```
try({  
  probs <- cfb4th::add_4th_probs(play)  
  cfb4th::make_table_data(probs)  
})
```

Index

`add_4th_probs`, [2](#)

`cfb4th_clear_cache`, [3](#)

`get_4th_plays`, [4](#)

`load_4th_pbp`, [5](#)

`make_table_data`, [6](#)