

Package ‘sportsfeatures’

September 28, 2026

Title Simulation Framework for Sports Physiology and Analytics

Version 0.3.0

Description Provides a rule-based simulation environment for modeling real-world athlete performance, dynamic training sessions, hierarchical variance, and missing telemetry data.

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Depends R (>= 4.1.0)

Suggests dplyr, ggplot2, glmnet, here, knitr, lme4, lmerTest, mice, quarto, ranger, rmarkdown, testthat (>= 3.0.0)

VignetteBuilder quarto

Encoding UTF-8

Config/roxygen2/version 8.1.0

NeedsCompilation no

Author Mohammad Abbas [aut, cre]

Maintainer Mohammad Abbas <ma.abbas3107@gmail.com>

Repository CRAN

Date/Publication 2026-09-28 11:00:02 UTC

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 sports_features_missing

Comprehensive Sports Features Dataset (With Missing Values)

Description

Comprehensive Sports Features Dataset (With Missing Values)

Usage

```
data(sports_features_missing)
```

Format

A tibble or data frame with 42 variables describing athlete sessions and performance metrics:

session_id Unique alphanumeric identifier for each training session.

athlete_id Unique alphanumeric identifier for each athlete.

datetime Timestamp of when the training session occurred.

activity_type Type of exercise performed (e.g., running, cycling, swimming).

region Geographical area where the session took place.

distance_km Total distance covered during the session in kilometers.

weather_type Weather condition during the session (e.g., sunny, rainy, cloudy).

temperature_c Ambient outdoor temperature in degrees Celsius.

personal_status Pre-activity physical or mental status reported by the athlete.

is_group_activity Logical indicator (TRUE/FALSE) if the session was done with a group.

gender Categorical gender of the athlete.

age Age of the athlete in years.

base_fitness Baseline fitness score of the athlete.

base_speed Baseline average speed capability of the athlete.

base_stamina Baseline stamina level of the athlete.

base_weight Baseline body weight of the athlete in kilograms.

resting_heart_rate Baseline resting heart rate in beats per minute (bpm).

device_type Type of tracking device used during the session.

speed_kmh Average speed maintained throughout the session in km/h.

duration_min Total duration of the training session in minutes.

heart_rate_avg Average heart rate monitored during the session in bpm.

calories_burned Estimated total energy expenditure in kilocalories (kcal).

exhaustion_level Subjective exhaustion level reported after the session.

hydration_status Hydration level (%) recorded during or after the session.

- fatigue_score** Calculated post-activity fatigue accumulation score.
- aerobic_contribution_pct** Estimated percentage contribution of the aerobic energy system to total session workload.
- anaerobic_contribution_pct** Estimated percentage contribution of the anaerobic energy system to total session workload.
- energy_system** Categorical classification of session effort (Aerobic dominant, Mixed, or Anaerobic dominant).
- vo2_session_ml_kg_min** Estimated oxygen consumption rate during the session in mL/kg/min.
- vo2max_est_ml_kg_min** Estimated maximal oxygen uptake potential of the athlete in mL/kg/min.
- vo2_utilisation** Normalises aerobic demand relative to VO2max; quantifies session intensity as a fraction of physiological capacity.
- efficiency_index** Captures cardiovascular economy by relating oxygen uptake to heart rate; used to assess aerobic efficiency and readiness.
- hr_reserve** Represents net cardiovascular elevation above resting state; proxy for internal load and autonomic strain.
- aerobic_efficiency** Indicates aerobic contribution per unit heart rate; evaluates aerobic system utilisation and metabolic economy.
- fatigue_per_km** Normalises fatigue accumulation by distance; models workload-adjusted fatigue dynamics.
- athlete_mean_fatigue** Chronic fatigue baseline; separates stable athlete-level fatigue differences from session-level variation.
- fatigue_deviation** Within-athlete centred fatigue; isolates session-specific deviations from an athlete's personal fatigue norm.
- athlete_mean_distance** Chronic volume baseline; captures habitual training load differences between athletes.
- distance_centered** Within-athlete centred distance; models session-specific deviations from typical training volume.
- pace_min_km** Represents external speed demand; used to model performance intensity and pacing strategy.
- calories_per_km** Normalises metabolic cost by distance; quantifies energetic efficiency and workload economy.
- calories_per_min** Represents metabolic burn rate; models internal metabolic intensity independent of distance.

Details

A variant of the core sports analytics dataset containing structured missingness (NA values) across performance tracking columns to demonstrate imputation workflows.

Source

Synthesized sports features analytics framework.

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* **datasets**

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