

# Package ‘imuf’

May 8, 2026

**Title** Estimate Orientation of an Inertial Measurement Unit

**Version** 0.6.0

**Description** Estimate the orientation of an inertial measurement unit (IMU) with a 3-axis accelerometer and a 3-axis gyroscope using a complementary filter. 'imuf' takes an IMU's accelerometer and gyroscope readings, time duration, its initial orientation, and a gain factor as inputs, and returns an estimate of the IMU's final orientation.

**License** MIT + file LICENSE

**Encoding** UTF-8

**RoxygenNote** 7.3.2

**LinkingTo** Rcpp, RcppEigen

**Imports** htmltools, htmlwidgets, Rcpp

**Suggests** knitr, rmarkdown, testthat (>= 3.0.0), purrr, ggplot2, shiny, serial, stringr

**Config/testthat/edition** 3

**URL** <https://github.com/gitboosting/imuf>,  
<https://gitboosting.github.io/imuf/>

**BugReports** <https://github.com/gitboosting/imuf/issues>

**Depends** R (>= 2.10)

**LazyData** true

**VignetteBuilder** knitr

**NeedsCompilation** yes

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**Repository** CRAN

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animate_imu	<i>Animate movement of an inertial measurement unit</i>
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### Description

Create interactive animated movements of an inertial measurement unit

### Usage

```
animate_imu(data, dt, width = NULL, height = NULL, elementId = NULL)
```

### Arguments

data	A list of numeric 4-vectors each of which a unit quaternion (w,x,y,z)
dt	A numeric of time duration in milli-seconds
width, height	width and height of animate_imu htmlwidget specified in any valid CSS size unit
elementId	string id as a valid CSS element id.

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animate_imu-shiny	<i>Shiny bindings for animate_imu</i>
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### Description

Output and render functions for using animate\_imu within Shiny applications and interactive Rmd documents.

### Usage

```
animate_imuOutput(outputId, width = "100%", height = "400px")

renderAnimate_imu(expr, env = parent.frame(), quoted = FALSE)
```

**Arguments**

outputId	output variable to read from
width, height	Must be a valid CSS unit (like '100%', '400px', 'auto') or a number, which will be coerced to a string and have 'px' appended.
expr	An expression that generates a animate_imu
env	The environment in which to evaluate expr.
quoted	Is expr a quoted expression (with quote())? This is useful if you want to save an expression in a variable.

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compUpdate	<i>Update orientation with 3-axis acc and gyr data</i>
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**Description**

compUpdate() uses complementary filtering to update the orientation, given an initial orientation, readings of a 3-axis accelerometer and a 3-axis gyroscope, time duration, and a gain factor

**Usage**

```
compUpdate(acc, gyr, dt, initQuat, gain)
```

**Arguments**

acc	A numeric 3-vector of 3-axis accelerometer readings in g
gyr	A numeric 3-vector of 3-axis gyroscope readings in rad/sec
dt	A numeric of time duration in sec
initQuat	A numeric 4-vector of the starting orientation in quaternion
gain	A numeric gain factor between 0 and 1

**Value**

A numeric 4-vector of the ending orientation in quaternion

**Examples**

```
compUpdate(c(0, 0, -1), c(1, 0, 0), 0.1, c(1, 0, 0, 0), 0.1)
```

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imu_object	<i>Animate in real time movement of an inertial measurement unit in shiny</i>
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### Description

Create in real time animated movements of an inertial measurement unit in shiny

### Usage

```
imu_object(data = c(1, 0, 0, 0), width = NULL, height = NULL, elementId = NULL)
```

### Arguments

data	A vector of numeric 4-vectors each of which a unit quaternion (w,x,y,z)
width, height	width and height of imu_object htmlwidget specified in any valid CSS size unit
elementId	string id as a valid CSS element id.

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imu_object-shiny	<i>Shiny bindings for imu_object</i>
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### Description

Output and render functions for using imu\_object within Shiny applications and interactive Rmd documents.

### Usage

```
imu_objectOutput(outputId, width = "100%", height = "400px")
renderImu_object(expr, env = parent.frame(), quoted = FALSE)
```

### Arguments

outputId	output variable to read from
width, height	Must be a valid CSS unit (like '100%', '400px', 'auto') or a number, which will be coerced to a string and have 'px' appended.
expr	An expression that generates a imu_object
env	The environment in which to evaluate expr.
quoted	Is expr a quoted expression (with quote())? This is useful if you want to save an expression in a variable.

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imu_object-update	<i>Update a widget in shiny with an orientation</i>
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**Description**

Pair of functions used in conjunction to update a imu\_object widget

**Usage**

```
imu_proxy(id, session = shiny::getDefaultReactiveDomain())

imu_send_data(proxy, data)
```

**Arguments**

id	HTML element id that houses the html widget
session	shiny session - default to current session
proxy	imu_proxy output to be used as input to imu_send_data
data	a numeric unit 4-vector (quaternion) for the updated orientation

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rotV	<i>Rotate a 3-vector by a quaternion</i>
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**Description**

rotV() rotates a 3-vector by a quaternion expressed as a unit 4-vector in (w,x,y,z) convention

**Usage**

```
rotV(quat, vin)
```

**Arguments**

quat	A numeric unit 4-vector (w,x,y,z) for a rotation quaternion
vin	A numeric 3-vector to be rotated by quat

**Value**

A numeric 3-vector after the rotation

**Examples**

```
q <- c(cos(pi/4), sin(pi/4), 0, 0)
vin <- c(0, 1, 0)
rotV(q, vin)
```

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walking\_shin\_1

*University of Mannheim Real World Activities*

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**Description**

Accelerations and angular velocities captured by sensors of the mobile device situated on the shin of subject 1 while the subject was walking for 10 minutes

**Usage**

walking\_shin\_1

**Format**

walking\_shin\_1:

A data frame with 31,946 rows and 6 columns of accelerometer and gyroscope measurements at 50 Hz

**acc\_x, acc\_y, acc\_z** north, east and down acceleration in  $m/s^2$

**gyr\_x, gyr\_y, gyr\_z** angular velocity about north, east and down in rad/sec

**Source**

<https://www.uni-mannheim.de/dws/research/projects/activity-recognition/dataset/dataset-realworld/s1/>

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