Package 'imuf'

Title Estimate Orientation of an Inertial Measurement Unit

Version 0.4.0

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 GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.3.2

LinkingTo Rcpp, RcppEigen

Imports Rcpp

Suggests knitr, rmarkdown, testthat (>= 3.0.0), purrr, ggplot2

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

Author Felix Chan [aut, cre, cph]

Maintainer Felix Chan <chanfelix@gmail.com>

Repository CRAN

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compUpdate	*Update orientation with 3-axis acc and gyr data*

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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rotV *Rotate a 3-vector by a quaternion*

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*

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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