

# Package ‘Rlibkdv’

October 22, 2023

**Type** Package

**Title** A Versatile Kernel Density Visualization Library for Geospatial Analytics (Heatmap)

**Version** 1.1

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**Description** Unlock the power of large-scale geospatial analysis, quickly generate high-resolution kernel density visualizations, supporting advanced analysis tasks such as bandwidth-tuning and spatiotemporal analysis. Regardless of the size of your dataset, our library delivers efficient and accurate results.

Tsz Nam Chan, Leong Hou U, Byron Choi, Jianliang Xu, Reynold Cheng (2023) <doi:10.1145/3555041.3589401>.

Tsz Nam Chan, Rui Zang, Pak Lon Ip, Leong Hou U, Jianliang Xu (2023) <doi:10.1145/3555041.3589711>.

Tsz Nam Chan, Leong Hou U, Byron Choi, Jianliang Xu (2022) <doi:10.1145/3514221.3517823>.

Tsz Nam Chan, Pak Lon Ip, Kaiyan Zhao, Leong Hou U, Byron Choi, Jianliang Xu (2022) <doi:10.14778/3554821.3554855>.

Tsz Nam Chan, Pak Lon Ip, Leong Hou U, Byron Choi, Jianliang Xu (2022) <doi:10.14778/3503585.3503591>.

Tsz Nam Chan, Pak Lon Ip, Leong Hou U, Byron Choi, Jianliang Xu (2022) <doi:10.14778/3494124.3494135>.

Tsz Nam Chan, Pak Lon Ip, Leong Hou U, Weng Hou Tong, Shivansh Mittal, Ye Li, Reynold Cheng (2021) <doi:10.14778/3476311.3476312>.

Tsz Nam Chan, Zhe Li, Leong Hou U, Jianliang Xu, Reynold Cheng (2021) <doi:10.14778/3461535.3461540>.

Tsz Nam Chan, Reynold Cheng, Man Lung Yiu (2020) <doi:10.1145/3318464.3380561>.

Tsz Nam Chan, Leong Hou U, Reynold Cheng, Man Lung Yiu, Shivansh Mittal (2020) <doi:10.1109/TKDE.2020.3018376>.

Tsz Nam Chan, Man Lung Yiu, Leong Hou U (2019) <doi:10.1109/ICDE.2019.00055>.

**URL** <https://github.com/bojianzhu/Rlibkdv>

**BugReports** <https://github.com/bojianzhu/Rlibkdv/issues>

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**Encoding** UTF-8

**LazyData** true  
**RoxygenNote** 7.2.3  
**Imports** leaflet, raster, magrittr, Rcpp, sf  
**Depends** R (>= 2.10)  
**Suggests** knitr, rmarkdown  
**VignetteBuilder** knitr  
**LinkingTo** Rcpp  
**NeedsCompilation** yes  
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|----|---|
| hk | <i>Hong Kong COVID-19 Cases Dataset</i> |
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### Description

This dataset contains the COVID-19 cases data in Hong Kong.

### Usage

```
hk
```

### Format

A data frame with 3 variables:

**lon** Longitude of the location

**lat** Latitude of the location

**t** Number of COVID-19 cases

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|-----|----------------|
| kdv | <i>Use KDV</i> |
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**Description**

Efficient and accurate kernel density visualization.

**Usage**

```
kdv(  
  longitude,  
  latitude,  
  bandwidth_s = 1000,  
  row_pixels = 800,  
  col_pixels = 640  
)
```

**Arguments**

|             |                     |
|-------------|---------------------|
| longitude   | features' longitude |
| latitude    | features' latitude  |
| bandwidth_s | spatial bandwidth   |
| row_pixels  | row pixels          |
| col_pixels  | col pixels          |

**Value**

kdv result

**Examples**

```
data(hk)  
resKDV <- kdv(hk$lon, hk$lat, 1000, 800 ,640)
```

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|         |                 |
|---------|-----------------|
| plotKDV | <i>Plot KDV</i> |
|---------|-----------------|

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**Description**

Plot KDV

**Usage**

```
plotKDV(data)
```

**Arguments**

data                    result of kdv

**Value**

No return value, called to plot KDV heatmap

**Examples**

```
data(hk)
resKDV <- kdv(hk$lon, hk$lat, 1000, 800 ,640)
plotKDV(resKDV)
```

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plotSTKDV

*Plot STKDV*

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**Description**

Plot STKDV

**Usage**

```
plotSTKDV(data)
```

**Arguments**

data                    result of stkdv

**Value**

No return value, called to plot STKDV heatmap

**Examples**

```
data(hk)
resSTKDV <- stkdv(hk$lon, hk$lat, hk$t, 1000, 6, 800, 640, 32)
plotSTKDV(resSTKDV)
```

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`stkdv`*Use STKDV*

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**Description**

Efficient and accurate spatiotemporal kernel density visualization.

**Usage**

```
stkdv(  
  longitude,  
  latitude,  
  time,  
  bandwidth_s = 1000,  
  bandwidth_t = 6,  
  row_pixels = 800,  
  col_pixels = 640,  
  t_pixels = 32  
)
```

**Arguments**

|                          |                     |
|--------------------------|---------------------|
| <code>longitude</code>   | features' longitude |
| <code>latitude</code>    | features' latitude  |
| <code>time</code>        | features' time      |
| <code>bandwidth_s</code> | spatial bandwidth   |
| <code>bandwidth_t</code> | temporal bandwidth  |
| <code>row_pixels</code>  | row pixels          |
| <code>col_pixels</code>  | col pixels          |
| <code>t_pixels</code>    | time pixels         |

**Value**

stkdv result

**Examples**

```
data(hk)  
resSTKDV <- stkdv(hk$lon, hk$lat, hk$t, 1000, 6, 800, 640, 32)
```

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