

Package ‘nanotatoR’

June 5, 2023

Title Next generation structural variant annotation and classification

Version 1.17.0

Author Surajit Bhattacharya, Hayk Barsheghyan, Emmanuele C Delot and Eric Vilain

Description

Whole genome sequencing (WGS) has successfully been used to identify single-nucleotide variants (SNV), small insertions and deletions (INDELs) and, more recently, small copy number variants (CNVs). However, due to utilization of short reads, it is not well suited for identification of structural variants (SV). Optical mapping (OM) from Bionano Genomics, utilizes long fluorescently labeled megabase size DNA molecules for de novo genome assembly and identification of SVs with a much higher sensitivity than WGS. Nevertheless, currently available SV annotation tools have limited number of functions. NanotatoR is an R package written to provide a set of annotations for SVs identified by OM. It uses Database of Genomic Variants (DGV), Database of Chromosomal Imbalance and Phenotype in Humans Using Ensembl Resources (DECIPHER) as well as a subset (154 samples) of 1000 Genome Project to calculate the population frequencies of the SVs (an optional internal cohort SV frequency calculation is also available). NanotatoR creates a primary gene list (PG) from NCBI databases based on proband’s phenotype specific keywords and compares the list to the set of genes overlapping/near SVs. The output is given in an Excel file format, which is subdivided into multiple sheets based on SV type (e.g., INDELs, Inversions, Translocations). Users then have a choice to filter SVs using the provided annotations for de novo (if parental samples are available) or inherited rare variants.

Depends R (>= 4.1),

Imports hash(>= 2.2.6), openxlsx(>= 4.0.17), rentrez(>= 1.1.0), stats, rlang, stringr, knitr, testthat, utils, AnnotationDbi, httr, GenomicRanges, tidyverse, VarfromPDB, org.Hs.eg.db, curl, dplyr, XML, XML2R

Suggests rmarkdown, yaml

VignetteBuilder knitr

License file LICENSE

biocViews Software, WorkflowStep, GenomeAssembly, VariantAnnotation

Encoding UTF-8

RoxygenNote 7.1.1.9001

URL <https://github.com/VilainLab/nanotatoR>

BugReports <https://github.com/VilainLab/nanotatoR/issues>

git_url <https://git.bioconductor.org/packages/nanotatoR>

git_branch devel

git_last_commit f37cb9f

git_last_commit_date 2023-04-25

Date/Publication 2023-06-05

Maintainer Surajit Bhattacharya <sbhattach2@childrensnational.org>

R topics documented:

BNDBfrequency	3
buildrunBNBedFiles	5
clinvar_gene	6
Decipherfrequency	6
DGVfrequency	8
extract_clinvar_mod	9
FamilyInfoPrep	10
gene_extraction	11
gene_list_generation	11
gtr_gene	13
internalFrequencyTrio_Duo	13
internalFrequency_solo	16
makeInternalBNDatabase	19
mergingSMAP_SE	20
mergingSMAP_SVMerge	20
merging_SE_SVMerge	21
nanotatoR	22
nanotatoR_Duo_SVmerge	23
nanotatoR_main_Duo_SE	28
nanotatoR_main_Solo_SE	33
nanotatoR_main_Solo_SVmerge	38
nanotatoR_main_Trio_SE	43
nanotatoR_SVmerge_Trio	47
nonOverlapGenes	52
nonOverlappingDNGenes	54
nonOverlappingUPGenes	55
nonOverlapRNAseq	55
nonOverlapRNAseq_solo	56
omim_gene	57
overlapGenes	58
overlapnearestgeneSearch	59
overlappingGenes	60
OverlapRNAseq	61
OverlapRNAseq_solo	62

phenoextractHPO_mod	63
readBNBedFiles	63
reading_GTR	64
reading_mim2gene	65
readSMap	65
readSMap_DLE	66
RNAseqcombine	66
RNAseqcombine_solo	67
run_bionano_filter_SE_duo	68
run_bionano_filter_SE_solo	69
run_bionano_filter_SE_Trio	72
run_bionano_filter_SVMerge_duo	74
run_bionano_filter_SVMerge_solo	76
run_bionano_filter_SVMerge_Trio	78
SVexpression_duo_trio	80
SVexpression_solo	81

Index**84**

BNDBfrequency

*Calculates the internal frequencies of BNDB cohorts***Description**

Calculates the internal frequencies of BNDB cohorts

Usage

```
BNDBfrequency(
  internalBNDB,
  smappath,
  smap,
  buildBNInternalDB = FALSE,
  smapdata,
  input_fmt_SV = c("Text", "dataFrame"),
  dbOutput = c("dataframe", "text"),
  BNDBpath,
  BNDBpattern,
  outpath,
  win_indel = 10000,
  win_inv_trans = 50000,
  perc_similarity = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  limsize = 1000,
  transconf = 0.1,
  returnMethod = c("Text", "dataFrame"),
  EnzymeType = c("SVmerge", "SE")
)
```

Arguments

internalBNDB	character. Path to the merged SV files.
smappath	character. path to the query smap file.
smap	character. File name for the smap
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
smapdata	dataframe. smapdata in the form of dataframe.
input_fmt_SV	character. Choice between Text and DataFrame.
dbOutput	character. database output type. Options dataframe or text.
BNDBpath	character. Path to the BNDB file database.
BNDBpattern	character. pattern of the file names to merge.
outpath	character. Path to merged SV solo datasets.
win_indel	Numeric. Insertion and deletion error window.
win_inv_trans	Numeric. Inversion and translocation error window.
perc_similarity	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion Score.
invconf	Numeric. Threshold for inversion Score.
limsize	Numeric. SV size limit.
transconf	Numeric. Threshold for translocation Score.
returnMethod	character. Choice between Text and DataFrame.
EnzymeType	Character. Type of enzyme. Options SVmerge and SE.

Value

Text file or data frames containing internalFrequency data.

Examples

```
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern <- "*_hg19_*"
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
BNDBfrequency(smap = smap,
  buildBNInternalDB=TRUE,
  input_fmt_SV = "Text",
  dbOutput="dataframe",
  BNDBpath = path,
  BNDBpattern = pattern,
  outpath,
  win_indel = 10000,
  win_inv_trans = 50000,
  perc_similarity = 0.5,
  indelconf = 0.5,
```

```
    invconf = 0.01,  
    limsize = 1000,  
    transconf = 0.1,  
    returnMethod=c("dataFrame"),  
    EnzymeType = c("SE"))
```

buildrunBNBedFiles	<i>Reads BED files to produce bionano Bed files</i>
--------------------	---

Description

Reads BED files to produce bionano Bed files

Usage

```
buildrunBNBedFiles(  
  bedFile,  
  returnMethod = c("Text", "dataFrame"),  
  outdir,  
  fname  
)
```

Arguments

bedFile	character. Path to UCSC Bed File.
returnMethod	character. Path to output directory.
outdir	character. Path to output directory.
fname	character. Output File name.

Value

Data Frame or text file. Contains the gene information.

Examples

```
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed",  
  package="nanotator")  
bed<-buildrunBNBedFiles(bedFile,returnMethod="dataFrame")
```

clinvar_gene	<i>Extracting genes from clinvar database NCBI.</i>
--------------	---

Description

Extracting genes from clinvar database NCBI.

Usage

```
clinvar_gene(terms, clinvar, downloadClinvar, omimID = NULL)
```

Arguments

terms	Single or Multiple Terms.
clinvar	character clinvar database location.
downloadClinvar	boolean If TRUE, download the gtr database. Default FALSE.
omimID	numeric Omim Id for disease.

Value

Dataframe returned containing gene lists in entrezid and Gene Symbols, and terms associated with it

Examples

```
terms="Liver cirrhosis"
clinvar = system.file("extdata", "localPDB/", package="nanotator")
downloadClinvar = FALSE
ge <- clinvar_gene(terms = terms, clinvar = clinvar,
downloadClinvar = downloadClinvar,
omimID = "OMIM:118980")
```

Decipherfrequency	<i>Frequency calculation of variants compared to Decipher.</i>
-------------------	--

Description

Frequency calculation of variants compared to Decipher.

Usage

```
Decipherfrequency(
  decipherpath,
  smap,
  smap_data,
  win_indel = 10000,
  perc_similarity = 0.5,
  returnMethod = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  EnzymeType = c("SVMerge", "SE"),
  outpath
)
```

Arguments

decipherpath	character. Decipher Text file.
smap	character Filepath for smap.
smap_data	Dataset containing smap data.
win_indel	character indel window. Default 10000.
perc_similarity	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
returnMethod	character. Choice between text or data frame as the output.
input_fmt_SV	boolean . Options SE and SVMerge.
EnzymeType	boolean . Options SE and SVMerge.
outpath	character. Path where gene lists are saved.

Value

dataframe containing decipher data. are stored as text files.

Examples

```
decipherpath = system.file("extdata", "population_cnv.txt",
  package="nanotatoR")
smappath=system.file("extdata", "GM24385_Ason_DLE1_VAP_trio5.smap",
  package="nanotatoR")
datdecipher <- Decipherfrequency (decipherpath = decipherpath,
  smap = smappath, win_indel = 10000,
  EnzymeType= "SE",
  perc_similarity = 0.5,returnMethod="dataFrame",
  input_fmt_SV = "Text")
datdecipher[1,]
```

DGVfrequency

Frequency calculation of variants compared to DGV.

Description

Frequency calculation of variants compared to DGV.

Usage

```
DGVfrequency(
  hgpath,
  smap,
  smap_data,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  input_fmt_SV = c("Text", "dataframe"),
  returnMethod = c("Text", "dataFrame"),
  outpath,
  EnzymeType = c("SVMerge", "SE")
)
```

Arguments

hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
smap	character. File name for smap textfile.
smap_data	dataframe. Dataset containing smap data.
win_indel_DGV	Numeric. Insertion and deletion error window. Default 10000 bases.
win_inv_trans_DGV	Numeric. Inversion and translocation error window. Default 50000 bases.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV. Default 0.5.
input_fmt_SV	boolean . Options Text and dataframe.
returnMethod	character. Choice between text or data frame as the output.
outpath	character. Path where gene lists are saved.
EnzymeType	boolean . Options SE and SVMerge.

Value

Text and character vector containig gene list and terms associated with them are stored as text files.

Examples

```
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
smappath=system.file("extdata", "GM24385_Ason_DLE1_VAP_trio5.smap", package="nanotatoR")
datDGV <- DGVfrequency (hgpath = hgpath,
  smap = smappath,
  win_indel_DGV = 10000,
  EnzymeType = "SE",
  input_fmt_SV = "Text",
  perc_similarity_DGV = 0.5,returnMethod="dataFrame")
```

extract_clinvar_mod	<i>Extract the genes and variants related to a genetic disorder from ClinVar</i>
---------------------	--

Description

Extract the genes and variants related to a genetic disorder from ClinVar

Usage

```
extract_clinvar_mod(
  keyword,
  localPDB.path,
  type = "both",
  HPO.disease = NULL,
  genelist = NULL,
  OMIM = NULL
)
```

Arguments

keyword	character. character string: keyword, to search a disease, a clinical feature, or a phenotype.
localPDB.path	character. the path of localized public data bases. The default value is set in the working directory.
type	character. the type of the information to extract, must be one of "gene", "variant", "both"(default).
HPO.disease	character. MIM number of the disease. The default value is NULL, which means that all the OMIM number of the disease in HPO are added. localized public data bases. The default value is set in the working directory.
genelist	character. the gene(s) associated to the disease, or the genes you are interested.
OMIM	character. whether use the information from OMIM database. The default value is NULL. It can be set 'yes' when you make sue you have a OMIM API key.

Value

subset of the file `gene_condition_source_id`, which include all the information about genes and phenotypes in ClinVar and subset of the file `variant_summary.txt`, but added several columns which describe the phenotype from GeneReview, MedGen, and OMIM databases. Function modified from `extract_clinvar` function `VarFromPDB`.

Examples

```
keyword = "retinoblastoma"
extract_clinvar_mod(keyword,
  localPDB.path = system.file("extdata", "localPDB", package="nanotatoR"),
  type = "both", HPO.disease = NULL,
  genelist = NULL, OMIM = NULL)
```

FamilyInfoPrep

Mapping Relationship to unique nanoIDs

Description

Mapping Relationship to unique nanoIDs

Usage

```
FamilyInfoPrep(
  Samplecodes = "X:/Hayks_Materials/BNG/Projects/nanotatoR_sample_codes.csv",
  mergeKey = "X:/Hayks_Materials/BNG/Projects/MergeKey.csv",
  outMode = c("Text", "dataframe"),
  outpath = "X:/Hayks_Materials/BNG/Projects/VAP_DLE1_solo_SMAPs/Merged"
)
```

Arguments

<code>Samplecodes</code>	character. File containing relations and IDs associated to them.
<code>mergeKey</code>	character. File containing sample ID and relation.
<code>outMode</code>	character. The output mode. Choices, dataframe or Text.
<code>outpath</code>	character. Path where the dual labelled merged samples are kept. Is mandatory if <code>outMode</code> is Text.

Value

Text files containing merged smaps from different samples

Examples

```
FamilyInfoPrep(
  Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR"),
  mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR"),
  outMode = c("dataframe"))
```

gene_extraction	<i>Extracting genes from gene database NCBI.</i>
-----------------	--

Description

Extracting genes from gene database NCBI.

Usage

```
gene_extraction(terms)
```

Arguments

terms	Single or Multiple Terms.
-------	---------------------------

Value

Dataframe returned containing gene lists in entrezid and Gene Symbols, and terms associated with it

Examples

```
terms="Liver cirrhosis"  
ge <- gene_extraction(terms)
```

gene_list_generation	<i>Extracting genes for phenotype/diseases from NCBI.</i>
----------------------	---

Description

Extracting genes for phenotype/diseases from NCBI.

Usage

```
gene_list_generation(  
  method_entrez = c("Single", "Multiple", "Text"),  
  termPath,  
  omimID = NULL,  
  term,  
  outpath,  
  thresh = 5,  
  returnMethod = c("Text", "dataFrame"),  
  omim,  
  clinvar,  
  gtr,  
  removeClinvar = FALSE,
```

```

    removeGTR = FALSE,
    downloadClinvar = FALSE,
    downloadGTR = FALSE,
    url_gtr
  )

```

Arguments

method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile. FileName should be in the following format "SampleID_Keywords.csv".
omimID	numeric. mimID for disease. Default is NULL.
term	character. Single or Multiple Terms.
outpath	character. Path where gene lists are saved.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
returnMethod	Method of returning output. Options, Text or data.frame.
omim	character. omim2gene file name and location.
clinvar	character. clinvar file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.

Value

Text files containing gene list and terms associated with them are stored as text files.

Examples

```

terms="CIRRHOSIS, FAMILIAL"
genes <- gene_list_generation(
  method_entrez = c("Single"),
  term = terms,
  returnMethod=c("dataFrame"),
  omimID = "OMIM:118980",
  omim = system.file("extdata", "mim2gene.txt", package="nanotatoR"),
  clinvar = system.file("extdata", "localPDB/", package="nanotatoR"),
  gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR"),
  downloadClinvar = FALSE, downloadGTR = FALSE)

```

gtr_gene	<i>Extracting genes from gtr database NCBI.</i>
----------	---

Description

Extracting genes from gtr database NCBI.

Usage

```
gtr_gene(terms, gtr, url_gtr, downloadGTR = TRUE)
```

Arguments

terms	Single or Multiple Terms.
gtr	character gtr database location.
url_gtr	character url for gtr database.
downloadGTR	boolean If TRUE, download the gtr database. Default FALSE.

Value

Dataframe returned containing gene lists in entrezid and Gene Symbols, and terms associated with it

Examples

```
terms="Liver cirrhosis"
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
ge <- gtr_gene(terms = terms,gtr = gtr, downloadGTR = FALSE)
```

internalFrequencyTrio_Duo	<i>Calculates the internal frequencies of SV in internal cohorts, for SVMerge</i>
---------------------------	---

Description

Calculates the internal frequencies of SV in internal cohorts, for SVMerge

Usage

```

internalFrequencyTrio_Duo(
  mergedFiles,
  smappath,
  smap,
  buildSVInternalDB = FALSE,
  smapdata,
  path,
  pattern,
  outpath,
  win_indel = 10000,
  win_inv_trans = 50000,
  perc_similarity = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  fname,
  limsize = 1000,
  win_indel_parents = 5000,
  win_inv_trans_parents = 40000,
  transconf = 0.1,
  dbOutput = c("dataframe", "text"),
  perc_similarity_parents = 0.9,
  returnMethod = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  indexfile,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
  mergedKeyoutpath,
  mergedKeyFname
)

```

Arguments

<code>mergedFiles</code>	character. Path to the merged SV files.
<code>smappath</code>	character. path to the query smap file.
<code>smap</code>	character. File name for the smap
<code>buildSVInternalDB</code>	boolean. Checking whether the merged solo file database exist.
<code>smapdata</code>	character. Dataframe if input type chosen as dataframe.
<code>path</code>	character. Path to the solo file database.
<code>pattern</code>	character. pattern of the file names to merge.

outpath	character. Path where the merged samples are kept.
win_indel	N umeric. Insertion and deletion error window. Default 10000.
win_inv_trans	Numeric. Inversion and translocation error window. Default 50000.
perc_similarity	Numeric . ThresholdPercentage similarity of the query SV and reference SV. Default 0.5.
indelconf	Numeric. Threshold for insertion and deletion confidence. Default 0.5
invconf	Numeric. Threshold for inversion confidence.Default 0.01.
fname	character. Filename in case dbOutput = Text.
limsize	Numeric. Minimum size of SV that can be determined accurately by the Bionano SV caller. Default 1000.
win_indel_parents	Numeric. Insertion and deletion error window to determine zygoty in case of parents. Default 5000.
win_inv_trans_parents	Numeric. Inversion and translocation error window to determine zygoty in case of parents. Default 40000.
transconf	Numeric. Threshold for translocation confidence. Default 0.1.
dbOutput	character. Output of merged bionano data.
perc_similarity_parents	Numeric . ThresholdPercentage similarity for zygoty determination. Default 0.9.
returnMethod	character. Choice between Text and DataFrame. Required if you want to calculate internal frequency.
input_fmt_SV	Format in which data is provided as an input to thefunction.
indexfile	File containing connection between sample and nanoIDs
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.

Value

Calculated internal frequency in dataframe or text.

Examples

```

smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
indelconf = 0.5; invconf = 0.01;transconf = 0.1;input_fmt_SV="Text";
datInf <- internalFrequency_solo( smap = smap,
buildSVInternalDB = FALSE, win_indel=10000,
win_inv_trans=50000, EnzymeType = "SE",
mergedFiles = system.file("extdata", "nanotatoRControl.txt", package="nanotatoR"),
perc_similarity_parents =0.9,
indexfile = system.file("extdata", "Sample_index.csv", package="nanotatoR"),
perc_similarity=0.5, indelconf=0.5, invconf=0.01,
transconf=0.1, limsize=1000, win_indel_parents=5000,input_fmt="Text",
win_inv_trans_parents=40000,
returnMethod="dataFrame", input_fmt_SV = "Text")

```

internalFrequency_solo

Calculates the internal frequencies of SV in internal cohorts, for SE

Description

Calculates the internal frequencies of SV in internal cohorts, for SE

Usage

```

internalFrequency_solo(
  mergedFiles,
  smappath,
  smap,
  buildSVInternalDB = FALSE,
  smapdata,
  input_fmt = c("Text", "dataFrame"),
  path,
  pattern,
  outpath,
  win_indel = 10000,
  win_inv_trans = 50000,
  perc_similarity = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  fname,
  limsize = 1000,
  win_indel_parents = 5000,
  win_inv_trans_parents = 40000,
  transconf = 0.1,
  dbOutput = c("dataframe", "text"),
  returnMethod = c("Text", "dataFrame"),

```

```

    input_fmt_SV = c("Text", "dataFrame"),
    indexfile,
    perc_similarity_parents = 0.9,
    EnzymeType = c("SVmerge", "SE"),
    labelType = c("SVMerge", "SE", "Both"),
    SVMerge_path,
    SVMerge_pattern,
    SE_path,
    SE_pattern,
    Samplecodes,
    mergeKey,
    mergedKeyoutpath,
    mergedKeyFname
)

```

Arguments

mergedFiles	character. Path to the merged SV files.
smappath	character. path to the query smap file.
smap	character. File name for the smap
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.
smapdata	character. Dataframe if input type chosen as dataframe.
input_fmt	Format in which data is provided as an input to the function.
path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.
outpath	character. Path where the merged samples are kept.
win_indel	N umeric. Insertion and deletion error window. Default 10000.
win_inv_trans	Numeric. Inversion and translocation error window. Default 50000.
perc_similarity	Numeric . ThresholdPercentage similarity of the query SV and reference SV. Default 0.5.
indelconf	Numeric. Threshold for insertion and deletion confidence. Default 0.5
invconf	Numeric. Threshold for inversion confidence.Default 0.01.
fname	character. Filename in case dbOutput = Text.
limsize	Numeric. Minimum size of SV that can be determined accurately by the Bionano SV caller. Default 1000.
win_indel_parents	Numeric. Insertion and deletion error window to determine zygotity in case of parents. Default 5000.
win_inv_trans_parents	Numeric. Inversion and translocation error window to determine zygotity in case of parents. Default 40000.
transconf	Numeric. Threshold for translocation confidence. Default 0.1.

dbOutput	character. Output of merged bionano data.
returnMethod	character. Choice between Text and DataFrame. Required if you want to calculate internal frequency.
input_fmt_SV	character. Choice between Text and DataFrame.
indexfile	File containing connection between sample and nanoIDs
perc_similarity_parents	Numeric . ThresholdPercentage similarity for zygoty determination. Default 0.9.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.

Value

Calculated internal frequency in dataframe or text.

Examples

```

smapName = "NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
indelconf = 0.5; invconf = 0.01;transconf = 0.1;input_fmt="Text";
datInf <- internalFrequency_solo( smap = smap,
buildSVInternalDB = FALSE, win_indel=10000,
win_inv_trans=50000, EnzymeType = "SE",
mergedFiles = system.file("extdata", "nanotatoRControl.txt", package="nanotatoR"),
perc_similarity_parents =0.9,
indexfile = system.file("extdata", "Sample_index.csv", package="nanotatoR"),
perc_similarity=0.5, indelconf=0.5, invconf=0.01,
transconf=0.1, lmsize=1000, win_indel_parents=5000,input_fmt="Text",
win_inv_trans_parents=40000,
returnMethod="dataFrame", input_fmt_SV = "Text")

```

`makeInternalBNDDatabase`*Merges Solo SV files to one common SV file*

Description

Merges Solo SV files to one common SV file

Usage

```
makeInternalBNDDatabase(  
  path,  
  pattern,  
  outpath,  
  fname,  
  dbOutput = c("dataframe", "text")  
)
```

Arguments

<code>path</code>	character. Path to the solo files.
<code>pattern</code>	character. file name pattern for solo files.
<code>outpath</code>	character. file path for the output file.
<code>fname</code>	character. file name for the output file.
<code>dbOutput</code>	character. Output option database or text.

Value

Text file containing all the solo SMAP files.

Examples

```
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")  
pattern <- "_hg19.txt"  
mergedSmap <- makeInternalBNDDatabase(path = path,  
  pattern = pattern, dbOutput = "dataframe")  
mergedSmap[1,]
```

mergingSMAP_SE	<i>Merging DLE labelled smaps</i>
----------------	-----------------------------------

Description

Merging DLE labelled smaps

Usage

```
mergingSMAP_SE(path, pattern, outMode = c("Text", "dataframe"), outpath)
```

Arguments

path	character. Path to the solo files directory.
pattern	character. Pattern for the solo files.
outMode	character. The ouput mode. Choices, dataframe or Text.
outpath	character. Path where the dual labelled merged samples are kept. Is mandatory if outMode is Text.

Value

Text files containg merged smaps from different samples

Examples

```
mergedSmap <- mergingSMAP_SE (
  path = system.file("extdata", "SoloFile/", package="nanotatoR"),
  pattern = "*_DLE1_*", outMode = "dataframe",
  outpath = system.file("extdata", "Merged/", package="nanotatoR"))
```

mergingSMAP_SVMerge	<i>Merging dual labelled smaps</i>
---------------------	------------------------------------

Description

Merging dual labelled smaps

Usage

```
mergingSMAP_SVMerge(path, pattern, outMode = c("dataframe", "Text"), outpath)
```

Arguments

path	character. Path to the solo files directory.
pattern	character. Patternna for the solo files.
outMode	character. The ouput mode. Choices, dataframe or Text.
outpath	character. Path where the dual labelled merged samples are kept. Is mandatory if outMode is Text.

Value

Text files containg merged smaps from different samples

Examples

```
a <- mergingSMAP_SVMerge(
  path = system.file("extdata", "SoloFile/", package="nanotatoR"),
  pattern = "*.txt", outMode = "dataframe",
  outpath = system.file("extdata", "SoloFile/", package="nanotatoR"))
```

merging_SE_SVMerge	<i>Merging Dual and DLE, and adding nanotatoR relation ID</i>
--------------------	---

Description

Merging Dual and DLE, and adding nanotatoR relation ID

Usage

```
merging_SE_SVMerge(
  labelType = c("SVMerge", "SE", "Both", "SE_Cancer"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
  outpath,
  mergedKeyoutpath,
  mergedKeyFname,
  filename,
  outputMode = c("dataframe", "Text")
)
```

Arguments

labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
outpath	character. Path where the merged samples are kept.
mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
filename	character. Output file name.
outputMode	character. Mode of databse output. Text or dataframe.

Value

Text files containg merged smaps from different samples

Examples

```
dat1 <- merging_SE_SVMerge (
  labelType = c("SE"),
  SE_path = system.file("extdata", "SoloFile/", package="nanotatoR"),
  SE_pattern = "*_DLE1_*",
  Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR"),
  mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR"),
  outpath = system.file("extdata", package="nanotatoR"),
  mergedKeyoutpath = system.file("extdata", package="nanotatoR"),
  mergedKeyFname = "Sample_index.csv",
  filename= "nanotatoRControl.txt",
  outputMode = "dataframe")
```

nanotatoR

nanotatoR: Annotation package for Bionano Data

Description

Annotation of Bionano data using available databases

Examples

```
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern <- "_hg19.txt"
mergedSmap <- makeInternalBNDatabase(path = path,
  pattern = pattern, dbOutput = "dataframe")
mergedSmap[1,]
```

nanotatoR_Duo_SVmerge *Annotation and visualisation of Bionano SV, of SVMerge Duo samples.*

Description

Annotation and visualisation of Bionano SV, of SVMerge Duo samples.

Usage

```
nanotatoR_Duo_SVmerge(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  perc_similarity_INF_parents = 0.9,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
```

```

SE_path,
SE_pattern,
Samplecodes,
mergeKey,
mergedKeyoutpath,
mergedKeyFname,
RNAseqcombo = TRUE,
RNASeqDir,
returnMethod = "dataFrame",
RNASeqData,
RNASeqPATH,
pattern_Proband = NA,
pattern_Mother = NA,
pattern_Father = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
geneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.

buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.
smappath	character. Path and file name for textfile.
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.
path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.
win_indel_INF	Numeric. Insertion and deletion error window.
win_inv_trans_INF	Numeric. Inversion and translocation error window.
perc_similarity_INF	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion confidence.
invconf	Numeric. Threshold for inversion confidence.
transconf	Numeric. Threshold for translocation confidence.
perc_similarity_INF_parents	Numeric . ThresholdPercentage similarity for parent zygoty calculation. Default threshold 0.9.
hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
win_indel_DGV	Numeric. Insertion and deletion error window for DGV.
win_inv_trans_DGV	Numeric. Inversion and translocation error window for DGV.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..
method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile.
term	character. Single or Multiple Terms.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
limsize	Numeric. Minimum size for SV. Default 1000.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.

mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
RNAseqcombo	boolean whether RNASeq datasets are combined or not.
RNASeqDir	boolean Directory for RNASeq.
returnMethod	character. Choice between text or data frame as the output.
RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
pattern_Proband	character. Pattern for proband.
pattern_Mother	character. Pattern to identify the mother reads.
pattern_Father	character. Pattern to identify the father reads.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
geneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containing gene list and terms associated with them are stored as text files.

Examples

```
## Not run:
smapName="NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
clinvar = system.file("extdata", "localPDB/", package="nanotatoR")
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
labelType = c("SE")
SE_path = system.file("extdata", "SoloFile/", package="nanotatoR")
SE_pattern = "*_DLE1_*"
Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR")
mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR")
mergedKeyoutpath = system.file("extdata", package="nanotatoR")
indexfile = "Sample_index.csv"
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_Duo_SVmerge(
  smap = smap, bed = bedFile, inputfmtBed = c("bed"),
  n=3,EnzymeType = c("SVMerge"),
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = TRUE,
  labelType = c("SE"),
  SE_path = SE_path, SE_pattern = SE_pattern,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1, perc_similarity_INF_parents = 0.9,
  hgpath = hgpath, win_indel_DGV = 10000, win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  RNASeqDatasetPresent = FALSE,
  RNASeqcombo = TRUE,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  limsize = 1000,
  pattern_Proband = "*_P_*",
  outpath = outpath, primaryGenesPresent = FALSE,
  outputFilename = outputFilename,
  termListPresent = FALSE,
  InternaldatabasePresent = TRUE,
  outputType = c("Excel"), RZIPpath = RZIPpath)
```

```
## End(Not run)
```

nanotatoR_main_Duo_SE *Annotation and visualisation of Bionano SV, of Single enzyme Duo samples.*

Description

Annotation and visualisation of Bionano SV, of Single enzyme Duo samples.

Usage

```
nanotatoR_main_Duo_SE(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  perc_similarity_INF_parents = 0.9,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
```

```

mergedKeyoutpath,
mergedKeyFname,
RNAseqcombo = TRUE,
RNASeqDir,
returnMethod = "dataFrame",
RNASeqData,
RNASeqPATH,
pattern_Proband = NA,
pattern_Mother = NA,
pattern_Father = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
geneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.
smappath	character. Path and file name for textfile.

buildSVInternalDB
boolean. Checking whether the merged solo file database exist.

path
character. Path to the solo file database.

pattern
character. pattern of the file names to merge.

win_indel_INF
Numeric. Insertion and deletion error window.

win_inv_trans_INF
Numeric. Inversion and translocation error window.

perc_similarity_INF
Numeric . ThresholdPercentage similarity of the query SV and reference SV.

indelconf
Numeric. Threshold for insertion and deletion confidence.

invconf
Numeric. Threshold for inversion confidence.

transconf
Numeric. Threshold for translocation confidence.

perc_similarity_INF_parents
Numeric . ThresholdPercentage similarity for parent zygoty calculation. Default threshold 0.9.

hgpath
character. Path to Database of Genomic Variants (DGV) Text file.

win_indel_DGV
Numeric. Insertion and deletion error window for DGV.

win_inv_trans_DGV
Numeric. Inversion and translocation error window for DGV.

perc_similarity_DGV
Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..

method_entrez
character. Input Method for terms. Choices are "Single", "Multiple" and "Text".

termPath
character. Path and file name for textfile.

term
character. Single or Multiple Terms.

thresh
integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.

limsize
Numeric. Minimum size for SV. Default 1000.

EnzymeType
Character. Type of enzyme. Options Dual and DLE.

labelType
character. Type of labels used for mapping. Choices are Dual, DLE and Both.

SVMerge_path
character. Path for the Dual labelled cmap

SVMerge_pattern
character. pattern of the dual files.

SE_path
character. Path for the Dual labelled cmap

SE_pattern
character. pattern of the dual files.

Samplecodes
character. File containing relations and IDs associated to them.

mergeKey
character. File containing sample ID and relation.

mergedKeyoutpath
character. File path storing sample name and nanoID key information.

mergedKeyFname
character. File name storing sample name and nanoID key information.

RNAseqcombo
boolean whether RNASeq datasets are combined or not.

RNASeqDir	boolean Directory for RNASeq.
returnMethod	character. Choice between text or data frame as the output.
RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
pattern_Proband	character. Pattern for proband.
pattern_Mother	character. Pattern to identify the mother reads.
pattern_Father	character. Pattern to identify the father reads.
outputpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
geneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containing gene list and terms associated with them are stored as text files.

Examples

```
## Not run:
terms="Muscle Weakness"
smapName="NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
clinvar = system.file("extdata", "localPDB/", package="nanotatoR")
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
labelType = c("SE")
SE_path = system.file("extdata", "SoloFile/", package="nanotatoR")
SE_pattern = "*_DLE1_*"
Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR")
mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR")
mergedKeyoutpath = system.file("extdata", package="nanotatoR")
mergedKeyFname = "Sample_index.csv"
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_main_Duo_SE(
  smap = smap, bed = bedFile, inputfmtBed = c("bed"), limsize = 1000,
  n=3,EnzymeType = c("SE"),
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = TRUE,
  labelType = c("SE"),
  SE_path = SE_path, SE_pattern = SE_pattern,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1, perc_similarity_INF_parents = 0.9,
  hgpath = hgpath, win_indel_DGV = 10000, win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez=c("Single"),
  term = "Liver cirrhosis",
  omim = omim, clinvar = clinvar, gtr = gtr,
  removeClinvar = TRUE, removeGTR = TRUE,
  downloadClinvar = FALSE, downloadGTR = FALSE,
  RNASeqDatasetPresent = FALSE,
  RNASeqcombo = TRUE,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  pattern_Proband = "*_P_*",
  outpath = outpath,
```

```

outputFilename = outputFilename,
termListPresent = FALSE, primaryGenesPresent = FALSE,
InternaldatabasePresent = TRUE,
outputType = c("Excel"))

## End(Not run)

```

nanotatoR_main_Solo_SE

Annotation and visualisation of Bionano SV, of DLE Solo samples.

Description

Annotation and visualisation of Bionano SV, of DLE Solo samples.

Usage

```

nanotatoR_main_Solo_SE(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,

```

```

SE_path,
SE_pattern,
Samplecodes,
mergeKey,
mergedKeyoutpath,
mergedKeyFname,
RNAseqcombo = TRUE,
RNASeqDir,
returnMethod = "dataFrame",
RNASeqData,
RNASeqPATH,
pattern_Proband = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
datGeneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.

smappath	character. Path and file name for textfile.
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.
path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.
win_indel_INF	Numeric. Insertion and deletion error window.
win_inv_trans_INF	Numeric. Inversion and translocation error window.
perc_similarity_INF	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion confidence.
invconf	Numeric. Threshold for inversion confidence.
transconf	Numeric. Threshold for translocation confidence.
hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
win_indel_DGV	Numeric. Insertion and deletion error window for DGV.
win_inv_trans_DGV	Numeric. Inversion and translocation error window for DGV.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..
method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile.
term	character. Single or Multiple Terms.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
limsize	Numeric. Minimum size for SV. Default 1000.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
RNAseqcombo	boolean whether RNASeq datasets are combined or not.
RNASeqDir	boolean Directory for RNASeq.

returnMethod	character. Choice between text or data frame as the output.
RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
pattern_Proband	character. Pattern for proband.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
datGeneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containg gene list and terms associated with them are stored as text files.

Examples

```

smapName="NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
clinvar = system.file("extdata", "localPDB/", package="nanotatoR")
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
labelType = c("SE")
SE_path = system.file("extdata", "SoloFile/", package="nanotatoR")
SE_pattern = "*_DLE1_*"
Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR")
mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR")
mergedKeyoutpath = system.file("extdata", package="nanotatoR")
mergedKeyFname = "Sample_index.csv"
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "NA12878_DLE1_VAP_solo5_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_main_Solo_SE(
  smap = smap, bed = bedFile, inputfmtBed = c("bed"),
  n=3,EnzymeType = c("SE"),
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = TRUE,
  labelType = c("SE"), decipherpath = decipherpath,
  SE_path = SE_path, SE_pattern = SE_pattern,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1,
  hgpath = hgpath, win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5, limsize = 1000,
  method_entrez=c("Single"),
  term = "Liver cirrhosis", RZIPpath = RZIPpath,
  omim = omim, clinvar = clinvar, gtr = gtr,
  removeClinvar = TRUE, removeGTR = TRUE,
  downloadClinvar = FALSE, downloadGTR = FALSE,
  RNASeqDatasetPresent = TRUE,
  RNASeqcombo = TRUE, datGeneListPresent = FALSE,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  pattern_Proband = "*_P_*",
  outpath = outpath,
  indexfile = system.file("extdata", "Sample_index.csv",package="nanotatoR"),
  primaryGenesPresent = FALSE,
  outputFilename = outputFilename,
  termListPresent = FALSE,
  InternaldatabasePresent = TRUE,
  outputType = c("Excel"))

```

nanotatoR_main_Solo_SVmerge

Annotation and visualisation of Bionano SV, of Solo SVMerge samples.

Description

Annotation and visualisation of Bionano SV, of Solo SVMerge samples.

Usage

```
nanotatoR_main_Solo_SVmerge(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
  mergedKeyoutpath,
  mergedKeyFname,
  RNAseqcombo = TRUE,
```

```

RNASeqDir,
returnMethod = "dataFrame",
RNASeqData,
RNASeqPATH,
pattern_Proband = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
geneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.
smappath	character. Path and file name for textfile.
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.
path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.

win_indel_INF	Numeric. Insertion and deletion error window.
win_inv_trans_INF	Numeric. Inversion and translocation error window.
perc_similarity_INF	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion confidence.
invconf	Numeric. Threshold for inversion confidence.
transconf	Numeric. Threshold for translocation confidence.
hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
win_indel_DGV	Numeric. Insertion and deletion error window for DGV.
win_inv_trans_DGV	Numeric. Inversion and translocation error window for DGV.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..
method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile.
term	character. Single or Multiple Terms.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
limsize	Numeric. Minimum size for SV. Default 1000.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutputpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
RNAseqcombo	boolean whether RNASeq datasets are combined or not.
RNASeqDir	boolean Directory for RNASeq.
returnMethod	character. Choice between text or data frame as the output.
RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
pattern_Proband	character. Pattern for proband.

outpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
geneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containg gene list and terms associated with them are stored as text files.

Examples

```

smapName="NA12878_Q.S_VAP_SVmerge_solo5.txt"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
clinvar = system.file("extdata", "localPDB/", package="nanotatoR")
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
labelType = c("SE")
SE_path = system.file("extdata", "SoloFile/", package="nanotatoR")
SE_pattern = "*_DLE1_*"
Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR")
mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR")
mergedKeyoutpath = system.file("extdata", package="nanotatoR")
mergedKeyFname = "Sample_index.csv"
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "NA12878_Q.S_VAP_SVmerge_solo5_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_main_Solo_SVmerge(
  smap = smap, bed = bedFile, inputfmtBed = c("bed"),
  n=3,EnzymeType = c("SVMerge"),
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = TRUE,
  labelType = c("SE"), decipherpath = decipherpath,
  SE_path = SE_path, SE_pattern = SE_pattern,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1,
  hgpath = hgpath, win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5, limsize = 1000,
  method_entrez=c("Single"),
  term = "Liver cirrhosis", RZIPpath = RZIPpath,
  omim = omim, clinvar = clinvar, gtr = gtr,
  removeClinvar = TRUE, removeGTR = TRUE,
  downloadClinvar = FALSE, downloadGTR = FALSE,
  RNASeqDatasetPresent = TRUE,
  RNASeqcombo = TRUE, geneListPresent = FALSE,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  pattern_Proband = "*_P_*",
  outpath = outpath,
  indexfile = system.file("extdata", "Sample_index.csv", package="nanotatoR"),
  primaryGenesPresent = FALSE,
  outputFilename = outputFilename,
  termListPresent = FALSE,
  InternaldatabasePresent = TRUE,
  outputType = c("Excel"))

```

nanotatoR_main_Trio_SE

Annotation and visualisation of Bionano SV, of DLE Trio samples.

Description

Annotation and visualisation of Bionano SV, of DLE Trio samples.

Usage

```
nanotatoR_main_Trio_SE(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  perc_similarity_INF_parents = 0.9,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
  mergedKeyoutpath,
  mergedKeyFname,
```

```

RNAseqcombo = TRUE,
RNASeqDir,
returnMethod = "dataFrame",
RNASeqData,
RNASeqPATH,
pattern_Proband = NA,
pattern_Mother = NA,
pattern_Father = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
geneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.
smappath	character. Path and file name for textfile.
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.

path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.
win_indel_INF	Numeric. Insertion and deletion error window.
win_inv_trans_INF	Numeric. Inversion and translocation error window.
perc_similarity_INF	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion confidence.
invconf	Numeric. Threshold for inversion confidence.
transconf	Numeric. Threshold for translocation confidence.
perc_similarity_INF_parents	Numeric . ThresholdPercentage similarity for parent zygosity calculation. Default threshold 0.9.
hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
win_indel_DGV	Numeric. Insertion and deletion error window for DGV.
win_inv_trans_DGV	Numeric. Inversion and translocation error window for DGV.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..
method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile.
term	character. Single or Multiple Terms.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
limsize	Numeric. Minimum size for SV. Default 1000.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutputpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
RNAseqcombo	boolean whether RNASeq datasets are combined or not.
RNASeqDir	boolean Directory for RNASeq.
returnMethod	character. Choice between text or data frame as the output.

RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
pattern_Proband	character. Pattern for proband.
pattern_Mother	character. Pattern to identify the mother reads.
pattern_Father	character. Pattern to identify the father reads.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
geneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containg gene list and terms associated with them are stored as text files.

Examples

```
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
clinvar = system.file("extdata", "localPDB/", package="nanotatoR")
gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR")
mergedFiles = system.file("extdata", "nanotatoRControl.txt", package="nanotatoR")
indexfile = system.file("extdata", "Sample_index.csv", package="nanotatoR")
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "NA12878_DLE1_VAP_solo5_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_main_Trio_SE(
  smap = smap, bed = bedFile, inputfmtBed = c("bed"),
  n=3,EnzymeType = c("SE"),
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = FALSE,
  decipherpath = decipherpath,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1, perc_similarity_INF_parents = 0.9,
  hgpath = hgpath, win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5, limsize = 1000,
  method_entrez=c("Single"),
  term = "Liver cirrhosis", RZIPpath = RZIPpath,
  omim = omim, clinvar = clinvar, gtr = gtr,
  removeClinvar = TRUE, removeGTR = TRUE,
  downloadClinvar = FALSE, downloadGTR = FALSE,
  RNASeqDatasetPresent = TRUE,
  RNASeqcombo = TRUE, geneListPresent = FALSE,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  pattern_Proband = "*_P_*",
  outpath = outpath,
  indexfile = system.file("extdata", "Sample_index.csv",package="nanotatoR"),
  primaryGenesPresent = FALSE,
  outputFilename = outputFilename,
  termListPresent = FALSE,
  InternaldatabasePresent = TRUE,
  outputType = c("Excel"))
```

nanotatoR_SVmerge_Trio

Annotation and visualisation of Bionano SV, of DLE Trio samples.

Description

Annotation and visualisation of Bionano SV, of DLE Trio samples.

Usage

```
nanotatoR_SVmerge_Trio(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBed"),
  n = 3,
  buildBNInternalDB = TRUE,
  mergedFiles,
  smappath,
  buildSVInternalDB = FALSE,
  path,
  pattern,
  win_indel_INF = 10000,
  win_inv_trans_INF = 50000,
  perc_similarity_INF = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  transconf = 0.1,
  perc_similarity_INF_parents = 0.9,
  hgpath,
  win_indel_DGV = 10000,
  win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  method_entrez = c("Single", "Multiple", "Text"),
  termPath,
  term,
  thresh = 5,
  limsize = 1000,
  EnzymeType = c("SVmerge", "SE"),
  labelType = c("SVMerge", "SE", "Both"),
  SVMerge_path,
  SVMerge_pattern,
  SE_path,
  SE_pattern,
  Samplecodes,
  mergeKey,
  mergedKeyoutpath,
  mergedKeyFname,
  RNAseqcombo = TRUE,
  RNASeqDir,
  returnMethod = "dataFrame",
  RNASeqData,
  RNASeqPATH,
  pattern_Proband = NA,
```

```

pattern_Mother = NA,
pattern_Father = NA,
outpath,
outputFilename = "",
termListPresent = TRUE,
internalBNDB,
clinvar,
InternaldatabasePresent = TRUE,
RNASeqDatasetPresent = TRUE,
geneListPresent = TRUE,
omim,
gtr,
removeClinvar = FALSE,
removeGTR = FALSE,
downloadClinvar = FALSE,
downloadGTR = FALSE,
url_gtr,
omimID,
RZIPpath,
directoryName,
fileprefix,
datGeneListPath,
decipherpath,
indexfile,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv")
)

```

Arguments

smap	character. File name for the smap
bed	Text Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
buildBNInternalDB	boolean. Checking whether the merged BNDB file database exist.
mergedFiles	character. Path to the merged SV files.
smappath	character. Path and file name for textfile.
buildSVInternalDB	boolean. Checking whether the merged solo file database exist.
path	character. Path to the solo file database.
pattern	character. pattern of the file names to merge.
win_indel_INF	Numeric. Insertion and deletion error window.
win_inv_trans_INF	Numeric. Inversion and translocation error window.

perc_similarity_INF	Numeric . ThresholdPercentage similarity of the query SV and reference SV.
indelconf	Numeric. Threshold for insertion and deletion confidence.
invconf	Numeric. Threshold for inversion confidence.
transconf	Numeric. Threshold for translocation confidence.
perc_similarity_INF_parents	Numeric . ThresholdPercentage similarity for parent zygoty calculation. Default threshold 0.9.
hgpath	character. Path to Database of Genomic Variants (DGV) Text file.
win_indel_DGV	Numeric. Insertion and deletion error window for DGV.
win_inv_trans_DGV	Numeric. Inversion and translocation error window for DGV.
perc_similarity_DGV	Numeric . ThresholdPercentage similarity of the query SV and reference SV, for DGV..
method_entrez	character. Input Method for terms. Choices are "Single", "Multiple" and "Text".
termPath	character. Path and file name for textfile.
term	character. Single or Multiple Terms.
thresh	integer. Threshold for the number of terms sent to entrez. Note if large lists are sent to ncbi, it might fail to get processed. Default is 5.
limsize	Numeric. Minimum size for SV. Default 1000.
EnzymeType	Character. Type of enzyme. Options Dual and DLE.
labelType	character. Type of labels used for mapping. Choices are Dual, DLE and Both.
SVMerge_path	character. Path for the Dual labelled cmap
SVMerge_pattern	character. pattern of the dual files.
SE_path	character. Path for the Dual labelled cmap
SE_pattern	character. pattern of the dual files.
Samplecodes	character. File containing relations and IDs associated to them.
mergeKey	character. File containing sample ID and relation.
mergedKeyoutpath	character. File path storing sample name and nanoID key information.
mergedKeyFname	character. File name storing sample name and nanoID key information.
RNAseqcombo	boolean whether RNASeq datasets are combined or not.
RNASeqDir	boolean Directory for RNASeq.
returnMethod	character. Choice between text or data frame as the output.
RNASeqData	dataFrame. RNASeq data with gene names.
RNASeqPATH	character. RNASeq dataset path .
pattern_Proband	character. Pattern for proband.
pattern_Mother	character. Pattern to identify the mother reads.

pattern_Father	character. Pattern to identify the father reads.
outputpath	Character Directory to the output file.
outputFilename	Character Output filename.
termListPresent	logical Checks whether term list is provided by the user.
internalBNDB	character. internak Bionano merged databse.
clinvar	character. clinvar file name and location.
InternaldatabasePresent	boolean. Checking whether internal DB present.
RNASeqDatasetPresent	boolean. Checking whether RNASeq database present or not.
geneListPresent	logical Checks whether gene list is provided by the user.
omim	character. omim2gene file name and location.
gtr	character. gtr file name and location.
removeClinvar	logical. Deletes the Clinvar database if TRUE.
removeGTR	logical. Deletes the GTR database if TRUE.
downloadClinvar	logical. Downloads the Clinvar database if TRUE.
downloadGTR	logical. Downloads the GTR database if TRUE.
url_gtr	character. url for GTR.
omimID	character. Omim ID.
RZIPpath	character. Path to RZippath.
directoryName	Directory name where individual SV files will be stored.
fileprefix	character Prefix to use for each of the files in the directory.
datGeneListPath	Character Path for genelist.
decipherpath	character. Decipher database path.
indexfile	character. indexfile containing nano ID and sample relation.
primaryGenesPresent	logical Checks whether primarygene list is provided by the user.
outputType	Variants in excel tabs or in different csv files. Options Excel or csv.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Text files containg gene list and terms associated with them are stored as text files.

Examples

```
## Not run:
smapName="NA12878_Q.S_VAP_SVmerge_solo5.txt"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
labelType = c("SE")
SE_path = system.file("extdata", "SoloFile/", package="nanotatoR")
SE_pattern = "*_DLE1_*"
Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR")
mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR")
mergedKeyoutpath = system.file("extdata", package="nanotatoR")
mergedKeyFname = "Sample_index.csv"
RNASeqDir = system.file("extdata", "NA12878_P_Blood_S1.genes.results", package="nanotatoR")
path = system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern = "_hg19.txt"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
nanotatoR_main_Solo_SE(
  smap = smap, bed = bedFile, inputfmt = c("bed"),
  n=3,
  buildBNInternalDB=TRUE,
  path = path , pattern = pattern,
  buildSVInternalDB = TRUE,
  EnzymeType = c("SVMerge"),
  labelType = c("SVMerge"),
  SE_path = SE_path, SE_pattern = SE_pattern,
  win_indel_INF = 10000, win_inv_trans_INF = 50000,
  perc_similarity_INF= 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1,
  hgpath = hgpath, win_indel_DGV = 10000, win_inv_trans_DGV = 50000,
  perc_similarity_DGV = 0.5,
  RNAseqcombo = TRUE, perc_similarity_INF_parents = 0.9,
  RNASeqDir = RNASeqDir, returnMethod = "dataFrame",
  pattern_Proband = "*_P_*",
  outpath = outpath,
  outputFilename = outputFilename,
  termListPresent = FALSE,
  InternaldatabasePresent = FALSE,
  primaryGenesPresent = FALSE,
  outputType = c("Excel"))

## End(Not run)
```

nonOverlapGenes

Calculates Genes that are near to the SV region

Description

Calculates Genes that are near to the SV region

Usage

```
nonOverlapGenes(
  bed,
  chrom,
  startpos,
  chrom2,
  endpos,
  svid,
  n = 3,
  SVTyp,
  bperrorindel = 3000,
  bperrorinvtrans = 50000
)
```

Arguments

bed	Text Bionano Bed file.
chrom	character SVmap chromosome.
startpos	numeric starting position of the breakpoints.
chrom2	character SVmap 2nd chromosome.
endpos	numeric end position of the breakpoints.
svid	numeric Structural variant identifier (Bionano generated).
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
SVTyp	Character. Type of SV.
bperrorindel	Numeric. base pair error indel.
bperrorinvtrans	Numeric. base pair error invtranslocation.

Value

Data Frame. Contains the SVID, Gene name, strand information and Distance from the SV covered.

Examples

```
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed",
  package="nanotatoR")
bed<-buildrunBNBedFiles(bedFile,returnMethod="dataFrame")
smap<-readSMap_DLE(smap, input_fmt_smap = "Text")
chrom<-smap$RefcontigID1
chrom2 <- smap$RefcontigID2
startpos<-smap$RefStartPos
endpos<-smap$RefEndPos
if (length(grep("SVIndex",names(smap)))>0){
  svid <- smap$SVIndex
```

```

    }else{
      svid <- smap$SmapEntryID
    }
    SVTyp <- smap$SType
    n<-3
    nonOverlapGenes(bed = bed, chrom = chrom, startpos = startpos,
endpos = endpos, svid = svid, chrom2 = chrom2, SVTyp = SVTyp,
      bpperrorindel = 3000, bpperrorinvtrans = 50000, n = 3)

```

nonOverlappingDNGenes *Extracting terms for genes that overlap SVs*

Description

Extracting terms for genes that overlap SVs

Usage

```
nonOverlappingDNGenes(rr, dngene)
```

Arguments

rr	character. dataframe with primary genes and terms associated.
dngene	character. genes that overlap the SV.

Value

Dataframe with overlapping genes and terms.

Examples

```

terms= c("steroid_Gene","steroid synthesis_Gene")
genes <- c("NR1H3", "ABCC4")
rr <- data.frame(Genes = genes, Terms = terms)
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
bed=bedFile, inputfmtBed = "bed", outpath,
n = 3, returnMethod_bedcomp = c("dataFrame"),
input_fmt_SV = "Text",
EnzymeType = "SE",
bpperrorindel = 3000, bpperrorinvtrans = 50000)
dngene <- as.character(datcomp$Downstream_nonOverlapGenes_dist_kb)
dataPGDN <- nonOverlappingDNGenes (rr, dngene)

```

nonOverlappingUPGenes *Extracting terms for genes that overlap SVs*

Description

Extracting terms for genes that overlap SVs

Usage

```
nonOverlappingUPGenes(rr, upgene)
```

Arguments

rr character. dataframe with primary genes and terms associated.
upgene character. genes that overlap the SV.

Value

Dataframe with overlapping genes and terms.

Examples

```
terms= c("steroid_Gene","steroid synthesis_Gene")
genes <- c("NR1H3", "ABCC4")
rr <- data.frame(Genes = genes, Terms = terms)
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
bed=bedFile, inputfmtBed = "bed", outpath,
n = 3, returnMethod_bedcomp = c("dataFrame"),
input_fmt_SV = "Text",
EnzymeType = "SE",
bperrorindel = 3000, bperrorinvtrans = 50000)
upgene <- as.character(datcomp$Upstream_nonOverlapGenes_dist_kb)
dataPGUP <- nonOverlappingUPGenes (rr, upgene)
```

nonOverlapRNAseq *Extract Read counts for genes that are near SVs.*

Description

Extract Read counts for genes that are near SVs.

Usage

```
nonOverlapRNAseq(
  gnsNonOverlap,
  SVID,
  RNASeqData,
  pattern_Proband = NA,
  pattern_Mother = NA,
  pattern_Father = NA
)
```

Arguments

gnsNonOverlap character. genes that are upstream and/or downstream of SV.

SVID character. ID of the SVs.

RNASeqData character. Expression of the genes.

pattern_Proband character. Pattern to identify the proband reads.

pattern_Mother character. Pattern to identify the mother reads.

pattern_Father character. Pattern to identify the father reads.

Value

Text or Dataframe containing TPM read counts of genes in the family.

Examples

```
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine(RNASeqDir = RNASeqDir,
  returnMethod = returnMethod)
gnsNonOverlap <- c("DDX11L1", "MIR1302-2HG", "OR4G4P")
SVID = 397
datgnsnonovrlap <- nonOverlapRNAseq(gnsNonOverlap = gnsNonOverlap,
  SVID = SVID, RNASeqData = datRNASeq,
  pattern_Proband = "*_P_*")
```

nonOverlapRNAseq_solo *Annotating the Non-Overlapping genes with RNAseq expression*

Description

Annotating the Non-Overlapping genes with RNAseq expression

Usage

```
nonOverlapRNAseq_solo(gnsNonOverlap, SVID, RNASeqData, pattern_Proband = NA)
```

Arguments

- gnsNonOverlap character. Vector containing non-overlapping genes.
- SVID character. SV Index ID.
- RNASeqData dataframe. RNAseq data with gene names.
- pattern_Proband character. Pattern for proband.

Value

Dataframe containing TPM read counts of overlapping genes.

Examples

```
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine_solo(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)
gnsNonOverlap <- c("DDX11L1", "MIR1302-2HG", "OR4G4P")
SVID = 397
datgnonovrlap <- nonOverlapRNAseq_solo(gnsNonOverlap = gnsNonOverlap,
SVID = SVID, RNASeqData = datRNASeq,
pattern_Proband = "*_P_*")
```

omim_gene	<i>Extracting genes from OMIM database NCBI.</i>
-----------	--

Description

Extracting genes from OMIM database NCBI.

Usage

```
omim_gene(terms, omim)
```

Arguments

- terms character Single or Multiple Terms.
- omim character omim database location.

Value

Dataframe returned containing gene lists in entrezid and Gene Symbols, and terms associated with it

Examples

```
terms="Liver cirrhosis"
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
ge <- omim_gene(terms = terms, omim = omim)
```

overlapGenes	<i>Calculates Genes that overlap the SV region</i>
--------------	--

Description

Calculates Genes that overlap the SV region

Usage

```
overlapGenes(
  bed,
  chrom,
  startpos,
  endpos,
  svid,
  chrom2,
  SVTyp,
  bperrorindel = 3000,
  bperrorinvtrans = 50000
)
```

Arguments

bed	Text Bionano Bed file.
chrom	character SVmap chromosome.
startpos	numeric starting position of the breakpoints.
endpos	numeric end position of the breakpoints.
svid	numeric Structural variant identifier (Bionano generated).
chrom2	character SVmap chromosome number 2.
SVTyp	Character. Type of SV.
bperrorindel	Numeric. base pair error indel.
bperrorinvtrans	Numeric. base pair error invtranslocation.

Value

Data Frame. Contains the SVID, Gene name, strand information and percentage of SV covered.

Examples

```
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed",
  package="nanotatoR")
bed<-buildrunBNBedFiles(bedFile,returnMethod="dataFrame")
```

```

smap<-readSMap_DLE(smap, input_fmt_smap = "Text")
chrom<-smap$RefcontigID1
chrom2 <- smap$RefcontigID2
startpos<-smap$RefStartPos
endpos<-smap$RefEndPos
if (length(grep("SVIndex",names(smap)))>0){
  svid <- smap$SVIndex
}else{
  svid <- smap$SmapEntryID
}
SVTyp <- smap$Type
overlapGenes(bed = bed, chrom = chrom, startpos = startpos,
  endpos = endpos, chrom2 = chrom2, svid = svid,
  SVTyp = SVTyp,
  bperrorindel = 3000, bperrorinvtrans = 50000)

```

overlapnearestgeneSearch

Extracts gene information from bed files

Description

Extracts gene information from bed files

Usage

```

overlapnearestgeneSearch(
  smap,
  bed,
  inputfmtBed = c("bed", "BNBED"),
  EnzymeType = c("SVMerge", "SE"),
  outputpath,
  n = 3,
  returnMethod_bedcomp = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  bperrorindel = 3000,
  bperrorinvtrans = 50000
)

```

Arguments

smap	character or dataFrame depending on the input_fmt_SV argument. If input_fmt_SV= 'Text', it is path to SMAP file. If input_fmt_SV= 'dataFrame', it is a dataframe.
bed	Text. Normal Bed files or Bionano Bed file.
inputfmtBed	character Whether the bed input is UCSC bed or Bionano bed. Note: extract in bed format to be read by bedsv: <code>awk ' if(\$3 == "gene" && \$13 == "gene_status") print \$1,\$4,\$5,\$16,\$7 else if (\$3 == "gene" && \$13 == "gene_name") print \$1,\$4,\$5,\$14,\$7 ' gencode.v33.annotation.gtf >HomoSapienGRCH19.bed</code>

EnzymeType	Character. Type of enzyme. Options SVMerge and SE.
outpath	character Path for the output files.
n	numeric Number of genes to report which are nearest to the breakpoint. Default is 3.
returnMethod_bedcomp	Character. Type of output Dataframe or in Text format.
input_fmt_SV	Character. Type of output Dataframe or in Text format.
bperrorindel	Numeric. base pair error indel.
bperrorinvtrans	Numeric. base pair error invtranslocation.

Value

Data Frame and Text file. Contains the smap with additional Gene Information.

Examples

```
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
bed=bedFile, inputfmtBed = "bed", outpath,
n = 3, returnMethod_bedcomp = c("dataFrame"),
input_fmt_SV = "Text",
EnzymeType = "SE",
bperrorindel = 3000, bperrorinvtrans = 50000)
datcomp[1,]
```

overlappingGenes	<i>Extracting terms for genes that overlap SVs</i>
------------------	--

Description

Extracting terms for genes that overlap SVs

Usage

```
overlappingGenes(rr, ogene)
```

Arguments

rr	character. dataframe with primary genes and terms associated.
ogene	character. genes that overlap the SV.

Value

Dataframe with overlapping genes and terms.

Examples

```

terms= c("steroid_Gene","steroid synthesis_Gene")
genes <- c("NR1H3", "ABCC4")
rr <- data.frame(Genes = genes, Terms = terms)
smapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
bed=bedFile, inputfmtBed = "bed", outpath,
n = 3, returnMethod_bedcomp = c("dataFrame"),
input_fmt_SV = "Text",
EnzymeType = "SE",
bperrorindel = 3000, bperrorinvtrans = 50000)
ogene <- as.character(datcomp$OverlapGenes_strand_perc)
datogenes <- overlappingGenes (rr, ogene)

```

OverlapRNAseq	<i>Extract Read counts for genes that overlap SVs.</i>
---------------	--

Description

Extract Read counts for genes that overlap SVs.

Usage

```

OverlapRNAseq(
  gnsOverlap,
  SVID,
  RNASeqData,
  pattern_Proband = NA,
  pattern_Mother = NA,
  pattern_Father = NA
)

```

Arguments

- gnsOverlap character. genes that overlap SV.
- SVID character. ID of the SVs.
- RNASeqData character. Expression of the genes.
- pattern_Proband character. Pattern to identify the proband reads.
- pattern_Mother character. Pattern to identify the mother reads.
- pattern_Father character. Pattern to identify the father reads.

Value

Text or Dataframe containing TPM read counts of genes in the family.

Examples

```

RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)
gnsOverlap <- c("AGL")
SVID = 397
datgnovrlap <- OverlapRNAseq(gnsOverlap = gnsOverlap,
SVID = SVID, RNASeqData = datRNASeq,
pattern_Proband = "*_P_*")

```

OverlapRNAseq_solo	<i>Annotating the Overlapping genes with RNAseq expression</i>
--------------------	--

Description

Annotating the Overlapping genes with RNAseq expression

Usage

```
OverlapRNAseq_solo(gnsOverlap, SVID, RNASeqData, pattern_Proband = NA)
```

Arguments

gnsOverlap	character. Vector containing overlapping genes.
SVID	character. SV Index ID.
RNASeqData	dataFrame. RNAseq data with gene names.
pattern_Proband	character. Pattern for proband.

Value

Dataframe containing TPM read counts of overlapping genes.

Examples

```

RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine_solo(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)
gnsOverlap <- c("AGL")
SVID = 397
datgnovrlap <- OverlapRNAseq_solo(gnsOverlap = gnsOverlap,
SVID = SVID, RNASeqData = datRNASeq,
pattern_Proband = "*_P_*")

```

phenoextractHPO_mod	<i>Extract the genes related to a disease or disease alias from HPO database.</i>
---------------------	---

Description

Extract the genes related to a disease or disease alias from HPO database.

Usage

```
phenoextractHPO_mod(keyword, localPDB.path)
```

Arguments

keyword	character. character string: keyword, to search a disease, a clinical feature, or a phenotype.
localPDB.path	character. the path of localized public data bases. The default value is set in the working directory.

Value

subset of HPO and extract the genes and alias for a disease(phenotype), or a clinical feature. Function modified from pheno_extract_HPO function VarFromPDB.

Examples

```
HPO.phenotype = phenoextractHPO_mod("retinoblastoma",
localPDB.path = system.file("extdata", "localPDB", package="nanotatoR"))
```

readBNBedFiles	<i>Reads Bionano Bedfiles</i>
----------------	-------------------------------

Description

Reads Bionano Bedfiles

Usage

```
readBNBedFiles(BNFile)
```

Arguments

BNFile	character. Path to Bionano Bed File.
--------	--------------------------------------

Value

Data Frame Contains the gene information.

Examples

```
BNFile <- system.file("extdata", "HomoSapienGRCH19_lift37_BN.bed", package="nanotatoR")
bed<-readBNBedFiles(BNFile)
```

reading_GTR

Reading and parsing gtr database.

Description

Reading and parsing gtr database.

Usage

```
reading_GTR(
  gtr,
  downloadGTR,
  url_gtr = "ftp://ftp.ncbi.nlm.nih.gov/pub/GTR/data/test_condition_gene.txt"
)
```

Arguments

gtr	character gtr database location.
downloadGTR	logical if true, downloads gtr database, . and store data in the gtr location, else reads dataset from gtr location.
url_gtr	character url for gtr database.

Value

Dataframe representation of gtr database.

Examples

```
a <- reading_GTR(
  gtr = system.file("extdata", "gtrDatabase.txt", package="nanotatoR"),
  downloadGTR = FALSE)
```

reading_mim2gene	<i>Reading and parsing OMIM database.</i>
------------------	---

Description

Reading and parsing OMIM database.

Usage

```
reading_mim2gene(omim)
```

Arguments

omim character omim database location.

Value

Dataframe returned containing Omim ID and gene IDs.

Examples

```
omim = system.file("extdata", "mim2gene.txt", package="nanotatoR")
a <- reading_mim2gene(omim = omim)
```

readSMap	<i>Reads SMAP files to extract information from SVMerge</i>
----------	---

Description

Reads SMAP files to extract information from SVMerge

Usage

```
readSMap(smap, smapdata, input_fmt_smap = c("Text", "dataFrame"))
```

Arguments

smap character. Path to SMAP file.
smapdata dataframe. variable for smap dataset.
input_fmt_smap character. input format for smap text or dataframe.

Value

Data Frame or text file. Contains the SMAP information.

Examples

```
smapName="NA12878_Q.S_VAP_SVmerge_solo5.txt"
smap = system.file("extdata", smapName, package="nanotatoR")
readSMap(smap, input_fmt_smap = "Text")
```

readSMap_DLE	<i>Reads DLE SMAP files to extract information</i>
--------------	--

Description

Reads DLE SMAP files to extract information

Usage

```
readSMap_DLE(smap, smapdata, input_fmt_smap = "Text")
```

Arguments

smmap	character. Path to SMAP file.
smapdata	dataframe. variable for smap dataset.
input_fmt_smap	character. input format for smap text or dataframe.

Value

Data Frame or text file. Contains the SMAP information.

Examples

```
smmapName="GM24385_Ason_DLE1_VAP_trio5.smap"
smmap = system.file("extdata", smmapName, package="nanotatoR")
readSMap_DLE(smap, input_fmt_smap = "Text")
```

RNAseqcombine	<i>Combining the RNAseq reads of family members in a single file.</i>
---------------	---

Description

Combining the RNAseq reads of family members in a single file.

Usage

```
RNAseqcombine(
  RNASeqDir,
  returnMethod = c("Text", "dataFrame"),
  outpath = "",
  outFileName = ""
)
```

Arguments

RNASeqDir	character. Directory containing RNAseq reads.
returnMethod	character. Method of returning Data.
outpath	character. Contains file path if Method of return is chosen as Text.
outFileName	character. Output file name.

Value

Text or Dataframe containing TPM read counts of genes in the family.

Examples

```
## Not run:
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)

## End(Not run)
```

RNAseqcombine_solo	<i>Combining the RNAseq reads of family members in a single file.</i>
--------------------	---

Description

Combining the RNAseq reads of family members in a single file.

Usage

```
RNAseqcombine_solo(
  RNASeqDir,
  returnMethod = c("Text", "dataFrame"),
  outpath = "",
  outFileName = ""
)
```

Arguments

RNASeqDir	character. Directory containing RNAseq reads.
returnMethod	character. Method of returning Data.
outpath	character. Contains file path if Method of return is chosen as Text.
outFileName	character. Output file name.

Value

Text or Dataframe containing TPM read counts of genes in the family.

Examples

```
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine_solo(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)
```

```
run_bionano_filter_SE_duo
```

Getting the data from annotated smaps to extract SV information based on type of variants.

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```
run_bionano_filter_SE_duo(
  primaryGenesPresent = TRUE,
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  smap = NULL,
  svData,
  dat_geneList,
  fileName,
  outpath,
  outputFilename = "",
  RZIPpath,
  EnzymeType = c("SVMerge", "SE"),
  outputType = c("Excel", "csv"),
  directoryName,
  fileprefix
)
```

Arguments

primaryGenesPresent	boolean Checks whether the primary gene List is present or not.
input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.
dat_geneList	Dataframe Input data containing geneList data.
fileName	Character Name of file containing Gene List data.

outpath	Character Directory to the output file.
outputFilename	Character Output filename.
RZIPpath	Character Path for the Rtools Zip package.
EnzymeType	Character. Enzyme type used. Options SVMerge or SE.
outputType	Character. Variants in excel tabs or in different csv files. Options Excel or csv.
directoryName	Character. Directory name where individual SV files will be stored.
fileprefix	Character. fileprefix to use for each of the files in the directory.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```
## Not run:
smapName <- "GM24385_DLE-1_P_trio_hg19.smap"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
run_bionano_filter_SE_duo (input_fmt_geneList = c("Text"),
  input_fmt_SV = c("Text"),
  smap = smappath,
  dat_geneList = dat_geneList,
  RZIPpath = RZIPpath, EnzymeType = c("SE"),
  outputType = c("Excel"),
  primaryGenesPresent = FALSE,
  outputFilename = outputFilename,
  outpath = outpath)##
## End(Not run)
```

```
run_bionano_filter_SE_solo
```

Getting the data from annotated smaps to extract SV information based on type of variants.

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```
run_bionano_filter_SE_solo(
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  EnzymeType = c("SE", "SVMerge"),
  smap = NULL,
```

```

svData,
dat_geneList,
fileName,
outpath,
outputFilename = "",
RZIPpath,
primaryGenesPresent = TRUE,
outputType = c("Excel", "csv"),
directoryName,
fileprefix
)

```

Arguments

input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
EnzymeType	Character. Enzyme type used. Options SVMerge or SE.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.
dat_geneList	Dataframe Input data containing geneList data.
fileName	Character Name of file containing Gene List data.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
RZIPpath	Character Path for the Rtools Zip package.
primaryGenesPresent	boolean Checks whether the primary gene List is present or not.
outputType	Character. Variants in excel tabs or in different csv files. Options Excel or csv.
directoryName	Character. Directory name where individual SV files will be stored.
fileprefix	Character. fileprefix to use for each of the files in the directory.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```

smapName <- "NA12878_DLE1_VAP_solo5.smap"
outputFilename <- "NA12878_DLE1_VAP_solo5_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,

```

```

    bed=bedFile, inputfmtBed = "bed", outpath,
    n = 3, returnMethod_bedcomp = c("dataFrame"),
    input_fmt_SV = "Text",
    EnzymeType = "SE",
    bperrorindel = 3000, bperrorinvtrans = 50000)
hgbath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
datDGV <- DGVfrequency (hgbath = hgbath,
    smap_data = datcomp,
    win_indel_DGV = 10000,
    input_fmt_SV = "dataFrame", EnzymeType = "SE",
    perc_similarity_DGV = 0.5,returnMethod="dataFrame")
indelconf = 0.5; invconf = 0.01;transconf = 0.1;
datInf <- internalFrequency_solo(smapdata = datDGV,
    buildSVInternalDB=TRUE, win_indel=10000,
    win_inv_trans=50000,
    labelType = c("SE"), EnzymeType = "SE",
    SE_path = system.file("extdata", "SoloFile/", package="nanotatoR"),
    SE_pattern = "*_DLE1_*", perc_similarity_parents =0.9,
    Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR"),
    mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR"),
    mergedKeyoutpath = system.file("extdata", package="nanotatoR"),
    mergedKeyFname = "Sample_index.csv",
    indexfile = system.file("extdata", mergedKeyFname, package="nanotatoR"),
    perc_similarity = 0.5, indelconf = 0.5, invconf = 0.01,
    transconf = 0.1, limsize = 1000, win_indel_parents = 5000,
    win_inv_trans_parents=40000,
    returnMethod="dataFrame", input_fmt_SV = "dataFrame")
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern <- "*_hg19_*"
directoryName <- system.file("extdata", package="nanotatoR")
datBNDB <- BNDBfrequency(smapdata = datInf,
    buildBNInternalDB=TRUE,
    input_fmt_SV = "dataFrame",
    dbOutput="dataframe",
    BNDBpath = path,
    BNDBpattern = pattern,
    fname, outpath,
    win_indel = 10000,
    win_inv_trans = 50000,
    perc_similarity = 0.5,
    indelconf = 0.5,
    invconf = 0.01,
    limsize = 1000,
    transconf = 0.1,
    returnMethod=c("dataFrame"),
    EnzymeType = c("SE"))
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
datdecipher <- Decipherfrequency (decipherpath = decipherpath,
    smap_data = datBNDB, win_indel = 10000,
    perc_similarity = 0.5,returnMethod="dataFrame",
    input_fmt_SV = "dataFrame", EnzymeType = c("SE"))
run_bionano_filter_SE_solo (input_fmt_geneList = c("Text"),
    input_fmt_SV = c("dataFrame"),

```

```
svData = datdecipher,
dat_geneList = dat_geneList,
RZIPpath = RZIPpath, EnzymeType = c("SE"),
outputType = c("csv"),
primaryGenesPresent = FALSE,
directoryName = directoryName,
fileprefix = "AnnotatedSamplesNA12878_DLE")
```

run_bionano_filter_SE_Trio

Getting the data from annotated smaps to extract SV information based on type of variants.

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```
run_bionano_filter_SE_Trio(
  primaryGenesPresent = TRUE,
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  smap = NULL,
  svData,
  dat_geneList,
  fileName,
  outpath,
  outputFilename = "",
  RZIPpath,
  outputType = c("Excel", "csv"),
  directoryName,
  fileprefix,
  EnzymeType = c("SVMerge", "SE")
)
```

Arguments

primaryGenesPresent	boolean Checks whether the primary gene List is present or not.
input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.
dat_geneList	Dataframe Input data containing geneList data.

fileName	Character Name of file containing Gene List data.
outputpath	Character Directory to the output file.
outputFilename	Character Output filename.
RZIPpath	Character Path for the Rtools Zip package.
outputType	Character. Variants in excel tabs or in different csv files. Options Excel or csv.
directoryName	Character. Directory name where individual SV files will be stored.
fileprefix	Character. fileprefix to use for each of the files in the directory.
EnzymeType	Character. Enzyme type used. Options SVmerge or SE.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```

smapName <- "GM24385_Ason_DLE1_VAP_trio5.smap"
outputFilename <- "GM24385_Ason_DLE1_VAP_trio5_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outputpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outputpath <- system.file("extdata", package="nanotatoR")
directoryName <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
  bed=bedFile, inputfmtBed = "bed", outputpath,
  n = 3, returnMethod_bedcomp = c("dataFrame"),
  input_fmt_SV = "Text",
  EnzymeType = "SE",
  berrorindel = 3000, berrorinvtrans = 50000)
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
datDGV <- DGVfrequency (hgpath = hgpath,
  smap_data = datcomp,
  win_indel_DGV = 10000,
  input_fmt_SV = "dataFrame", EnzymeType = "SE",
  perc_similarity_DGV = 0.5, returnMethod="dataFrame")
indelconf = 0.5; invconf = 0.01; transconf = 0.1;
datInf <- internalFrequencyTrio_Duo(smapdata = datDGV,
  buildSVInternalDB=TRUE, win_indel=10000,
  win_inv_trans=50000,
  labelType = c("SE"), EnzymeType = "SE",
  SE_path = system.file("extdata", "SoloFile/", package="nanotatoR"),
  SE_pattern = "*_DLE1_*", perc_similarity_parents = 0.9,
  Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR"),
  mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR"),
  mergedKeyoutputpath = system.file("extdata", package="nanotatoR"),
  mergedKeyFname = "Sample_index.csv",
  indexfile = system.file("extdata", mergedKeyFname, package="nanotatoR"),
  perc_similarity = 0.5, indelconf = 0.5, invconf = 0.01,
  transconf = 0.1, limsize = 1000, win_indel_parents = 5000,

```

```

        win_inv_trans_parents=40000,
        returnMethod="dataFrame", input_fmt_SV = "dataFrame")
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern <- "*_hg19_*"
datBNDB <- BNDBfrequency(smapdata = datInf,
    buildBNInternalDB=TRUE,
    input_fmt_SV = "dataFrame",
    dbOutput="dataframe",
    BNDBpath = path,
    BNDBpattern = pattern,
    fname, outpath,
    win_indel = 10000,
    win_inv_trans = 50000,
    perc_similarity = 0.5,
    indelconf = 0.5,
    invconf = 0.01,
    limsize = 1000,
    transconf = 0.1,
    returnMethod=c("dataFrame"),
    EnzymeType = c("SE"))
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
datdecipher <- Decipherfrequency (decipherpath = decipherpath,
    smap_data = datBNDB, win_indel = 10000,
    perc_similarity = 0.5, returnMethod="dataFrame",
    input_fmt_SV = "dataFrame", EnzymeType = c("SE"))
run_bionano_filter_SE_Trio (input_fmt_geneList = c("Text"),
    input_fmt_SV = c("dataFrame"),
    svData = datdecipher,
    dat_geneList = dat_geneList,
    RZIPpath = RZIPpath, EnzymeType = c("SE"),
    outputType = c("csv"),
    primaryGenesPresent = FALSE,
    directoryName = directoryName,
    fileprefix = "AnnotatedSamplesGM24385")

```

```
run_bionano_filter_SVMerge_duo
```

Getting the data from annotated smaps to extract SV information based on type of variants.

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```

run_bionano_filter_SVMerge_duo(
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  smap = NULL,

```

```

svData,
dat_geneList,
fileName,
outpath,
outputFilename = "",
RZIPpath,
outputType = c("Excel", "csv"),
primaryGenesPresent = TRUE,
fileprefix,
directoryName,
EnzymeType = c("SVMerge", "SE")
)

```

Arguments

input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.
dat_geneList	Dataframe Input data containing geneList data.
fileName	Character Name of file containing Gene List data.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
RZIPpath	Character Path for the Rtools Zip package.
outputType	Character. Variants in excel tabs or in different csv files. Options Excel or csv.
primaryGenesPresent	boolean Checks whether the primary gene List is present or not.
fileprefix	Character. fileprefix to use for each of the files in the directory.
directoryName	Character. Directory name where individual SV files will be stored.
EnzymeType	Character. Enzyme type used. Options SVMerge or SE.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```

## Not run:
smapName <- "GM24385_DLE-1_P_trio_hg19.smap"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
run_bionano_filter_SVMerge_duo (input_fmt_geneList = c("Text"),
input_fmt_SV = c("Text"),

```

```

smap = smappath,
dat_geneList = dat_geneList,
RZIPpath = RZIPpath, EnzymeType = c("SVMerge"),
outputType = c("Excel"),
primaryGenesPresent = FALSE,
outputFilename = outputFilename,
outpath = outpath)

## End(Not run)

```

```
run_bionano_filter_SVMerge_solo
```

Getting the data from annotated smaps to extract SV information based on type of variants.

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```

run_bionano_filter_SVMerge_solo(
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  EnzymeType = c("SE", "SVMerge"),
  smap = NULL,
  svData,
  dat_geneList,
  fileName,
  outpath,
  outputFilename = "",
  RZIPpath,
  primaryGenesPresent = TRUE,
  outputType = c("Excel", "csv"),
  directoryName,
  fileprefix
)

```

Arguments

input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
EnzymeType	Character. Enzyme type used. Options SVMerge or SE.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.

dat_geneList Dataframe Input data containing geneList data.
 fileName Character Name of file containing Gene List data.
 outpath Character Directory to the output file.
 outputFilename Character Output filename.
 RZIPpath Character Path for the Rtools Zip package.
 primaryGenesPresent
 boolean Checks whether the primary gene List is present or not.
 outputType Character. Variants in excel tabs or in different csv files. Options Excel or csv.
 directoryName Character. Directory name where individual SV files will be stored.
 fileprefix Character. fileprefix to use for each of the files in the directory.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```

smapName <- "NA12878_Q.S_VAP_SVmerge_solo5.txt"
outputFilename <- "NA12878_Q.S_VAP_SVmerge_solo5_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
directoryName <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
  bed=bedFile, inputfmtBed = "bed", outpath,
  n = 3, returnMethod_bedcomp = c("dataFrame"),
  input_fmt_SV = "Text",
  EnzymeType = "SVMerge",
  berrorindel = 3000, berrorinvtrans = 50000)
hgpath=system.file("extdata", "GRCh37_hg19_variants_2016-05-15.txt", package="nanotatoR")
datDGV <- DGVfrequency (hgpath = hgpath,
  smap_data = datcomp,
  win_indel_DGV = 10000,
  EnzymeType = "SVMerge",
  input_fmt_SV = "dataFrame",
  perc_similarity_DGV = 0.5,returnMethod="dataFrame")
indelconf = 0.5; invconf = 0.01;transconf = 0.1;
datInf <- internalFrequency_solo(smapdata = datDGV,
  buildSVInternalDB=TRUE, win_indel=10000,
  win_inv_trans=50000,
  labelType = c("SE"),
  EnzymeType = "SVMerge",
  SE_path = system.file("extdata", "SoloFile/", package="nanotatoR"),
  SE_pattern = "*_DLE1_*", perc_similarity_parents =0.9,
  Samplecodes = system.file("extdata", "nanotatoR_sample_codes.csv", package="nanotatoR"),
  mergeKey = system.file("extdata", "nanotatoR_control_sample_codes.csv", package="nanotatoR"),

```

```

mergedKeyoutpath = system.file("extdata", package="nanotatoR"),
mergedKeyFname = "Sample_index.csv",
indexfile = system.file("extdata", mergedKeyFname, package="nanotatoR"),
perc_similarity = 0.5, indelconf = 0.5, invconf = 0.01,
transconf = 0.1, limsize = 1000, win_indel_parents = 5000,
win_inv_trans_parents=40000,
returnMethod="dataFrame", input_fmt_SV = "dataFrame")
path <- system.file("extdata", "Bionano_config/", package = "nanotatoR")
pattern <- "*_hg19_*"
datBNDB <- BNDBfrequency(smapdata = datInf,
  buildBNInternalDB=TRUE,
  input_fmt_SV = "dataFrame",
  dbOutput="dataframe",
  EnzymeType = "SVMerge",
  BNDBpath = path,
  BNDBpattern = pattern,
  fname, outpath,
  win_indel = 10000,
  win_inv_trans = 50000,
  perc_similarity = 0.5,
  indelconf = 0.5,
  invconf = 0.01,
  limsize = 1000,
  transconf = 0.1,
  returnMethod=c("dataFrame"))
decipherpath = system.file("extdata", "population_cnv.txt", package="nanotatoR")
datdecipher <- Decipherfrequency (decipherpath = decipherpath,
  smap_data = datBNDB, win_indel = 10000,
  perc_similarity = 0.5,returnMethod="dataFrame",
  input_fmt_SV = "dataFrame", EnzymeType = c("SVMerge"))
run_bionano_filter_SVMerge_solo (input_fmt_geneList = c("Text"),
  input_fmt_SV = c("dataFrame"),
  svData = datdecipher,
  dat_geneList = dat_geneList,
  RZIPpath = RZIPpath, EnzymeType = c("SVMerge"),
  outputType = c("csv"),
  primaryGenesPresent = FALSE,
  directoryName = directoryName,
  fileprefix = "AnnotatedSamplesNA12878_SVMerge")

```

run_bionano_filter_SVMerge_Trio

*Getting the data from annotated smaps to extract SV information
based on type of variants.*

Description

Getting the data from annotated smaps to extract SV information based on type of variants.

Usage

```
run_bionano_filter_SVMerge_Trio(
  input_fmt_geneList = c("Text", "dataFrame"),
  input_fmt_SV = c("Text", "dataFrame"),
  EnzymeType = c("SVMerge", "SE"),
  smap = NULL,
  svData,
  dat_geneList,
  fileName,
  outpath,
  outputFilename = "",
  RZIPpath,
  primaryGenesPresent = TRUE,
  outputType = c("Excel", "csv"),
  directoryName,
  fileprefix
)
```

Arguments

input_fmt_geneList	character. Choice of gene list input Text or Dataframe.
input_fmt_SV	character. Choice of gene list input Text or Dataframe.
EnzymeType	Character. Enzyme type used. Options SVMerge or SE.
smap	character. SV file name.
svData	Dataframe Input data containing SV data.
dat_geneList	Dataframe Input data containing geneList data.
fileName	Character Name of file containing Gene List data.
outpath	Character Directory to the output file.
outputFilename	Character Output filename.
RZIPpath	Character Path for the Rtools Zip package.
primaryGenesPresent	boolean Checks whether the primary gene List is present or not.
outputType	Character. Variants in excel tabs or in different csv files. Options Excel or csv.
directoryName	Character. Directory name where individual SV files will be stored.
fileprefix	Character. fileprefix to use for each of the files in the directory.

Value

Excel file containing the annotated SV map, tabs divided based on type of SVs.

Examples

```
## Not run:
smapName <- "GM24385_DLE-1_P_trio_hg19.smap"
outputFilename <- "GM24385_DLE-1_P_trio_hg19_out"
smappath <- system.file("extdata", smapName, package = "nanotatoR")
outpath <- system.file("extdata", smapName, package = "nanotatoR")
RZIPpath <- system.file("extdata", "zip.exe", package = "nanotatoR")
run_bionano_filter_SVMerge_Trio (input_fmt_geneList = c("Text"),
input_fmt_SV = c("Text"),
smap = smappath,
dat_geneList = dat_geneList,
RZIPpath = RZIPpath, EnzymeType = c("SVMerge"),
outputType = c("Excel"),
primaryGenesPresent = FALSE,
outputFilename = outputFilename,
outpath = outpath)##
## End(Not run)
```

SVexpression_duo_trio *Extract Read counts for genes that are near or overalapping SVs.*

Description

Extract Read counts for genes that are near or overalapping SVs.

Usage

```
SVexpression_duo_trio(
  input_fmt_SV = c("Text", "dataFrame"),
  smapdata,
  smappath,
  input_fmt_RNASeq = c("Text", "dataFrame"),
  RNASeqData,
  RNASeqPATH,
  outputfmt = c("Text", "datFrame"),
  pattern_Proband = NA,
  pattern_Mother = NA,
  pattern_Father = NA,
  EnzymeType = c("SVMerge", "SE")
)
```

Arguments

input_fmt_SV	character. genes that are upstream and/or downstream of SV. input_fmt_RNASeq
smapdata	dataframe. smap data in dataframe format.
smappath	character. smap path.

input_fmt_RNASeq
character. input format of RNASEQ data. Text or dataframe.

RNASeqData
character. Expression of the genes.

RNASeqPATH
character. RNASEQ path.

outputfmt
character. Output format choice dataframe or text.

pattern_Proband
character. Pattern to identify the proband reads.

pattern_Mother
character. Pattern to identify the mother reads.

pattern_Father
character. Pattern to identify the father reads.

EnzymeType
character. Enzyme used. option "Dual" or "DLE".

Value

Text or Dataframe containing TPM read counts of genes in the family.

Examples

```
## Not run:
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine(RNASeqDir = RNASeqDir,
returnMethod = returnMethod)
smapName="NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
  bed=bedFile, inputfmtBed = "BED", outpath,
  n = 3, returnMethod_bedcomp = c("dataFrame"),
  input_fmt_SV = "Text",
  EnzymeType = "SVMerge",
  bpererrorindel = 3000,
  bpererrorintrans = 50000)
datRNASeq1 <- SVexpression(
  input_fmt_SV=c("dataFrame"),
  input_fmt_RNASeq=c("dataFrame"),
  RNASeqData = datRNASeq,
  outputfmt=c("dataFrame"),
  pattern_Proband = "*_P_*", EnzymeType = c("SVMerge"))

## End(Not run)
```

SVexpression_solo	<i>Annotating the Overlapping and Non-Overlapping genes with RNAseq expression</i>
-------------------	--

Description

Annotating the Overlapping and Non-Overlapping genes with RNAseq expression

Usage

```
SVexpression_solo(
  input_fmt_SV = c("Text", "dataFrame"),
  smapdata,
  smappath,
  input_fmt_RNASeq = c("Text", "dataFrame"),
  RNASeqData,
  RNASeqPATH,
  outputfmt = c("Text", "datFrame"),
  pattern_Proband = NA,
  EnzymeType = c("SVMerge", "SE")
)
```

Arguments

input_fmt_SV	character. Input format of the SV data. Options "Text" or "DataFrame".
smapdata	dataframe. SV data dataframe.
smappath	character. smap path.
input_fmt_RNASeq	character. Input format of the RNASeq data. Options "Text" or "DataFrame"..
RNASeqData	dataFrame. RNAseq data with gene names.
RNASeqPATH	character. RNAseq dataset path .
outputfmt	character. Output format of the result. Options "Text" or "DataFrame"..
pattern_Proband	character. Pattern for proband.
EnzymeType	character. Enzyme used. option "SVMerge" or "SE".

Value

Dataframe Annotated dataframe with RNASeq data.

Examples

```
RNASeqDir = system.file("extdata", package="nanotatoR")
returnMethod="dataFrame"
datRNASeq <- RNAseqcombine_solo(RNASeqDir = RNASeqDir,
  returnMethod = returnMethod)
smapName="NA12878_DLE1_VAP_solo5.smap"
smap = system.file("extdata", smapName, package="nanotatoR")
smap = system.file("extdata", smapName, package="nanotatoR")
bedFile <- system.file("extdata", "HomoSapienGRCH19_lift37.bed", package="nanotatoR")
outpath <- system.file("extdata", package="nanotatoR")
datcomp<-overlapnearestgeneSearch(smap = smap,
  bed=bedFile, inputfmtBed = "bed", outpath,
  n = 3, returnMethod_bedcomp = c("dataFrame"),
  input_fmt_SV = "Text",
  EnzymeType = "SE",
  bperrorindel = 3000,
```

```
bperrorinvtrans = 50000)
datRNASeq1 <- SVexpression_solo (input_fmt_SV=c("dataFrame"),
  smapdata = datcomp,
  input_fmt_RNASeq=c("dataFrame"),
  RNASeqData = datRNASeq,
  outputfmt=c("datFrame"),
  pattern_Proband = "*_P_*", EnzymeType = c("SE"))
datRNASeq1[1,]
```

Index

BNDfrequency, [3](#)
buildrunBNBedFiles, [5](#)

clinvar_gene, [6](#)

Decipherfrequency, [6](#)
DGVfrequency, [8](#)

extract_clinvar_mod, [9](#)

FamilyInfoPrep, [10](#)

gene_extraction, [11](#)
gene_list_generation, [11](#)
gtr_gene, [13](#)

internalFrequency_solo, [16](#)
internalFrequencyTrio_Duo, [13](#)

makeInternalBNDatabase, [19](#)
merging_SE_SVMerge, [21](#)
mergingSMAP_SE, [20](#)
mergingSMAP_SVMerge, [20](#)

nanotatoR, [22](#)
nanotatoR_Duo_SVmerge, [23](#)
nanotatoR_main_Duo_SE, [28](#)
nanotatoR_main_Solo_SE, [33](#)
nanotatoR_main_Solo_SVmerge, [38](#)
nanotatoR_main_Trio_SE, [43](#)
nanotatoR_SVmerge_Trio, [47](#)
nonOverlapGenes, [52](#)
nonOverlappingDNGenes, [54](#)
nonOverlappingUPGenes, [55](#)
nonOverlapRNAseq, [55](#)
nonOverlapRNAseq_solo, [56](#)

omim_gene, [57](#)
overlapGenes, [58](#)
overlapnearestgeneSearch, [59](#)
overlappingGenes, [60](#)

OverlapRNAseq, [61](#)
OverlapRNAseq_solo, [62](#)

phenoextractHPO_mod, [63](#)

readBNBedFiles, [63](#)
reading_GTR, [64](#)
reading_mim2gene, [65](#)
readSMap, [65](#)
readSMap_DLE, [66](#)
RNAseqcombine, [66](#)
RNAseqcombine_solo, [67](#)
run_bionano_filter_SE_duo, [68](#)
run_bionano_filter_SE_solo, [69](#)
run_bionano_filter_SE_Trio, [72](#)
run_bionano_filter_SVMerge_duo, [74](#)
run_bionano_filter_SVMerge_solo, [76](#)
run_bionano_filter_SVMerge_Trio, [78](#)

SVexpression_duo_trio, [80](#)
SVexpression_solo, [81](#)