Manipulate a Simple Feature Data Frame

Code

Introduction

In this Notebook you'll practice importing some tabular data in to R, converting it to a simple feature data frame, projecting it, and saving it to disk as a GeoJSON file.

1) Import the missing persons CSV file:

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```
miss_pips_df <- read.csv("./data/yosemite_missing_people.csv", stringsAsFactors = FALSE)

head(miss_pips_df)
```

	X <dbl>	Y <dbl>	OBJECTID_1 <int>	OBJECTID <int>	Georef_Unc <dbl>	Distance <dbl>	Type <chr>	Lat <dbl>	Long <dbl>
1	-119.6632	37.66355	1	1	336.3710	1340.2605	IPP	37.66355	-119.6632
2	-119.8099	37.76910	2	2	526.3630	1293.0631	IPP	37.76910	-119.8099
3	-119.5958	37.74595	3	3	56.3650	0.0000	IPP	37.74595	-119.5958
4	-119.5599	37.75631	4	4	126.3640	1760.0421	IPP	37.75631	-119.5599
5	-119.5937	37.74561	5	5	41.3650	357.1429	IPP	37.74561	-119.5937
6	-119.6064	37.74521	6	6	846.5152	1823.4372	IPP	37.74521	-119.6064

6 rows | 1-10 of 49 columns

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```
# View(miss_pips_df)
```

Let's reduce the number of columns:

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```
library(dplyr)

miss_pips_thin_df <- miss_pips_df |>
  select(Long, Lat, Type, CaseNumber, IncidYear, ContactMet, IncidType, NumberofSu, GroupDynam,
         SubjectCat, SubSex, SubAge, IncidContr, Scenario, RescueMeth, Incident_N, Found_GR_N)

head(miss_pips_thin_df)
```

	Long <dbl>	Lat <dbl>	Type <chr>	CaseNumber <int>	IncidYear <int>	ContactMet <chr>	IncidType <chr>
1	-119.6632	37.66355	IPP	20090248	2009	Subject Cell Phone	Search
2	-119.8099	37.76910	IPP	20090652	2009	Reported Missing	Separated Party
3	-119.5958	37.74595	IPP	20090940	2009	Reported Missing	Overdue
4	-119.5599	37.75631	IPP	20091134	2009	Subject Cell Phone	Search
5	-119.5937	37.74561	IPP	20091252	2009	Reported Missing	Separated Party
6	-119.6064	37.74521	IPP	20091345	2009	Reported Missing	Overdue

6 rows | 1-8 of 17 columns

2) Convert the data frame to a simple feature data frame

For convenience, here are some EPSG numbers:

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```
epsg_geo_wgs84 <- 4326       ## General long-lat
epsg_utm11n_nad83 <- 26911   ## use this one for YNP
```

Convert a data frame to a spatial object with `st_as_sf()`. You have to specify the names of the columns that contain the coordinates, and the EPSG number of the coordinates.

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```
library(sf)

miss_pips_sf <- st_as_sf(miss_pips_thin_df,
                         coords = c("Long", "Lat"),
                         crs = epsg_geo_wgs84)

miss_pips_sf
```

```
Simple feature collection with 213 features and 15 fields
Geometry type: POINT
Dimension:     XY
Bounding box:  xmin: -119.8801 ymin: 37.50101 xmax: -119.2493 ymax: 38.03343
Geodetic CRS:  WGS 84
```

```
First 10 features:
   Type CaseNumber IncidYear         ContactMet       IncidType NumberofSu            GroupDynam
1   IPP   20090248      2009 Subject Cell Phone          Search          1          Solo Subject
2   IPP   20090652      2009   Reported Missing Separated Party          1          Solo Subject
3   IPP   20090940      2009   Reported Missing         Overdue          1          Solo Subject
4   IPP   20091134      2009 Subject Cell Phone          Search          1          Solo Subject
5   IPP   20091252      2009   Reported Missing Separated Party          1          Solo Subject
6   IPP   20091345      2009   Reported Missing         Overdue          1          Solo Subject
7   IPP   20091382      2009   Reported Missing         Overdue          2 Group Stayed Together
8   IPP   20091583      2009   Reported Missing         Overdue          2 Group Stayed Together
9   IPP   20091755      2009 Subject Cell Phone          Search          3 Group Stayed Together
10  IPP   20091760      2009   Reported Missing          Search          1          Solo Subject
           SubjectCat            SubSex SubAge          IncidContr   Scenario   RescueMeth
1  Mental Retardation               Male     31            Darkness       Lost Snow Machine
2               Hiker               Male      0             Unknown  Separated      Walkout
3       Child (13-15)               Male     14             Unknown    Overdue        Other
4               Hiker               Male     35            Snow/Ice       Lost   Helicopter
5         Child (4-6)               Male      6             Unknown  Separated        Other
6               Hiker               Male     29             Unknown    Overdue        Other
7             Climber Group  - Mixed Sex      0       Weather - Cold    Overdue      Walkout
8               Hiker  Group - All Males      0            Darkness       Lost      Vehicle
9               Hiker  Group - All Males      0 Weather - Visibility       Lost   Helicopter
10    Substance Abuse               Male     23               Drugs Despondent        Other

Incident_N
1                                                          Subject was snowshoeing, became disoriented, and
called for help. Subject described as mentally challenged.
2                                                                                  Subject described as teenage ma
le; found in under half an hour from reported missing time
3                                                                                  Subject hiked Yosemite Falls Tr
ail and was found at his bike after being reported overdue
4                                Subject hiked up Yosemite falls Trail and to North Dome; planned to hike back to
the Valley via Snow Creek Trail but lost tral due to snow
5                                                                                  Subject became separated from fa
ther and returned to his hotel room to wait for his return
6                                                      Subject took shortcut off trail while hiking Upper Yos
emite Falls Trail and became separated from hiking partner
7
Two subjects, one M and one F, overdue after climbing
8                                        Two M subjects lost the trail in the darkness after hiking to Taft Po
int; attempted to find a high point to reorient themselves
9                                                                  Three M subjects intentionally left th
e trail to take a shortcut to some bathrooms that they saw
10 Subject ingested LSD and was last seen running nude through Upper Pines Campground; subject found deceased wit
h fatal injuries consistent with a fall from great heights
                                                                                                        Found_GR_
N
1  Found just south of the top of the Eale Chair Lift at Badger Pass Ski at an elevation of approximately 8,200 f
t
2                                                          Found in the parking lot looking for his mothe
r
3                                                                    Found at LKP after hike was complet
e
4                                          Found in the area of Indian Ridge, approximately 300 feet off the trai
l
5                                                                       Found at Yosemite Lodge room 462
3
6                                                                    Found near the Bank3-Way intersectio
n
7                                 Found near the base of Drug Dome and in the forested area leading to the trailhea
d
8                         Found walking along the road approximately 2 miles west of the Sentinel Dome parking are
a
9                         Found on the west-facing slope of Grizzly Peak at approximately -119 33.235 and 37 43.90
6
10        Found along the cliff bands below the Porcelain Wall on the west shoulder of Half Dome near Mirror Lak
e
                     geometry
1  POINT (-119.6632 37.66355)
2   POINT (-119.8099 37.7691)
3  POINT (-119.5958 37.74595)
4  POINT (-119.5599 37.75631)
5  POINT (-119.5937 37.74561)
6  POINT (-119.6064 37.74521)
7  POINT (-119.4291 37.86868)
8  POINT (-119.5864 37.71233)
9  POINT (-119.5271 37.74873)
10 POINT (-119.5634 37.73601)
```

3) Project the missing persons layer to UTM 11N (NAD83)

Hint. Answer

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```
epsg_utm11n_nad83 <- 26911
yose_miss_pips_utm11n_sf <- miss_pips_sf |>
  st_transform(epsg_utm11n_nad83)
```

4) Save as GeoJSON

You can save a spatial object to disk with `st_write()`. R will figure out what format to use based on the file name extension.

Save the Missing Persons layer as GeoJSON: Answer

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```
st_write(yose_miss_pips_utm11n_sf, "yose_miss_pips.geojson", delete_dsn = TRUE)
```

```
Deleting source `yose_miss_pips.geojson' using driver `GeoJSON'
Writing layer `yose_miss_pips' to data source `yose_miss_pips.geojson' using driver `GeoJSON'
Writing 213 features with 15 fields and geometry type Point.
```