# Exploring Building Permits DataSet

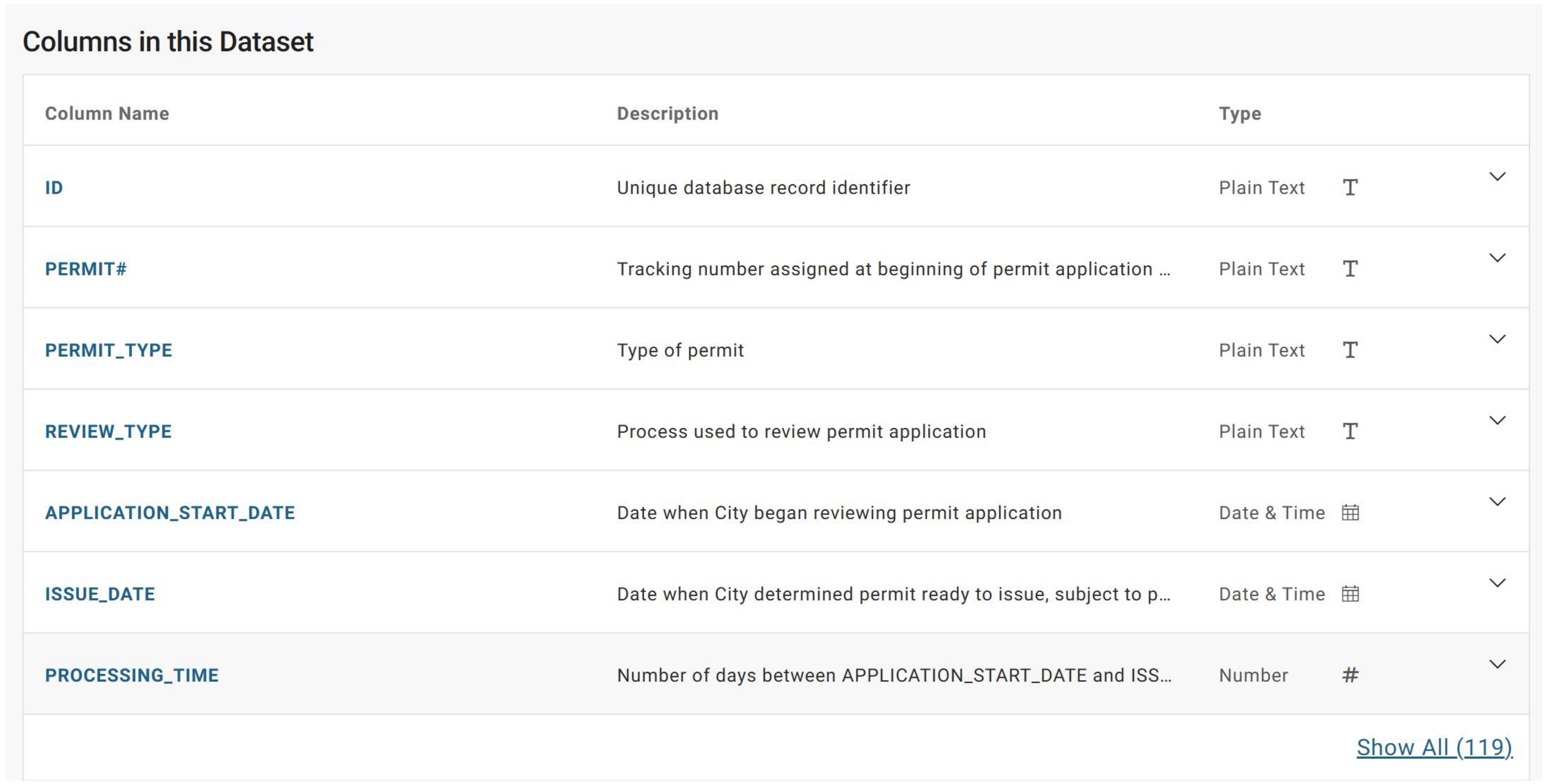
Jie Xu Group#9

## DataSet information

Building Permits

- This dataset includes information about currently-valid building permits issued by the City of Chicago from 2006 to the present
- https://data.cityofchicago.org/resource/ydr8-5enu.csv

# DataSet Details



Columns in this Dataset

| Column Name | Description | Type | |
|---|---|---|---|
| ID | Unique database record identifier | Plain Text | T |
| PERMIT# | Tracking number assigned at beginning of permit application … | Plain Text | T |
| PERMIT_TYPE | Type of permit | Plain Text | T |
| REVIEW_TYPE | Process used to review permit application | Plain Text | T |
| APPLICATION_START_DATE | Date when City began reviewing permit application | Date & Time | ▦ |
| ISSUE_DATE | Date when City determined permit ready to issue, subject to p… | Date & Time | ▦ |
| PROCESSING_TIME | Number of days between APPLICATION_START_DATE and ISS… | Number | # |

Show All (119)

## Issue summy

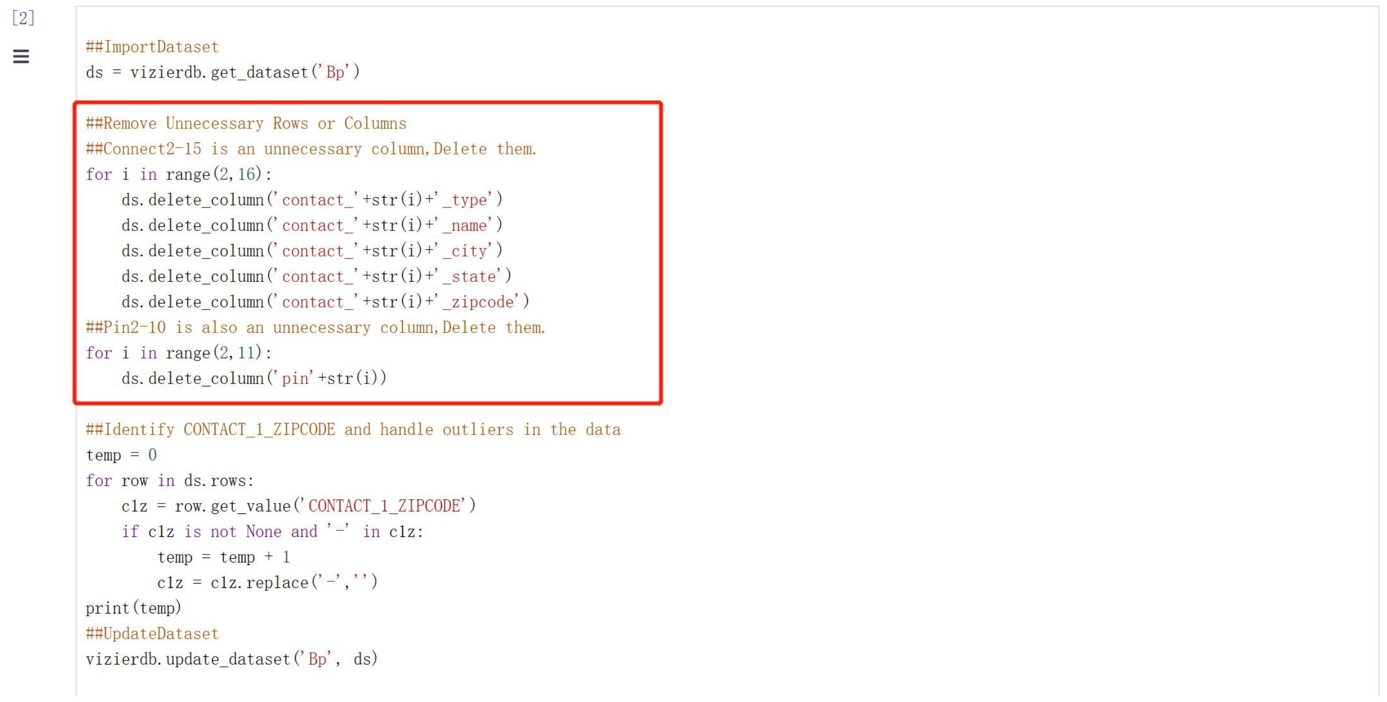
- Remove Unnecessary Rows or Columns
- Outlier Detection and Handling
- Value is incorrect
- Handle Missing Values

# Issue

A.Remove Unnecessary Rows or Columns

Solution

- Connect2-15 is an unnecessary column,Delete them.
- Pin2-10 is also an unnecessary column,Delete them.

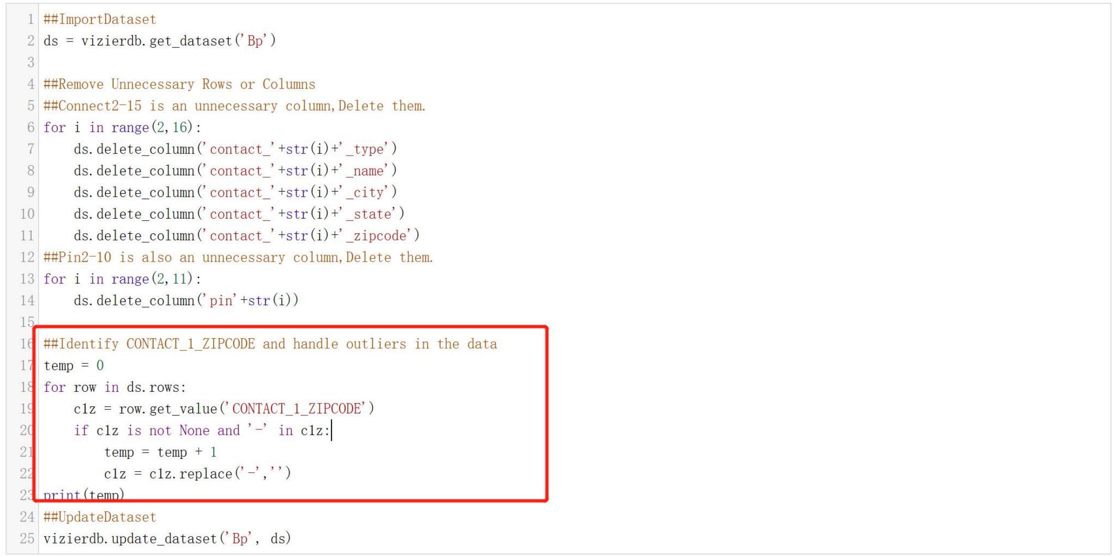


```
[2]
##ImportDataset
ds = vizierdb.get_dataset('Bp')

##Remove Unnecessary Rows or Columns
##Connect2-15 is an unnecessary column,Delete them.
for i in range(2,16):
    ds.delete_column('contact_'+str(i)+'_type')
    ds.delete_column('contact_'+str(i)+'_name')
    ds.delete_column('contact_'+str(i)+'_city')
    ds.delete_column('contact_'+str(i)+'_state')
    ds.delete_column('contact_'+str(i)+'_zipcode')
##Pin2-10 is also an unnecessary column,Delete them.
for i in range(2,11):
    ds.delete_column('pin'+str(i))

##Identify CONTACT_1_ZIPCODE and handle outliers in the data
temp = 0
for row in ds.rows:
    c1z = row.get_value('CONTACT_1_ZIPCODE')
    if c1z is not None and '-' in c1z:
        temp = temp + 1
        c1z = c1z.replace('-','')
print(temp)
##UpdateDataset
vizierdb.update_dataset('Bp', ds)
```

# Issue

B.Outlier Detection and Handling

- Solution
- There are symbols like ‘-’ in CONTACT_1_ZIPCODE that need to be removed



```
##ImportDataset
ds = vizierdb.get_dataset('Bp')

##Remove Unnecessary Rows or Columns
##Connect2-15 is an unnecessary column,Delete them.
for i in range(2,16):
    ds.delete_column('contact_'+str(i)+'_type')
    ds.delete_column('contact_'+str(i)+'_name')
    ds.delete_column('contact_'+str(i)+'_city')
    ds.delete_column('contact_'+str(i)+'_state')
    ds.delete_column('contact_'+str(i)+'_zipcode')
##Pin2-10 is also an unnecessary column,Delete them.
for i in range(2,11):
    ds.delete_column('pin'+str(i))

##Identify CONTACT_1_ZIPCODE and handle outliers in the data
temp = 0
for row in ds.rows:
    c1z = row.get_value('CONTACT_1_ZIPCODE')
    if c1z is not None and '-' in c1z:
        temp = temp + 1
        c1z = c1z.replace('-','')
print(temp)
##UpdateDataset
vizierdb.update_dataset('Bp', ds)
```

- There are punctuation marks like ’ ,’ in the price. Remove the symbol to facilitate subsequent calculations.

```
##Remove punctuation marks from prices to make calculations easier
def clean_str(value):
    try:
        if ',' in value:
            value.replace(',', '')
        return float(value)
    except ValueError:
        value = 0
        return value
#Get the value of row for clean_str
for row in ds.rows:
    bfp = row.get_value('BUILDING_FEE_PAID')
    zfp = row.get_value('ZONING_FEE_PAID')
    ofp = row.get_value('OTHER_FEE_PAID')
    sp = row.get_value('SUBTOTAL_PAID')
    bfp = clean_str(bfp)
    zfp = clean_str(zfp)
    ofp = clean_str(ofp)
    sp = clean_str(sp)
    #-------
    bfu = row.get_value('BUILDING_FEE_UNPAID')
    zfu = row.get_value('ZONING_FEE_UNPAID')
    ofu = row.get_value('OTHER_FEE_UNPAID')
    su = row.get_value('SUBTOTAL_UNPAID')
    bfu = clean_str(bfu)
    zfu = clean_str(zfu)
    ofu = clean_str(ofu)
    su = clean_str(su)
    #-------
    bfw = row.get_value('BUILDING_FEE_WAIVED')
    zfw = row.get_value('ZONING_FEE_WAIVED')
    ofw = row.get_value('OTHER_FEE_WAIVED')
    sw = row.get_value('SUBTOTAL_WAIVED')
    bfw = clean_str(bfw)
    zfw = clean_str(zfw)
    ofw = clean_str(ofw)
    sw = clean_str(sw)
```

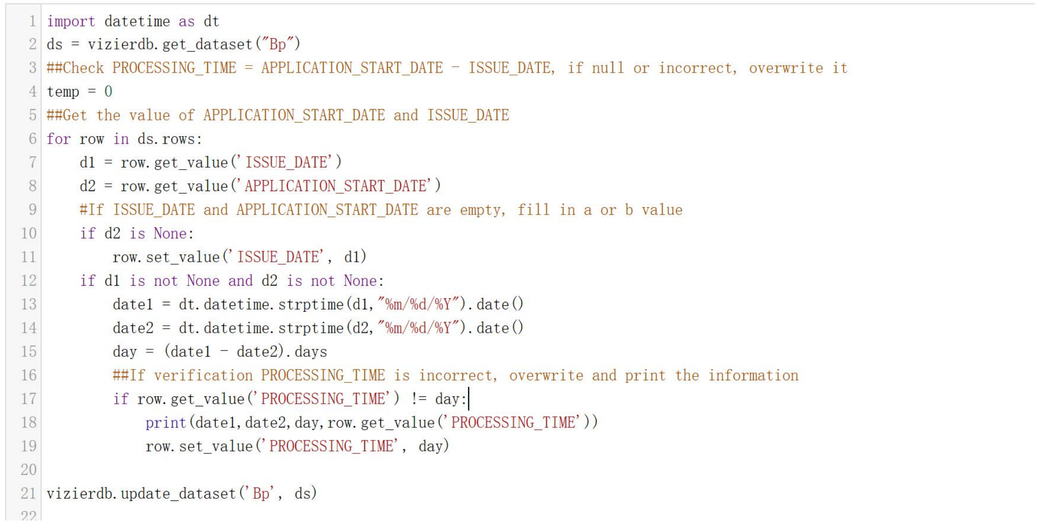
# Issue

C. Value is incorrect  && Handle Missing Values

Solution

- Check whether PROCESSING_TIME is equal to APPLICATION_START_DATE + ISSUE_DATE,and handle the null value

- Check SUBTOTAL_PAID = BUILDING_FEE_PAID + ZONING_FEE_PAID + OTHER_FEE_PAID
- Check SUBTOTAL_UNPAID = BUILDING_FEE_UNPAID + ZONING_FEE_UNPAID + OTHER_FEE_UNPAID
- Check SUBTOTAL_WAIVED = BUILDING_FEE_WAIVED + ZONING_FEE_WAIVED + OTHER_FEE_WAIVED
- Check TOTAL_FEE = SUBTOTAL_PAID + SUBTOTAL_WAIVED + SUBTOTAL_UNPAID



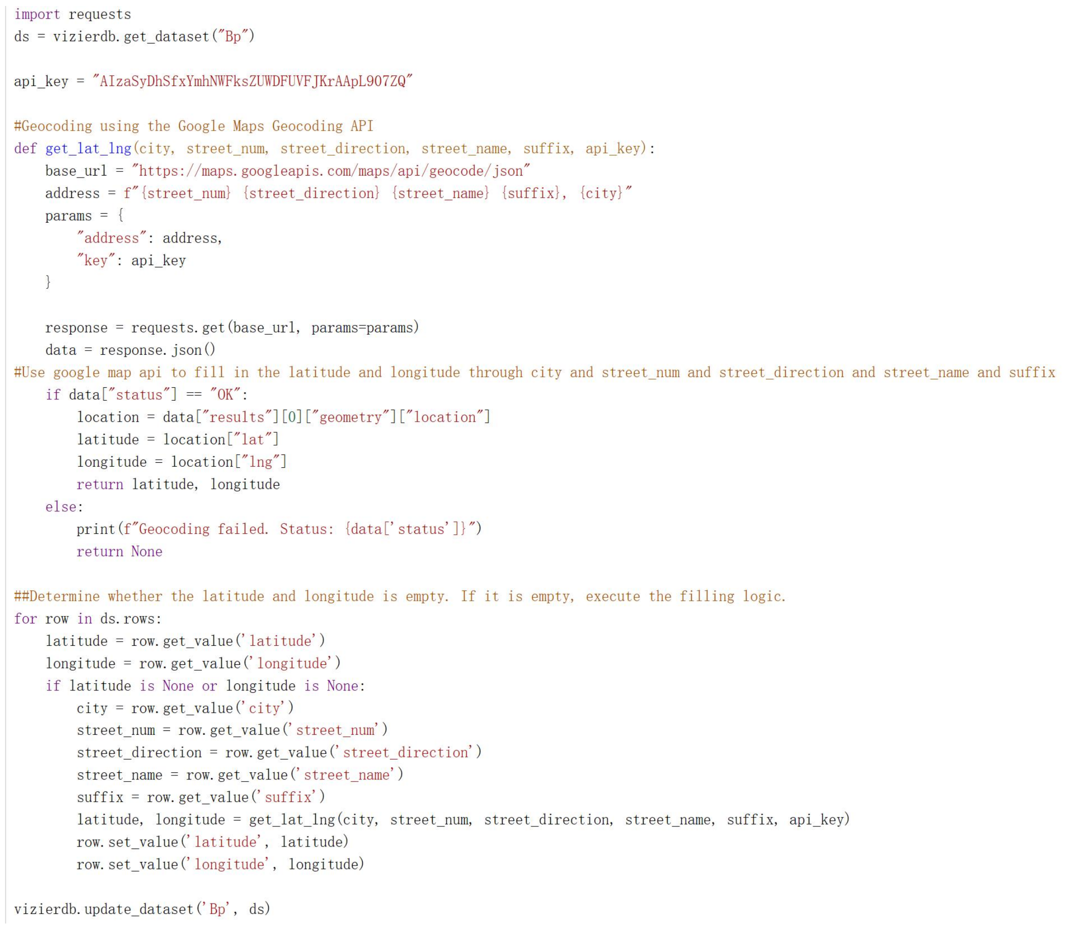
```
import datetime as dt
ds = vizierdb.get_dataset("Bp")
##Check PROCESSING_TIME = APPLICATION_START_DATE - ISSUE_DATE, if null or incorrect, overwrite it
temp = 0
##Get the value of APPLICATION_START_DATE and ISSUE_DATE
for row in ds.rows:
    d1 = row.get_value('ISSUE_DATE')
    d2 = row.get_value('APPLICATION_START_DATE')
    #If ISSUE_DATE and APPLICATION_START_DATE are empty, fill in a or b value
    if d2 is None:
        row.set_value('ISSUE_DATE', d1)
    if d1 is not None and d2 is not None:
        date1 = dt.datetime.strptime(d1,"%m/%d/%Y").date()
        date2 = dt.datetime.strptime(d2,"%m/%d/%Y").date()
        day = (date1 - date2).days
        ##If verification PROCESSING_TIME is incorrect, overwrite and print the information
        if row.get_value('PROCESSING_TIME') != day:
            print(date1,date2,day,row.get_value('PROCESSING_TIME'))
            row.set_value('PROCESSING_TIME', day)

vizierdb.update_dataset('Bp', ds)
```

```
    ##Format Conversion
    sum_p,sum_u,sum_w = round(float(sum_p), 2),round(float(sum_u), 2),round(float(sum_w), 2)
    if sum_p != sp:
        temp = temp + 1
        #Check SUBTOTAL_PAID = BUILDING_FEE_PAID + ZONING_FEE_PAID + OTHER_FEE_PAID
        row.set_value('SUBTOTAL_PAID', sum_p)
    if sum_u != su:
        temp = temp + 1
        #Check SUBTOTAL_UNPAID = BUILDING_FEE_UNPAID + ZONING_FEE_UNPAID + OTHER_FEE_UNPAID
        row.set_value('SUBTOTAL_UNPAID', sum_u)
    if sum_w != sw:
        temp = temp + 1
        #Check SUBTOTAL_WAIVED = BUILDING_FEE_WAIVED + ZONING_FEE_WAIVED + OTHER_FEE_WAIVED
        row.set_value('SUBTOTAL_WAIVED', sum_w)
    #Check TOTAL_FEE = SUBTOTAL_PAID + SUBTOTAL_WAIVED + SUBTOTAL_UNPAID
    tf = row.get_value('TOTAL_FEE')
    tf = clean_str(tf)
    tf = round(float(tf), 2)
    if sum_p+sum_u+sum_w != tf:
        row.set_value('TOTAL_FEE', tf)

print (temp)
```

# Issue

C. Handle Missing Values

- Solution
- Check the longitude and latitude. If it is empty, use the Google Map API to query the longitude and latitude through city, street and other information.



```python
import requests
ds = vizierdb.get_dataset("Bp")

api_key = "AIzaSyDhSfxYmhNWFksZUWDFUVFJKrAApL907ZQ"

#Geocoding using the Google Maps Geocoding API
def get_lat_lng(city, street_num, street_direction, street_name, suffix, api_key):
    base_url = "https://maps.googleapis.com/maps/api/geocode/json"
    address = f"{street_num} {street_direction} {street_name} {suffix}, {city}"
    params = {
        "address": address,
        "key": api_key
    }

    response = requests.get(base_url, params=params)
    data = response.json()
#Use google map api to fill in the latitude and longitude through city and street_num and street_direction and street_name and suffix
    if data["status"] == "OK":
        location = data["results"][0]["geometry"]["location"]
        latitude = location["lat"]
        longitude = location["lng"]
        return latitude, longitude
    else:
        print(f"Geocoding failed. Status: {data['status']}")
        return None

##Determine whether the latitude and longitude is empty. If it is empty, execute the filling logic.
for row in ds.rows:
    latitude = row.get_value('latitude')
    longitude = row.get_value('longitude')
    if latitude is None or longitude is None:
        city = row.get_value('city')
        street_num = row.get_value('street_num')
        street_direction = row.get_value('street_direction')
        street_name = row.get_value('street_name')
        suffix = row.get_value('suffix')
        latitude, longitude = get_lat_lng(city, street_num, street_direction, street_name, suffix, api_key)
        row.set_value('latitude', latitude)
        row.set_value('longitude', longitude)

vizierdb.update_dataset('Bp', ds)
```