DATA SCIENCE

join the Flickr community, home to tens of billions of photos and 2 million groups.

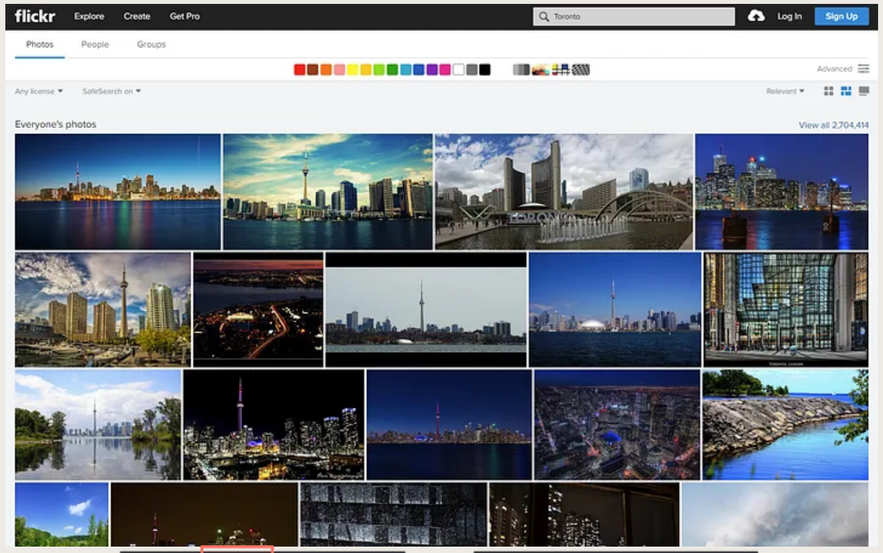
Bar Harush
Matan Katsnelson

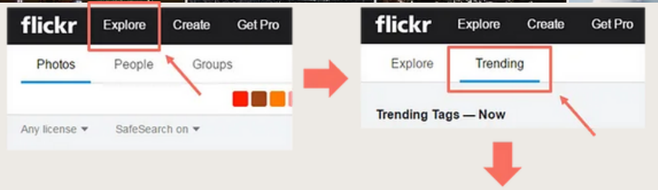
INTRODUCTION

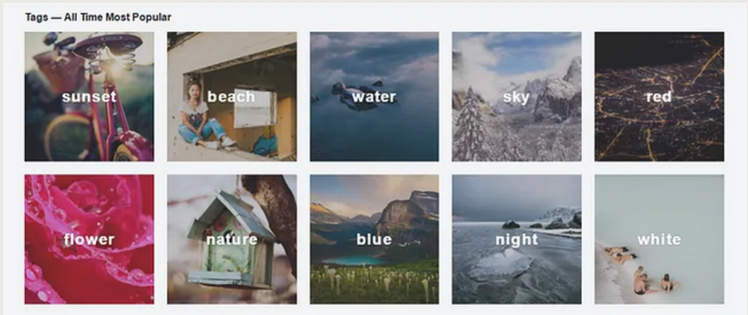
About flickr

- Flickr is a social photo-sharing platform created in 2004.
- It emphasizes community engagement through features like comments, likes, and groups.
- Flickr allows users to connect, interact, and share their photos with others who have similar interests.

THANKS TO WIKIPEDIA.



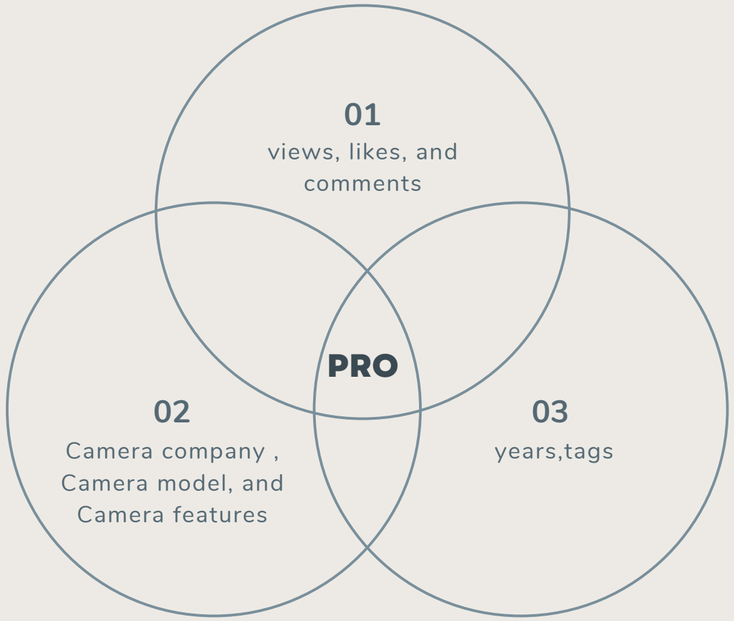


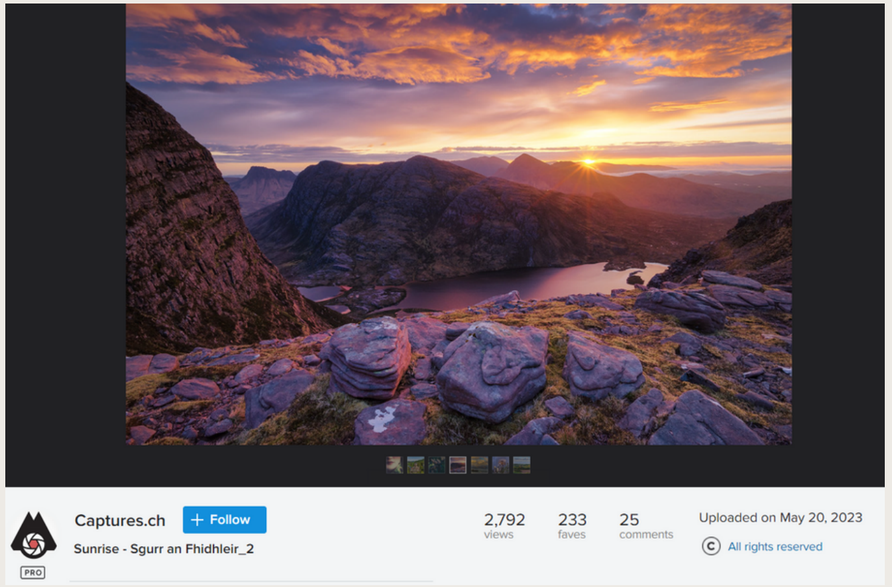


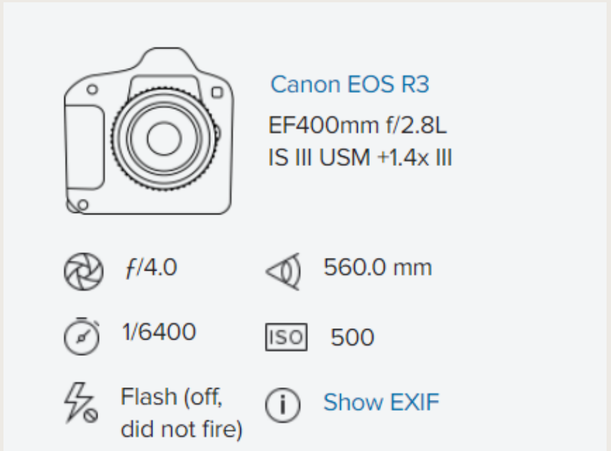
THANKS TO TIANHAO WU.

CAN "PRO" BE PREDICTED ON THE FLICKR WEBSITE?

- Is there a correlation between views, likes, and comments on "Pro"?
- Is there a correlation between Camera company , Camera model, and Camera features on "Pro"?
- Is there a correlation between years, tags and "Pro"?







THE STAGES IN THE PROJECT

1

Scraping and Crawling

2

Data Cleaning

3

Eda-Visualization

4

A comprehensive study on the website Flickr and plan B

5

Machine Learning

6

Summary and Conclusions

1 SCRAPING AND CRAWLING

```
url = f"https://www.flickr.com/photos/tags/{search_term}/page{i}"
```

❮ 1 2 ••• 74 75 76 77 78 79 80 ❯

SELENIUM

חיפוש לפי תגיות ומשיכת קישורים

אתר דינמי

BEAUTIFULSOUP

FOR PHOTOS PER TAGS

FOR CAMERA FEATURES

FOR GENERAL INFORMATION

```
from selenium import webdriver
from selenium.webdriver.firefox.options import Options as FirefoxOptions
from selenium.webdriver.common.desired_capabilities import DesiredCapabilities
import time
from bs4 import BeautifulSoup
import csv

# הקובץ שבו נרצה לשמור את התוצאות
filename = 'flickr_urls.csv'
driver_path = r'C:\Users\barex\Downloads\geckodriver-v0.33.0-win32\geckodriver.exe'
firefox_binary = 'C:\\Program Files\\Mozilla Firefox\\firefox.exe'

firefox_options = FirefoxOptions()
firefox_options.binary_location = firefox_binary
firefox_options.add_argument('--mute-audio')
firefox_options.add_argument('--headless')

capabilities = DesiredCapabilities.FIREFOX.copy()
capabilities['acceptInsecureCerts'] = True

search_terms = {"arizona": "arizona", "nature": "nature", "purple": "purple",
                "art": "art", "bridge": "bridge", "shop": "shop",
                "farm": "farm", "bar": "bar", "day": "day", "house": "house",
                "orange": "orange", "flowers": "flowers", "car": "car",
                "dog": "dog", "garden": "garden", "music": "music",
                "sky": "sky", "snow": "snow", "river": "river", "sun": "sun",
                "sunset": "sunset", "beach": "beach", "cat": "cat"}

with webdriver.Firefox(executable_path=driver_path, options=firefox_options, desired_capabilities=capabilities) as driver:
    all_urls = {}

    for search_term, tag in search_terms.items():
        urls = []
        for i in range(1, 81):
            url = f"https://www.flickr.com/photos/tags/{search_term}/page{i}"
            driver.get(url)
            time.sleep(2)
            if driver.current_url != url:
                break
            SCROLL_PAUSE_TIME = 1
            last_height = driver.execute_script("return document.body.scrollHeight")
            count = 0
            while True:
                driver.execute_script("window.scrollTo(0, document.body.scrollHeight);")
                time.sleep(SCROLL_PAUSE_TIME)
                try:
                    load_more = driver.find_element_by_xpath("//button[@class='load-more-suggestions loaded-suggestions-show']")
                    load_more.click()
                    time.sleep(SCROLL_PAUSE_TIME)
                except:
                    break
                if driver.find_elements_by_xpath("//a[@class='page-arrow right']") == []:
                    break
                count += 1
                if count >= 10000:
                    break
                new_height = driver.execute_script("return document.body.scrollHeight")
                if new_height == last_height:
                    break
                last_height = new_height
            html = driver.page_source
            soup = BeautifulSoup(html, 'html.parser')
            links = []
            for a in soup.select('div.view.tag-photos-everyone-view a.overlay'):
                link = a.get('href')
                links.append(f'https://www.flickr.com{link}')
            all_urls.setdefault(search_term, []).extend(links)
            if len(links) == 0:
                break

    driver.quit()

for tag, urls in all_urls.items():
    print(f"{len(urls)} URLs found for {tag}")

with open(filename, mode='w', newline='') as csv_file:
    writer = csv.writer(csv_file)
    writer.writerow(['Search term', 'Image URL'])

    for tag, urls in all_urls.items():
        for url in urls:
            writer.writerow([tag, url])
image.pngimage.pngimage.png
print(f"Data saved to {filename}")
```

```
def get_full_page(url):
    driver_path = r'C:\Users\barex\Downloads\geckodriver-v0.33.0-win32\geckodriver.exe'
    firefox_binary = r'C:\Program Files\Mozilla Firefox\firefox.exe'

    options = Options()
    options.headless = True
    driver = webdriver.Firefox(options=options, firefox_binary=firefox_binary, executable_path=driver_path)

    driver.get(url)
    elem = driver.find_element_by_tag_name("body")

    # Scroll down to the bottom of the page
    no_of_pagedowns = 2
    for i in range(no_of_pagedowns):
        driver.execute_script("window.scrollTo(0, document.body.scrollHeight);")
        time.sleep(0.5)
    # Wait for the page to load completely
    full_page = driver.page_source
    driver.quit()

    return full_page


def get_info_dict(url):
    info = {
        'exif-camera-name': 'camera name',
        'c-charm-item-aperture': 'Aperture',
        'c-charm-item-focal-length': 'Focal length',
        'c-charm-item-exposure-time': 'Exposure time',
        'c-charm-item-flash': 'Flash',
        'location-name-link': 'location'
    }

    i = 1
    i += 1

    info_dict = {'url': url}

    try:
        full_page = get_full_page(url)
        soup = BeautifulSoup(full_page, 'html.parser')

        for class_name, key in info.items():
            value = soup.find(class_=class_name)
            if value:
                value = value.text.strip()
                if value == 'NaN':
                    info_dict = {k: 'NaN' for k in info.values()}
                    break
            else:
                value = 'NaN'
            info_dict[key] = value

    except Exception as e:
     if i % 100 == 0:
         save_csv(results)
         print(f"the index is '{i}'saved csv")

     # Wait for 1 second between requests
     time.sleep(1)



    return info_dict
```

```
def scrape_camera_data(urls):
    headers = ['url', 'camera name', 'Aperture', 'Focal length', 'Exposure time', 'Flash', 'location']

    with concurrent.futures.ThreadPoolExecutor() as executor:
        for j in range(0, len(urls), 10):
            results = executor.map(get_info_dict, urls[j:j+10])

            # Convert generator object to list
            results = list(results)

            save_csv(results, headers)

            if j % 1000 == 0:
                print(f"Saved csv at index: {j}")

            # Wait for 1 second between requests
            time.sleep(1)

    return results

def save_csv(results, headers):
    filename = 'final_camera_info_check.csv'

    # Check if the file exists and add header if it doesn't
    if not os.path.exists(filename):
        with open(filename, mode='w', newline='', encoding='utf-8') as file:
            writer = csv.writer(file)
            writer.writerow(headers)

    # Append data to the csv file
    with open(filename, mode='a', newline='', encoding='utf-8') as file:
        writer = csv.writer(file)
        for result in results:
            writer.writerow([result.get('url', ''),
                             result.get('exif-camera-name', ''),
                             result.get('Aperture', ''),
                             result.get('Focal length', ''),
                             result.get('Exposure time', ''),
                             result.get('Flash', ''),
                             result.get('location', '')])
```

```
def scrape_links_General_information(urls, tags):
    class_to_key = {
        'view-count-label':'view',
        'fave-count-label': 'likes',
        'comment-count-label': 'comments',
        'date-taken-label': 'date',
        'icon-pro-badge': 'pro',
        'owner-name': 'photographer'
    }
    new_urls = set()
    for url in urls:
        if '%20' in url:
            new_url = url.replace('%20', ' ')
            new_urls.add(new_url)
        else:
            new_urls.add(url)
    scraped_data = []
    j=1
    i=1
    for url, tag in zip(new_urls, tags):
        # Check if the URL starts with "http://" or "https://"
        if not url.startswith(("http://", "https://")):
            url = "http://" + url
        info_dict = {'url': url, 'tag': tag}

        if((i)==j):
            print(i)
            j=j+10
            i=i+1
        else:
            i=i+1

        soup = BeautifulSoup(requests.get(url).content, 'html.parser')
        for class_name, key in class_to_key.items():
            value = soup.find(class_=class_name)
            if value is not None:
                if key == 'pro':
                    value = '1'

                elif key == 'photographer':
                    value = value.text.strip()
                elif key == 'date':
                    value = value.text.replace('Taken on ', '').strip()
                else:
                    value = value.text.strip()
            else:
                if key == 'pro':
                    value = '0'
                else:
                    value = 'NaN'
            info_dict[key] = value

        scraped_data.append(info_dict)


    return scraped_data
```

2 DATA CLEANING

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 73344 entries, 0 to 73343
Data columns (total 18 columns):
Unnamed: 0          73344 non-null int64
Unnamed: 0.1        73344 non-null int64
url                 73344 non-null object
tag                 73344 non-null object
view                73297 non-null object
likes               73297 non-null object
comments            73297 non-null object
date                73297 non-null object
pro                 73344 non-null int64
photographer        73297 non-null object
Camera model        49724 non-null object
Camera brand        49231 non-null object
camera name         49199 non-null object
Aperture            36810 non-null object
Focal length        73344 non-null object
Exposure time       73344 non-null object
Flash               36484 non-null object
location            12303 non-null object
dtypes: int64(3), object(15)
memory usage: 10.1+ MB
```

סהכ מידע לפני מחיקת הNaN

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 49176 entries, 0 to 49197
Data columns (total 18 columns):
Unnamed: 0          49176 non-null int64
Unnamed: 0.1        49176 non-null int64
url                 49176 non-null object
tag                 49176 non-null object
view                49176 non-null object
likes               49176 non-null object
comments            49176 non-null object
date                49176 non-null object
pro                 49176 non-null int64
photographer        49176 non-null object
Camera model        49176 non-null object
Camera brand        49176 non-null object
camera name         49176 non-null object
Aperture            49176 non-null object
Focal length        49176 non-null object
Exposure time       49176 non-null object
Flash               49176 non-null object
location            49176 non-null object
dtypes: int64(3), object(15)
memory usage: 7.1+ MB
```

49198 rows × 17 columns

לאחר הEDA חזרנו לנקיון נוסף

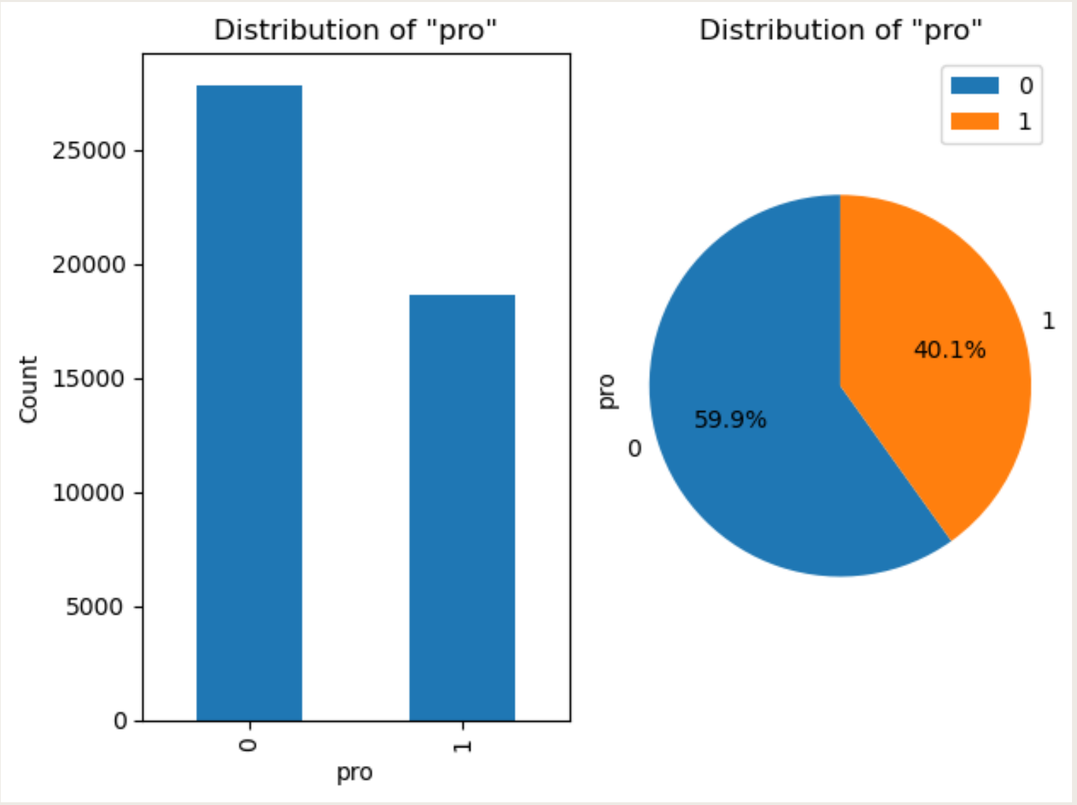
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 46435 entries, 0 to 46434
Data columns (total 79 columns):
Unnamed: 0                46435 non-null int64
url                       46435 non-null object
tag                       46435 non-null object
view                      46435 non-null int64
likes                     46435 non-null int64
comments                  46435 non-null int64
date                      45936 non-null object
pro                       46435 non-null int64
photographer              46435 non-null object
Camera model              46435 non-null object
Camera brand              46435 non-null object
camera name               46435 non-null object
Aperture                  34614 non-null object
Focal length              46435 non-null float64
Exposure time             46435 non-null object
Flash                     46435 non-null int64
location                  8641 non-null object
date year                 45936 non-null float64
more_pro_in_brand         46435 non-null float64
more_pro_in_model         46435 non-null float64
most pro in year          46435 non-null int64
Performances in Likes     46435 non-null float64
likes_views_ratio         46435 non-null float64
comments_views_ratio      46435 non-null float64
comments_likes_ratio      46435 non-null float64
Aperture Category         34420 non-null object
Focal Length Category     34375 non-null object
```

46435 rows × 79 columns

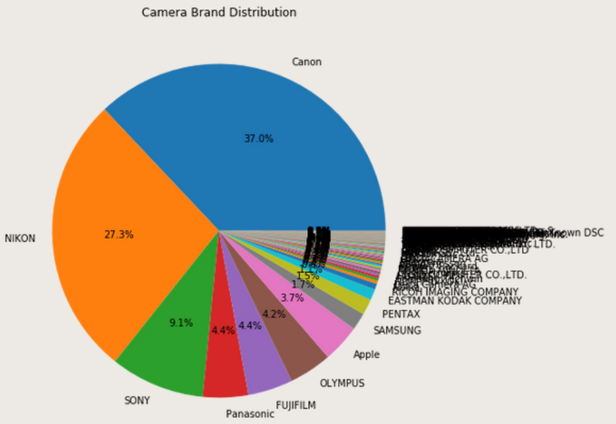
In the end, we reached from 73,000 to 46,000.

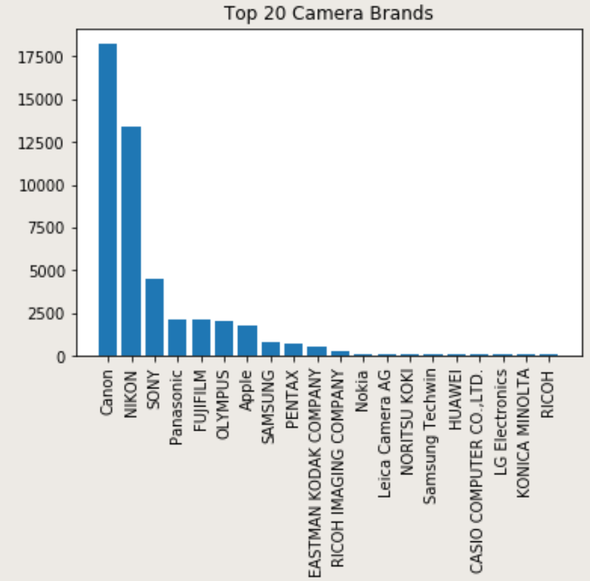
3 EDA-VISUALIZATION

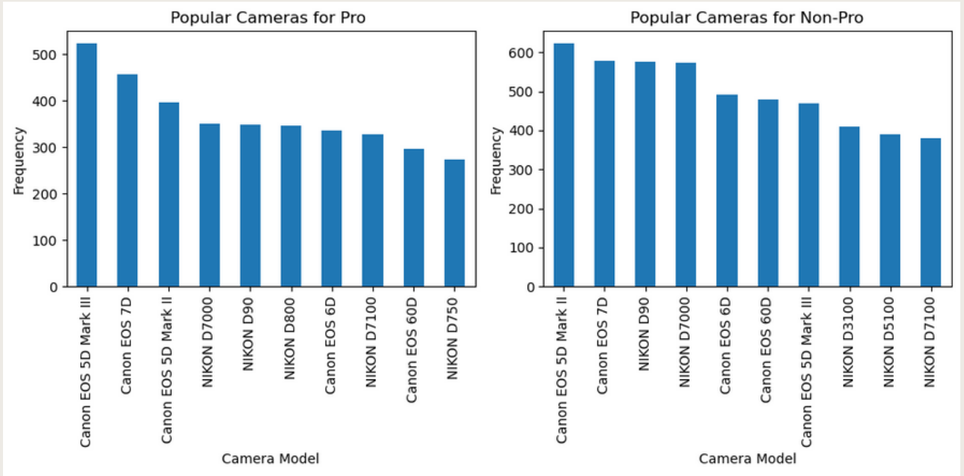
DISTRIBUTION PRO AND NON-PRO



ATTEMPT TO FIND A CORRELATION BETWEEN THE TYPE OF CAMERA AND WHETHER IT IS PRO OR NOT.

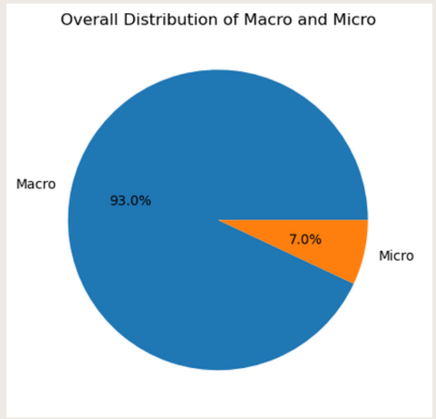


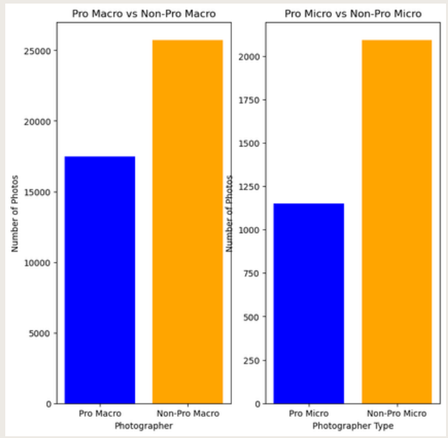


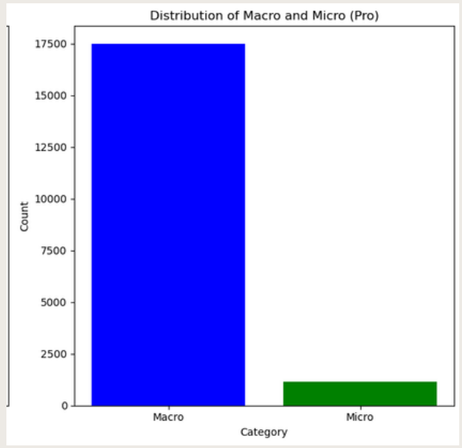


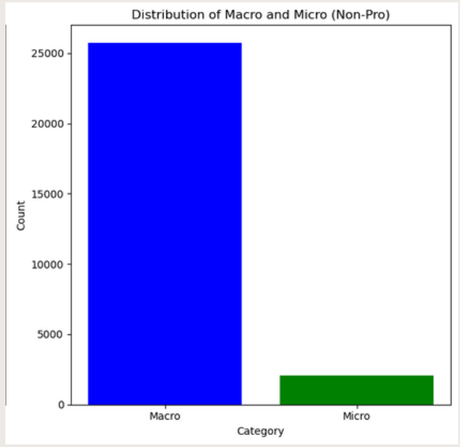
3 EDA-VISUALIZATION

EXAMINING THE RELATIONSHIP BETWEEN PROFESSIONAL OR NON-PROFESSIONAL STATUS AND THE TYPE OF PHOTOGRAPHY.

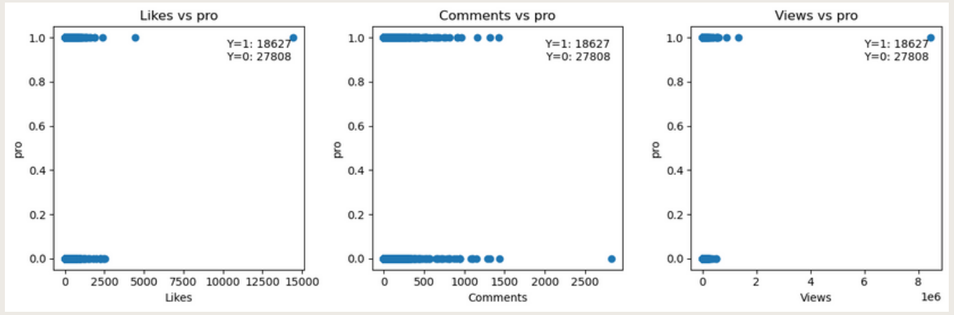


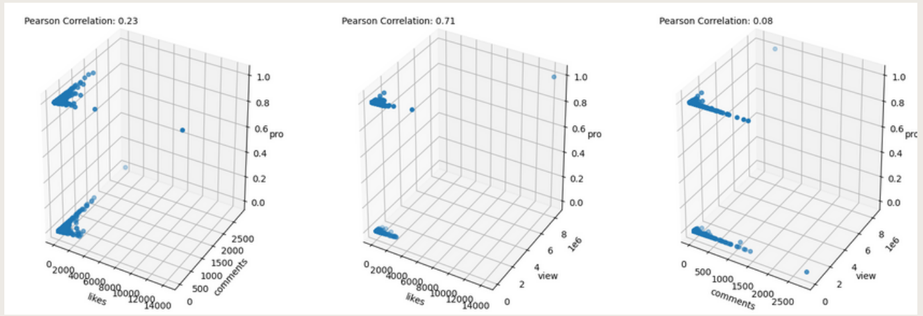


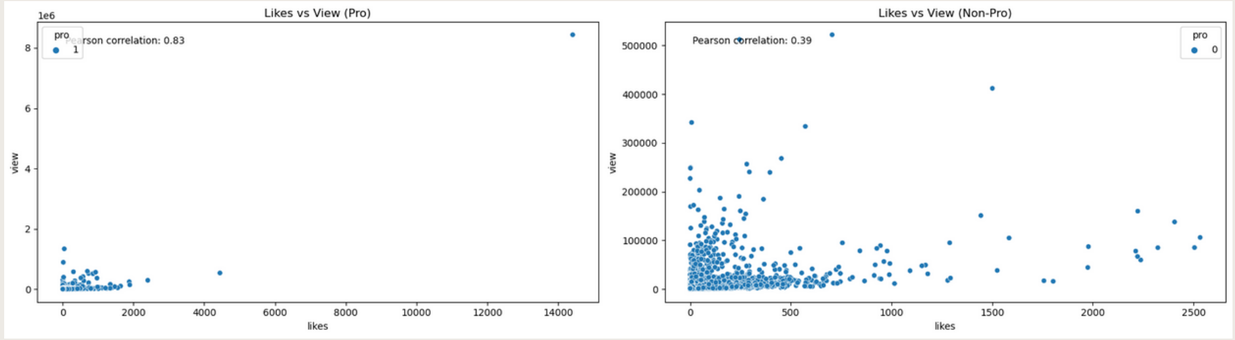




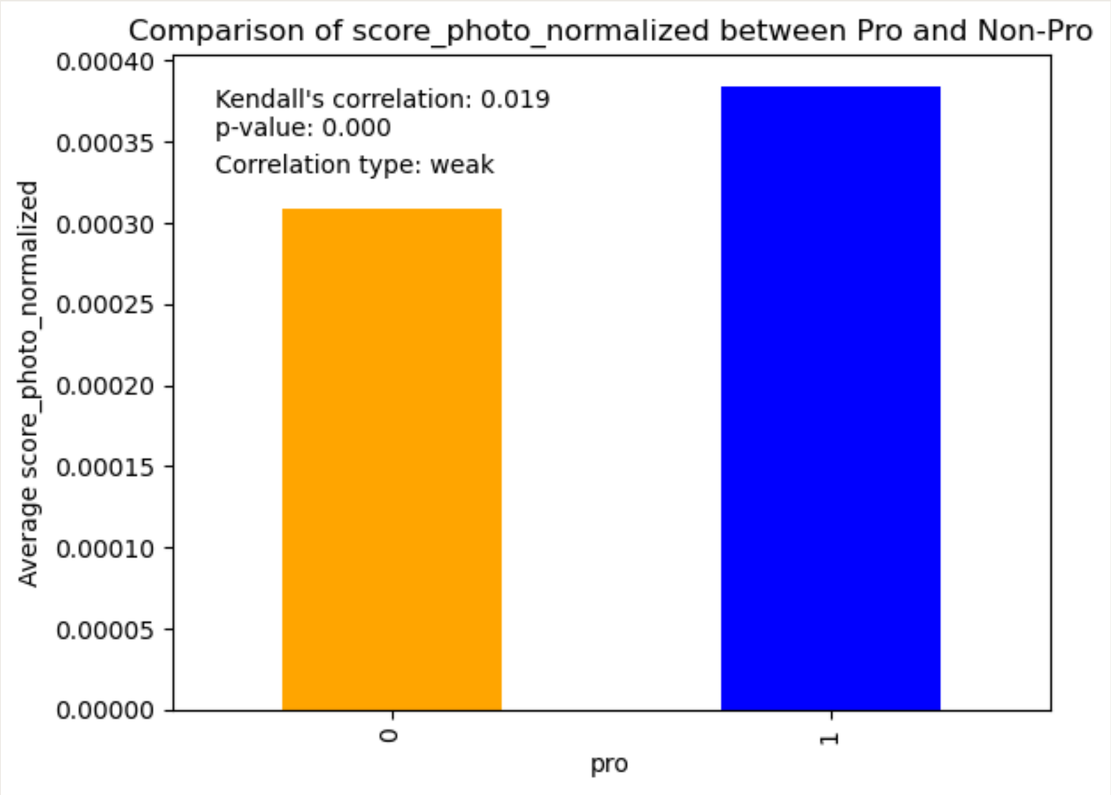
ASSESSING THE CORRELATION BETWEEN LIKES, VIEWS, AND COMMENTS USING THE PEARSON CORRELATION COEFFICIENT AND EVALUATING ITS ASSOCIATION WITH THE 'PRO' ASPECT.

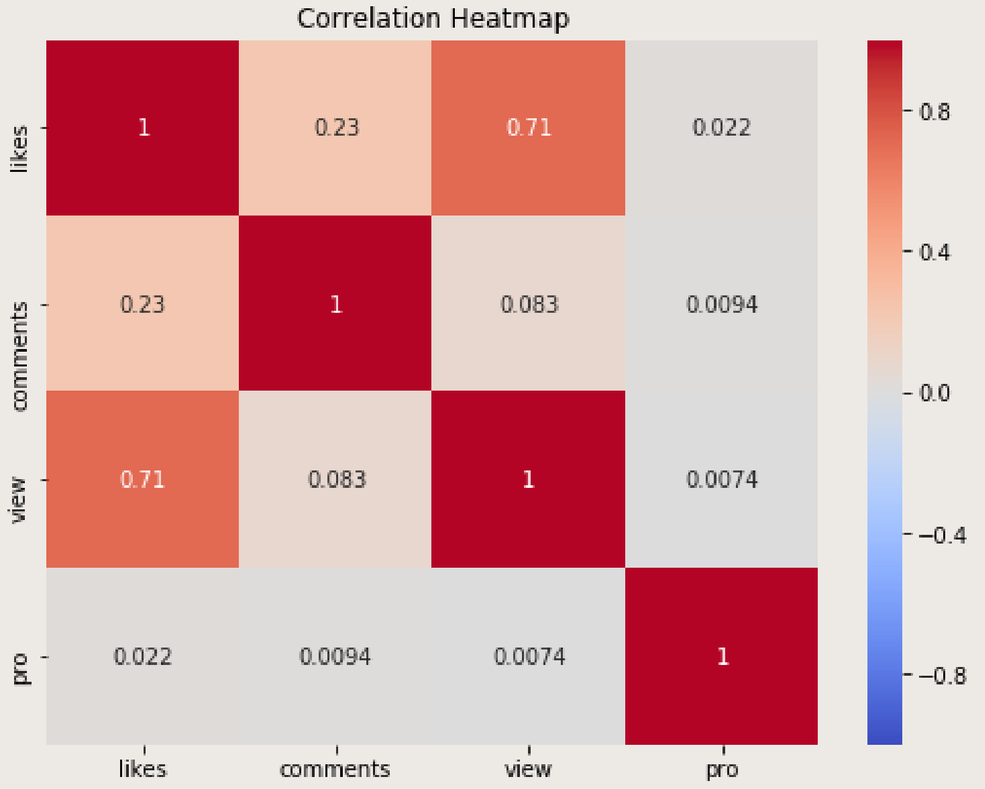






3 EDA-VISUALIZATION

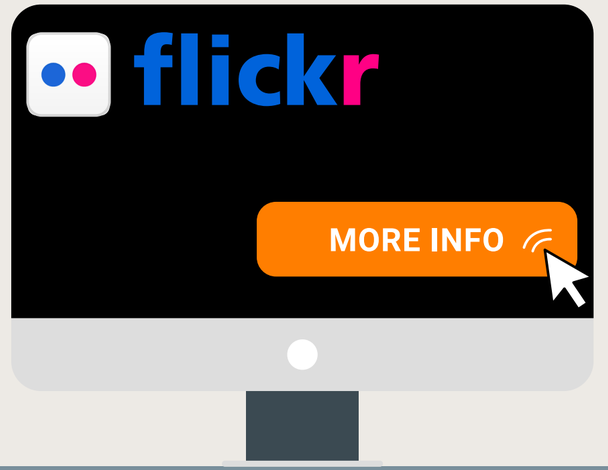




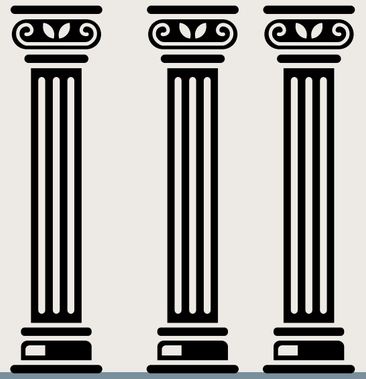

```
Correlation coefficient between 'likes' and 'pro': 0.021784754784267123
Correlation coefficient between 'comments' and 'pro': 0.009415841378713338
Correlation coefficient between 'views' and 'pro': 0.0073895582266121675
```

4

RESEARCH AND PLAN B



MORE COLUMN



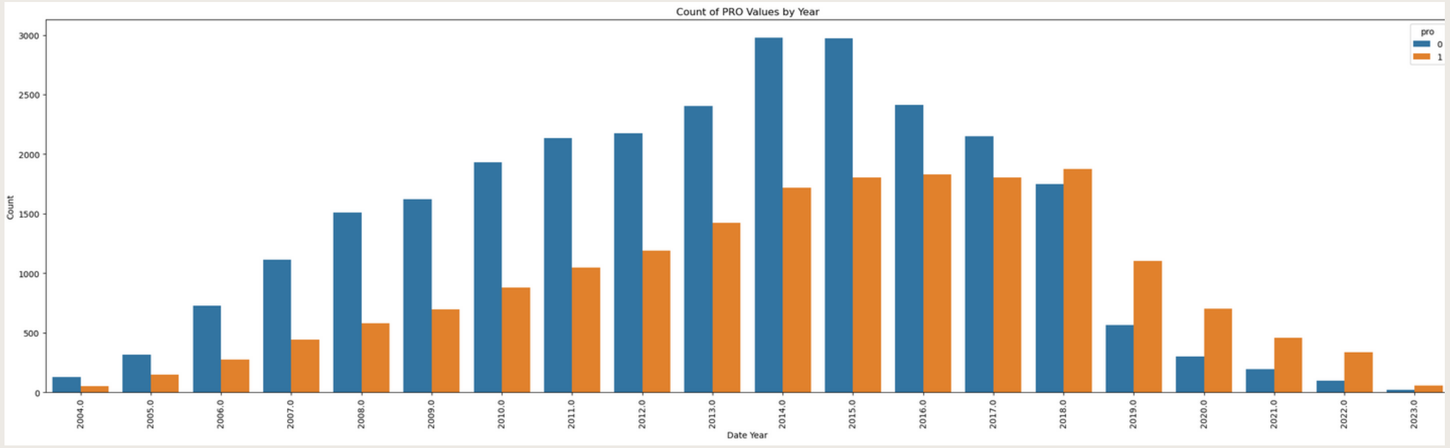
before

after

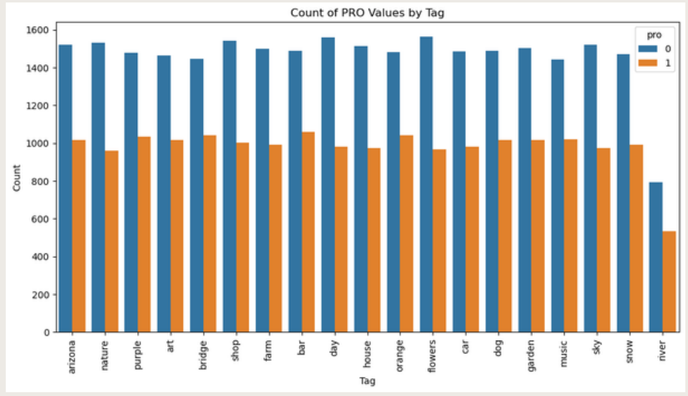
2018

3 EDA-VISUALIZATION

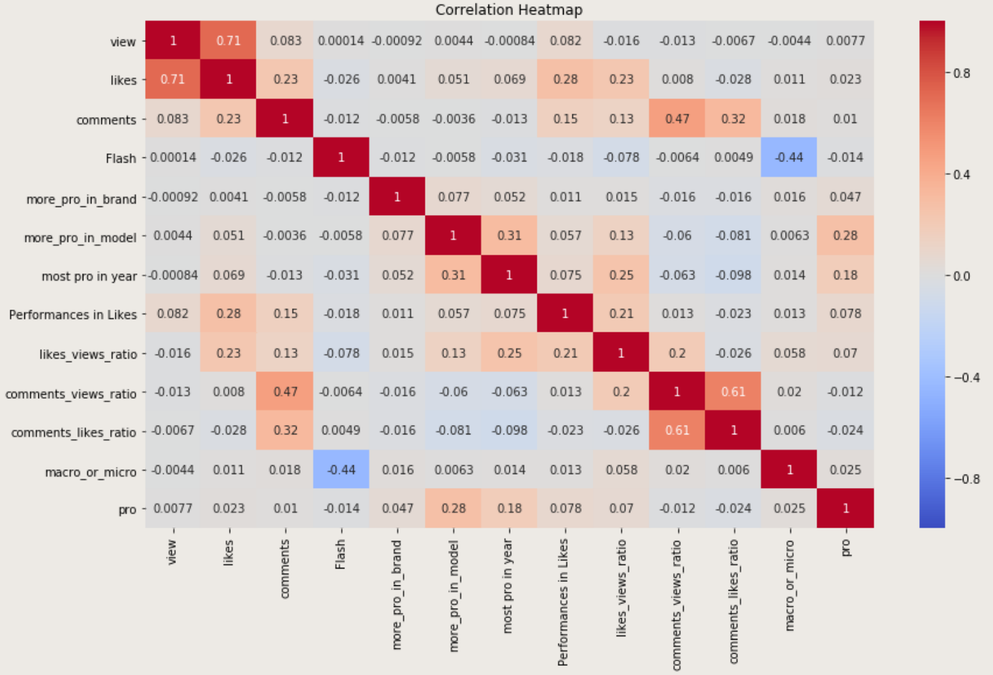
THE RELATIONSHIP BETWEEN YEARS AND "PRO" OR "NON-PRO" STATUS.



THE RELATIONSHIP BETWEEN TAGS AND "PRO" OR "NON-PRO" STATUS.



CHECK RELATIONSHIP WITH MORE COLUMNS IN HEATMAP.



5 MACHINE LEARNING

before

```python
X = df[['view','likes','comments','Flash','more_pro_in_brand','more_pro_in_model','most pro in year','Performances in Likes','likes_views_ratio','comments_views_ratio','comments_likes_ratio','macro_or_micro']]
y = df['pro']

# חלוקת הנתונים לסט האימון והבדיקה
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# יצירת ואימון המודל לוגיסטי רגרסיה
model = LogisticRegression()
model.fit(X_train, y_train)

# חיזוי תוויות עבור סט הבדיקה
y_pred = model.predict(X_test)

# 1 השוואה לערכים של
y_pred_1 = (y_pred ==1)

confusion_mtx = confusion_matrix(y_test, y_pred)

true_negative, false_positive, false_negative, true_positive = confusion_mtx.ravel()

# Calculate accuracy
accuracy = (true_positive + true_negative) / (true_positive + true_negative + false_positive + false_negative)

# Calculate recall (also known as sensitivity or true positive rate)
recall = true_positive / (true_positive + false_negative)

# Calculate precision (also known as positive predictive value)
precision = true_positive / (true_positive + false_positive)
```

```
df = pd.read_csv("Cleaned_csv_file1.7.csv")
true_negative 5966
false_positive 1
false_negative 3871
true_positive 2
Accuracy: 0.6065040650406504
Recall: 0.0005163955589981926
Precision: 0.6666666666666666
F-measure: 0.0010319917440660474
```

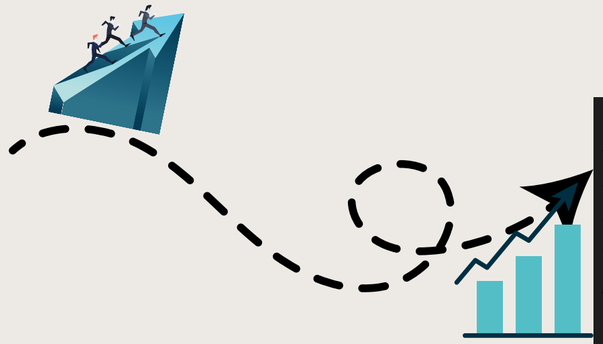
```
df = pd.read_csv("Cleaned_csv_file1.9.2.csv")
true_negative 4716
false_positive 817
false_negative 2280
true_positive 1474
Accuracy: 0.6665230968019813
Recall: 0.39264784230154504
Precision: 0.6433871671759057
F-measure: 0.4876757650951199
```

5 MACHINE LEARNING

after

```python
X = df[['score_photo_normalized','Flash','macro_or_micro','more_pro_in_model','most pro in year','Performances in likes','likes_views_ratio','comments_views_ratio','comments_likes_ratio','more_pro_in_brand']]
y = df['pro']

scaler = MinMaxScaler()
X_scaled = scaler.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

model = LogisticRegression()
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

y_pred_1 = (y_pred ==1)

confusion_mtx = confusion_matrix(y_test, y_pred)

true_negative, false_positive, false_negative, true_positive = confusion_mtx.ravel()

accuracy = (true_positive + true_negative) / (true_positive + true_negative + false_positive + false_negative)

recall = true_positive / (true_positive + false_negative)

precision = true_positive / (true_positive + false_positive)

f_measure = 2 * (precision * recall) / (precision + recall)

print('true_negative',true_negative)
print('false_positive',false_positive)
print('false_negative',false_negative)
print('true_positive',true_positive)
print("Accuracy:", accuracy)
print("Recall:", recall)
print("Precision:", precision)
print("F-measure:", f_measure)
```

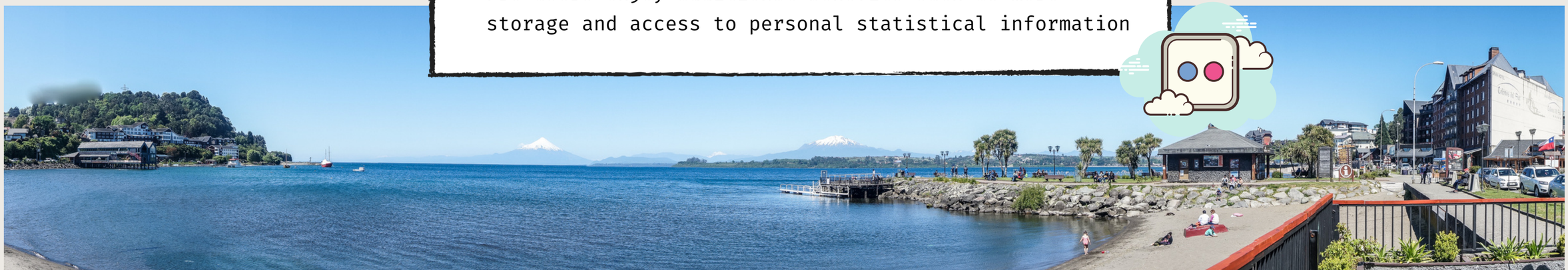
```
6  df = pd.read_csv("Cleaned_csv_file1.9.2.csv")
true_negative 4697
false_positive 836
false_negative 2257
true_positive 1497
Accuracy: 0.6669538063960375
Recall: 0.39877464038359084
Precision: 0.6416630947278182
F-measure: 0.4918679152291769
```



```
6  df = pd.read_csv("Cleaned_csv_file1.7.csv")
true_negative 5071
false_positive 896
false_negative 2306
true_positive 1567
Accuracy: 0.6745934959349593
Recall: 0.4045959204750839
Precision: 0.6362159967519285
F-measure: 0.4946338383838384
```

Summary

- Flickr is a photo-sharing website for photographers, both amateur and professional.
- It provides a platform for uploading and sharing photos, without distinguishing between free and pro users.
- Users can organize their photos and receive comments from others.
- There is no direct correlation between features like cameras, likes, comments, or views and a user's free or pro status.
- Pro users enjoy additional benefits such as more storage and access to personal statistical information



7 OUR RESOURCES:

- GeekForGeeks
- Selenium website
- Chat GPT
- Google Bard
- Numpy
- Matplotlib
- StackOverflow
- W3schools
- Wikipedia
- Campus IL
- medium.com
- Flicker |blog

flickr