SPRINT - 2

DATE	05 November 2022
Team ID	PNT2022TMID50144
Project Name	Project-Skill and job recommender

CODE:
app.py

```
from __future__ import print_function  # In python 2.
import sys
import sqlite3
from flask import Flask, request, g, redirect, url_for, render_template
import indeed as ind
import JaccardSimilarity as mal
import linkedin as lik

app = Flask(__name__.split('.')[0])   # create the application instance


def connect_db():
    """Connect to the specific database."""
    rv = sqlite3.connect('linked_deed.db')
    rv.row_factory = sqlite3.Row
    return rv


def get_db():
    """
    Open a new database connection.

    If there is none yet for the
    current application context.
    """
    if not hasattr(g, 'sqlite_db'):
        g.sqlite_db = connect_db()
    return g.sqlite_db


@app.teardown_appcontext
def close_db(error):
    """Close the database again at the end of the request."""
    if hasattr(g, 'sqlite_db'):
        g.sqlite_db.close()


@app.route('/')
def show_entries():
    db = get_db()
    cur = db.execute('SELECT DISTINCT WHAT, URL, DESCRIPTION FROM jobs_indeed
order by ACCURACY desc')
    entries = cur.fetchall()
    return render_template('jobs.html', entries=entries)


@app.route('/index', methods=['POST'])
def login():
    url = request.form['url']
    em = request.form['email']
    pwd = request.form['password']
    lik.main(em, pwd, url)
    db = get_db()
    cur = db.execute('SELECT LOCATION, DESIGNATIONS FROM linkedin_skills WHERE
ID=1')
    entry = cur.fetchone()
    # print(entry[1].split(", "), file=sys.stderr)
    return render_template('form.html', jobs=entry[1].split(", "),
location=entry[0].split(", "))


@app.route('/form', methods=['POST'])
def form():
    what = request.form['what']
    city = request.form['city']
    state = request.form['state']
    location = city + ", " + state
    db = get_db()
    db.execute('UPDATE linkedin_skills SET DESIGNATIONS = ? WHERE ID = 1',
(what, ))
    db.commit()
    db.execute('UPDATE linkedin_skills SET LOCATION = ? WHERE ID = 1',
(location, ))
    db.commit()
    ind.indeed_jobs(job=what, location=location)
    mal.main()
    return redirect(url_for('show_entries'))


if __name__ == '__main__':
    app.run(debug=True)
from __future__ import print_function  # In python 2.
import sys
import sqlite3
from flask import Flask, request, g, redirect, url_for, render_template
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if __name__ == '__main__':
    app.run(debug=True)
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Indeed.py

```
from bs4 import BeautifulSoup, SoupStrainer # For HTML parsing
import urllib2 # Website connections
import re # Regular expressions
from time import sleep # To prevent overwhelming the server between connections
import pandas as pd # For converting results to a dataframe and bar chart plots
import sqlite3
import unicodedata

job = "software developer"
location = "Victoria, BC, Canada"

def job_extractor(website):
    '''
    Cleans up the raw HTML
    '''
    company_name = "Unknown"
    try:
        site = urllib2.urlopen(website).read() # Connect to the job posting
    except:
        return   # Need this in case the website isn't there anymore or some
other weird connection problem

    soup_obj = BeautifulSoup(site,"html.parser") # Get the html from the site

    for script in soup_obj(["script", "style"]):
        script.extract() # Remove these two elements from the BS4 object

    company = soup_obj.find('span', {'class' : 'company'})
    if company:
        company_name = company.get_text()
    # print company_name

    content = soup_obj.get_text() # Get the text from this

    return content

def clean_up(dirty_data):
    """Clean up the dirty data."""
    clean_data = []

    for i in range(len(dirty_data)):
        temp = unicodedata.normalize('NFKD',
"".join(dirty_data[i]).replace('\n', ' ').
                                     replace('\[[0-9]*\]', "").replace(' +', '
').replace('\t', "").
                                     replace('\r', ' ')).encode('ascii',
'ignore')
        temp, sep, tail = temp.partition('Apply')
        clean_data.append(temp)

    return clean_data

def indeed_jobs(final_job =None, city = None, state = None):
    '''
    Inputs the location's city and state and then looks for the job in
Indeed.com
    '''
    # searching for data scientist exact fit("data scientist" on Indeed search)

    #Create the proper indeed url based on the search criteria
    # Make sure the city specified works properly if it has more than one word
(such as San Francisco)
    if final_job is not None:
        if city is not None:
            final_city = city.split()
            final_city = '+'.join(word for word in final_city)
            final_site_list = 'http://www.indeed.ca/jobs?q=' + final_job + '&l='
+ final_city + '%2C+' + state # Join all of our strings together so that indeed
will search correctly
        else:
            final_site_list = ['http://www.indeed.ca/jobs?q="', final_job, '"']
    else:
        if city is not None:
            final_city = city.split()
            final_city = '+'.join(word for word in final_city)
            final_site_list = 'http://www.indeed.ca/jobs?q=&l=' + final_city +
'%2C+' + state # Join all of our strings together so that indeed will search
correctly
        else:
            final_site_list = 'https://ca.indeed.com/jobs?q=&l=Nationwide'



    final_site = ''.join(final_site_list) # Merge the html address together into
one string


    base_url = 'https://www.indeed.ca/'

    print final_site_list


    try:
        html = urllib2.urlopen(final_site).read() # Open up the front page of
our search first
    except:
        'That city/state combination did not have any jobs. Exiting . . .' # In
case the city is invalid
        return
    soup = BeautifulSoup(html,"html.parser") # Get the html from the first page

    # Now find out how many jobs there were
    div = soup.find(id = 'searchCount')

    num_jobs_area = soup.find(id = 'searchCount').string.encode('utf-8') # Now
extract the total number of jobs found
                                                                        # The
'searchCount' object has this
```

```
    job_numbers = re.findall('\d+', num_jobs_area) # Extract the total jobs 
found from the search result

    # print job_numbers
    if len(job_numbers) > 3: # Have a total number of jobs greater than 1000
        total_num_jobs = (int(job_numbers[2])*1000) + int(job_numbers[3])
    else:
        total_num_jobs = int(job_numbers[2])

    city_title = city
    if city is None:
        city_title = 'Nationwide'

    print 'There were', total_num_jobs, 'jobs found,', city_title # Display how 
many jobs were found

    num_pages = total_num_jobs/10 # This will be how we know the number of times 
we need to iterate over each new
                                      # search result page
    job_descriptions = [] # Store all our descriptions in this list
    final_URLs = []       # Store final job URLs in this list


    for i in xrange(0,num_pages): # Loop through all of our search result pages
        print 'Getting page', i
        start_num = str(i*1) # Assign the multiplier of 10 to view the pages we 
want
        current_page = ''.join([final_site, '&start=', start_num])
        print "So that's the current page"
        print current_page
        # Now that we can view the correct 10 job returns, start collecting the 
text samples from each

        html_page = urllib2.urlopen(current_page).read() # Get the page

        page_obj = BeautifulSoup(html_page,"lxml") # Locate all of the job links
        for script in page_obj(["script", "style"]):
            script.extract()

        print "And that's the result col"
        job_link_area = page_obj.find(id = 'resultsCol') # The center column on 
the page where the job postings exist

        job_URLS = [base_url + link.get('href') for link in 
job_link_area.find_all('a', href=True)]

        job_URLS = filter(lambda x:'clk' in x, job_URLS)

        for j in xrange(0,len(job_URLS)):
            final_description = job_extractor(job_URLS[j])
            if final_description: # So that we only append when the website was 
accessed correctly
```

```python
                job_descriptions.append(final_description)
                final_URLs.append(job_URLS[j])

        new_job_desc = clean_up(job_descriptions)

        # code for database connectivity
        conn = sqlite3.connect('linkedeed.db')
        c = conn.cursor()
        c.execute('DROP TABLE IF EXISTS indeed_jobs')
        c.execute('CREATE TABLE indeed_jobs(ID INTEGER PRIMARY KEY
AUTOINCREMENT, WHAT TEXT, URL TEXT, DESCRIPTION TEXT)')
        for i in range(len(job_descriptions)):
            c.execute('INSERT INTO indeed_jobs (ID, WHAT, URL, DESCRIPTION)
VALUES(?, ?, ?, ?)', ((i + 1), final_job.replace("+", " "), final_URLs[i],
job_descriptions[i], ))
            conn.commit()
        c.close()
        conn.close()

        print 'Done with collecting the job postings!'
        print 'There were', len(job_descriptions), 'jobs successfully found.'


location_list = location.split(",", 1)
city = location_list[0]
state = location_list[1].strip()
final_job = job.lower().replace(' ', '+')

indeed_jobs(final_job = final_job, city = city, state = state)
from bs4 import BeautifulSoup, SoupStrainer # For HTML parsing
import urllib2 # Website connections
import re # Regular expressions
from time import sleep # To prevent overwhelming the server between connections
import pandas as pd # For converting results to a dataframe and bar chart plots
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other weird connection problem

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'ignore')
        temp, sep, tail = temp.partition('Apply')
        clean_data.append(temp)

    return clean_data

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    '''
    Inputs the location's city and state and then looks for the job in
Indeed.com
    '''
    # searching for data scientist exact fit("data scientist" on Indeed search)

    #Create the proper indeed url based on the search criteria
    # Make sure the city specified works properly if it has more than one word
(such as San Francisco)
    if final_job is not None:
        if city is not None:
            final_city = city.split()
            final_city = '+'.join(word for word in final_city)
            final_site_list = 'http://www.indeed.ca/jobs?q=' + final_job + '&l='
+ final_city + '%2C+' + state # Join all of our strings together so that indeed
will search correctly
        else:
            final_site_list = ['http://www.indeed.ca/jobs?q="', final_job, '"']
    else:
        if city is not None:
            final_city = city.split()
            final_city = '+'.join(word for word in final_city)
            final_site_list = 'http://www.indeed.ca/jobs?q=&l=' + final_city +
'%2C+' + state # Join all of our strings together so that indeed will search
correctly
        else:
            final_site_list = 'https://ca.indeed.com/jobs?q=&l=Nationwide'



    final_site = ''.join(final_site_list) # Merge the html address together into
one string


    base_url = 'https://www.indeed.ca/'

    print final_site_list


    try:
        html = urllib2.urlopen(final_site).read() # Open up the front page of
our search first
    except:
        'That city/state combination did not have any jobs. Exiting . . .' # In
case the city is invalid
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    soup = BeautifulSoup(html,"html.parser") # Get the html from the first page

    # Now find out how many jobs there were
    div = soup.find(id = 'searchCount')

    num_jobs_area = soup.find(id = 'searchCount').string.encode('utf-8') # Now
extract the total number of jobs found
                                                                        # The
'searchCount' object has this

    job_numbers = re.findall('\d+', num_jobs_area) # Extract the total jobs
found from the search result

    # print job_numbers
    if len(job_numbers) > 3: # Have a total number of jobs greater than 1000
        total_num_jobs = (int(job_numbers[2])*1000) + int(job_numbers[3])
    else:
        total_num_jobs = int(job_numbers[2])

    city_title = city
    if city is None:
        city_title = 'Nationwide'

    print 'There were', total_num_jobs, 'jobs found,', city_title # Display how
many jobs were found

    num_pages = total_num_jobs/10 # This will be how we know the number of times
we need to iterate over each new
                                      # search result page
    job_descriptions = [] # Store all our descriptions in this list
    final_URLs = []       # Store final job URLs in this list


    for i in xrange(0,num_pages): # Loop through all of our search result pages
        print 'Getting page', i
        start_num = str(i*1) # Assign the multiplier of 10 to view the pages we
want
        current_page = ''.join([final_site, '&start=', start_num])
        print "So that's the current page"
        print current_page
        # Now that we can view the correct 10 job returns, start collecting the
text samples from each

        html_page = urllib2.urlopen(current_page).read() # Get the page

        page_obj = BeautifulSoup(html_page,"lxml") # Locate all of the job links
        for script in page_obj(["script", "style"]):
            script.extract()

        print "And that's the result col"
        job_link_area = page_obj.find(id = 'resultsCol') # The center column on
the page where the job postings exist

        job_URLS = [base_url + link.get('href') for link in
job_link_area.find_all('a', href=True)]

        job_URLS = filter(lambda x:'clk' in x, job_URLS)

        for j in xrange(0,len(job_URLS)):
            final_description = job_extractor(job_URLS[j])
            if final_description: # So that we only append when the website was
accessed correctly
                job_descriptions.append(final_description)
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            conn.commit()
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    final_site = ''.join(final_site_list) # Merge the html address together into
one string


    base_url = 'https://www.indeed.ca/'

    print final_site_list


    try:
        html = urllib2.urlopen(final_site).read() # Open up the front page of
our search first
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job_link_area.find_all('a', href=True)]

        job_URLS = filter(lambda x:'clk' in x, job_URLS)

        for j in xrange(0,len(job_URLS)):
            final_description = job_extractor(job_URLS[j])
            if final_description: # So that we only append when the website was
accessed correctly
                job_descriptions.append(final_description)
                final_URLs.append(job_URLS[j])

        new_job_desc = clean_up(job_descriptions)

        # code for database connectivity
        conn = sqlite3.connect('linkedeed.db')
        c = conn.cursor()
        c.execute('DROP TABLE IF EXISTS indeed_jobs')
        c.execute('CREATE TABLE indeed_jobs(ID INTEGER PRIMARY KEY
AUTOINCREMENT, WHAT TEXT, URL TEXT, DESCRIPTION TEXT)')
        for i in range(len(job_descriptions)):
            c.execute('INSERT INTO indeed_jobs (ID, WHAT, URL, DESCRIPTION)
VALUES(?, ?, ?, ?)', ((i + 1), final_job.replace("+", " "), final_URLs[i],
job_descriptions[i], ))
            conn.commit()
        c.close()
        conn.close()

        print 'Done with collecting the job postings!'
        print 'There were', len(job_descriptions), 'jobs successfully found.'


location_list = location.split(",", 1)
city = location_list[0]
state = location_list[1].strip()
final_job = job.lower().replace(' ', '+')

indeed_jobs(final_job = final_job, city = city, state = state)
```

jaccaradsimilarity.py

```
"""Implementing an algorithm to find out the best match jobs."""
import csv
import sqlite3
import unicodedata

global total_count

text = []
```

```
labels = []
filename = 'SkillsetUniversal.txt'


def read_txt(file, text):
    """Reading data from text files(universal skill list)."""
    with open(file, 'r') as f:
        reader = csv.reader(f)
        for row in reader:
            for item in row:
                text.append(item)
    return text


def select_from():
    """Reading data from tables."""
    conn = sqlite3.connect('linkedeed.db')
    c = conn.cursor()
    jobs = []
    for row in c.execute('SELECT DESCRIPTION FROM jobs_indeed'):
        jobs.append(row)
    c.close()
    c = conn.cursor()
    skills = []
    for row in c.execute('SELECT SKILLS FROM linkedin_skills'):
        skills.append(row)
    c.close()
    conn.close()
    return jobs, skills


def jobs_calc(job, text):
    """Counting how many skills match."""
    count = 0
    for uni_word in job:
        if uni_word in text:
            count += 1
    return count


def data_cleanup(jobs, skills, txt):
    """Clean up of each job description and skills."""
    for i in range(len(jobs)):
        jobs[i] = unicodedata.normalize('NFKD',
"".join(jobs[i])).encode('ascii','ignore')

    # cz skills will just be in 1 cell
    skills[0] = unicodedata.normalize('NFKD',
"".join(skills[0])).encode('ascii', 'ignore')
    skill_l = (skills[0].split(', '))
    skill_list = [item.lower() for item in skill_l]
    text = [item.lower() for item in txt]
    jobss = [item.lower() for item in jobs]
```

```python
    job_list = []
    for job in jobss:
        job_list.append(job.split(' '))
    return skill_list, text, job_list


def accuracy(skill_list, text, job_list):
    """Calculate match accuracy for each job."""
    # skills_required = []
    # skills_match = []
    match = []  # match depending upon the skills required.
    for job in job_list:
        x = jobs_calc(job, text)
        y = jobs_calc(skill_list, job)
        # skills_required.append(x)
        # skills_match.append(y)
        match.append((float(y) / (x + 1)) * 100)
    return match


def update_table(match):
    """Update it in sqlite and order this in desc."""
    conn = sqlite3.connect('linkedeed.db')
    sql = '''UPDATE jobs_indeed SET ACCURACY = ? WHERE ID = ?'''
    for i in range(len(match)):
        cur = conn.cursor()
        cur.execute(sql, (match[i], i + 1))
        cur.close()
    conn.commit()
    conn.close()


def main():
    """Start up."""
    txt = read_txt(filename, labels)
    jobs, skills = select_from()
    skill_list, text, job_list = data_cleanup(jobs, skills, txt)
    skills_you_have = jobs_calc(skill_list, text)

    match = accuracy(skill_list, text, job_list)
    update_table(match)

# main()
"""Implementing an algorithm to find out the best match jobs."""
import csv
import sqlite3
import unicodedata

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    # cz skills will just be in 1 cell
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"".join(skills[0])).encode('ascii', 'ignore')
    skill_l = (skills[0].split(', '))
    skill_list = [item.lower() for item in skill_l]
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"".join(skills[0])).encode('ascii', 'ignore')
    skill_l = (skills[0].split(', '))
    skill_list = [item.lower() for item in skill_l]
    text = [item.lower() for item in txt]
    jobss = [item.lower() for item in jobs]
    job_list = []
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    match = accuracy(skill_list, text, job_list)
    update_table(match)

# main()
```
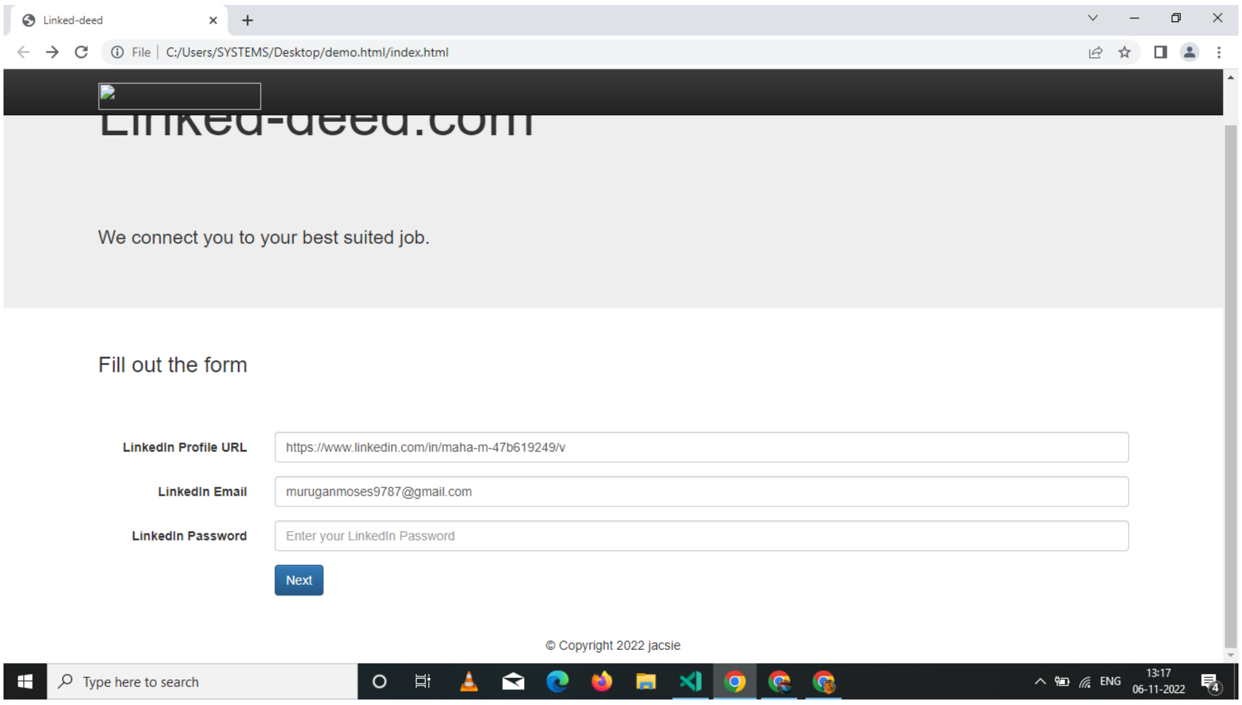

Output:



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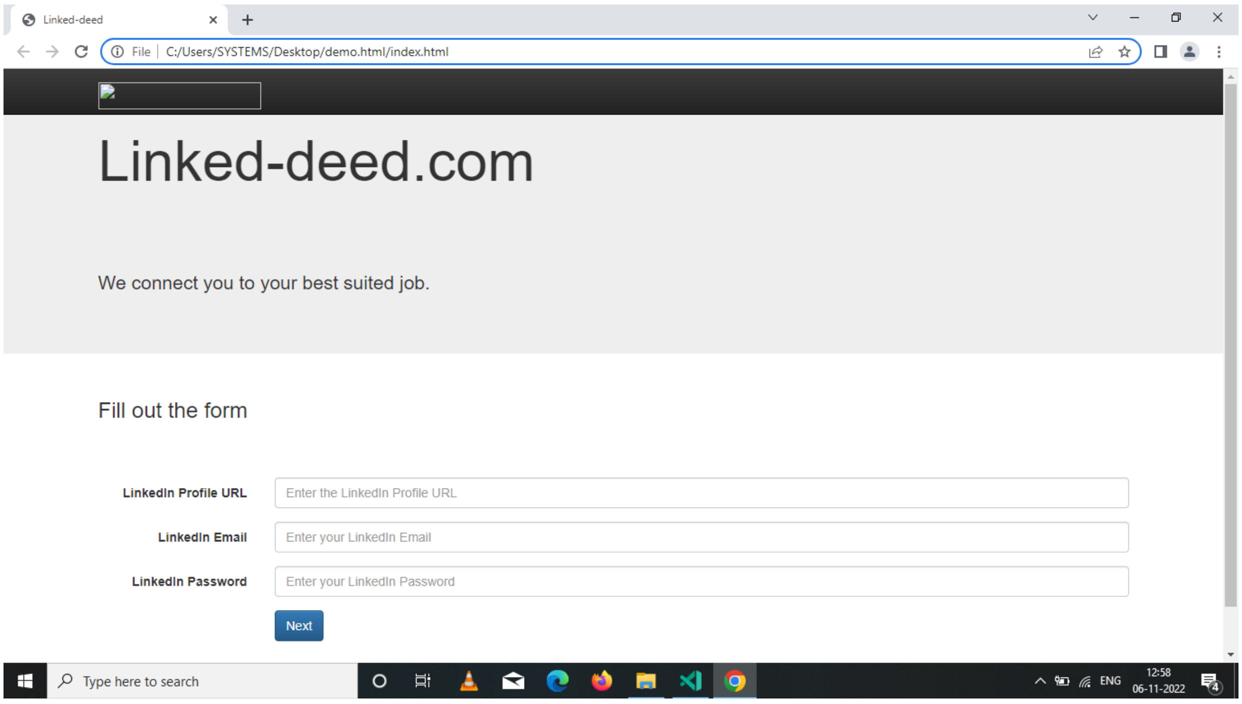

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