RESUME SHORTLISTER

Overview

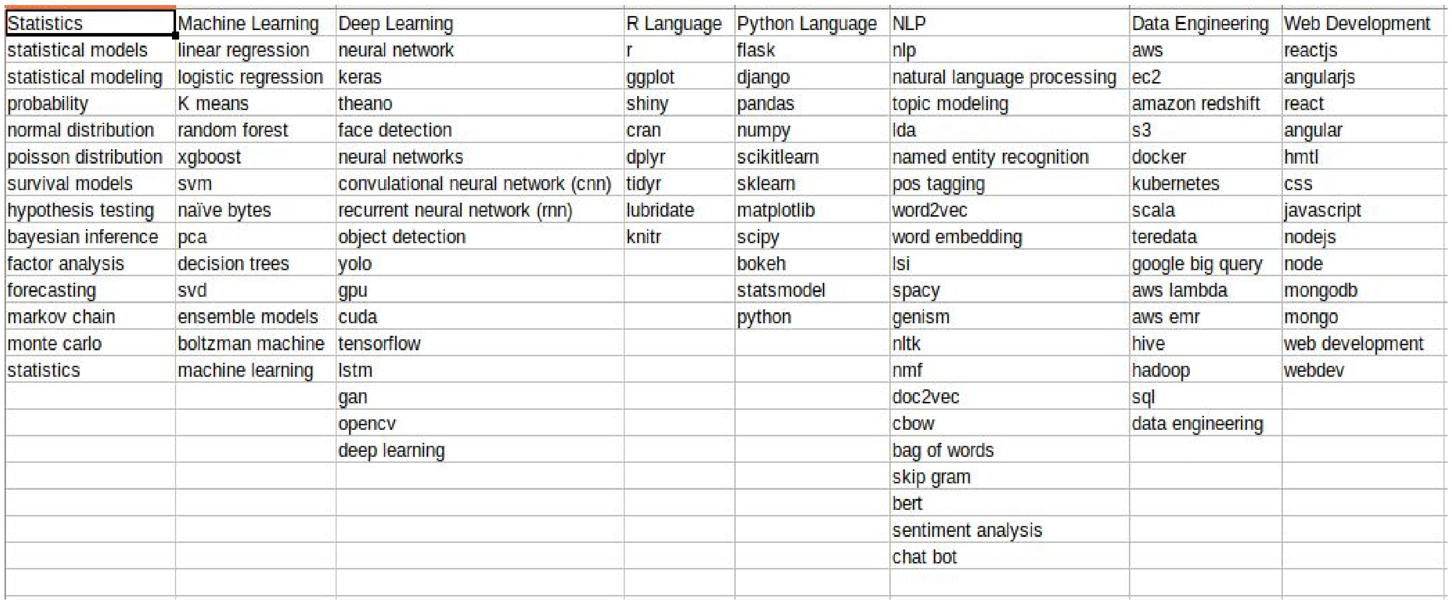
We have made a Resume Shortlister Project, an AI application for screening and shortlisting Resumes and candidatures of individuals using Natural Language Processing and heuristics to calculate the final score of each candidate. The candidates with the highest scores can then be called for further interview rounds.

Approach

1. We will use Natural Language Processing to solve the problem at hand. First, we created a CSV file, which acts as a dictionary and has the various skill sets categorized. The skills have been categorized into a total of 8 fields. They are:
    - Statistics
    - Machine Learning
    - Deep Learning
    - R language
    - Python Language
    - Natural Language Processing
    - Data Engineering
    - Web Development

2. These fields are then further categorized according to the various terms that appear in their respective domain. So for example, there are terms like keras, tensorflow which are grouped under Deep learning whereas terms like spacy, lda are added in the NLP category.

This is the CSV file containing all the skill sets.



Statistics	Machine Learning	Deep Learning	R Language	Python Language	NLP	Data Engineering	Web Development
statistical models	linear regression	neural network	r	flask	nlp	aws	reactjs
statistical modeling	logistic regression	keras	ggplot	django	natural language processing	ec2	angularjs
probability	K means	theano	shiny	pandas	topic modeling	amazon redshift	react
normal distribution	random forest	face detection	cran	numpy	lda	s3	angular
poisson distribution	xgboost	neural networks	dplyr	scikitlearn	named entity recognition	docker	hmtl
survival models	svm	convulational neural network (cnn)	tidyr	sklearn	pos tagging	kubernetes	css
hypothesis testing	naïve bytes	recurrent neural network (rnn)	lubridate	matplotlib	word2vec	scala	javascript
bayesian inference	pca	object detection	knitr	scipy	word embedding	teredata	nodejs
factor analysis	decision trees	yolo		bokeh	lsi	google big query	node
forecasting	svd	gpu		statsmodel	spacy	aws lambda	mongodb
markov chain	ensemble models	cuda		python	genism	aws emr	mongo
monte carlo	boltzman machine	tensorflow			nltk	hive	web development
statistics	machine learning	lstm			nmf	hadoop	webdev
		gan			doc2vec	sql	
		opencv			cbow	data engineering	
		deep learning			bag of words		
					skip gram		
					bert		
					sentiment analysis		
					chat bot		

3. After that, an NLP Algorithm is applied that goes through the resumes one by one, parses them and looks for the words mentioned in the dictionary.
4. The algorithm then counts the occurrences of the words under each category and then finally represents the above count in a visual way by plotting a graph and a showing a table for each candidate.
5. A graph is plotted which represents the candidates on the y- axis and their skill counts on the x-axis.
6. A scoring mechanism is used which helps us to filter out the candidates for the profile we have made the application for, by giving more weight to that particular field and assigning less weight to the others. Eg. For shortlisting candidates for an AI profile, more weightage is given to fields like Deep Learning, NLP, Machine learning compared to Statistics and Web Development.

Technology used

Language: Python
Visualization : Matplotlib

The following dependencies were used in the program :

1. PyPDF2
2. Numpy
3. Pandas
4. Spacy
5. En-core-web-lg

Benefits

1. **Automatically reading the Resume -** If we were to manually open each and every resume, it would take a lot of time. The code saves us from this scenario by automatically opening each and every resume and parsing the content.

```
# Function to read resumes from the folder one by one
mypath = '/home/karanpal/NLP_Resume/candidateResume'
onlyfiles = [os.path.join(mypath, f) for f in os.listdir(mypath) if
os.path.isfile(os.path.join(mypath, f))]
def pdfextract(file):
    fileReader = PyPDF2.PdfFileReader(open(file, 'rb'))
    countpage = fileReader.getNumPages()
    count = 0
    text = []
    while count < countpage:
        pageObj = fileReader.getPage(count)
        count += 1
        t = pageObj.extractText()
        print(t)
        text.append(t)
    return text
```

2. **Phrase Matching -** Instead of manually searching for whether a candidate has the desired skills or not, the code hunts for the keywords, keeps a count of their occurrence and categorizes them.

```
matcher = PhraseMatcher(nlp.vocab)
matcher.add('Stats', None, *stats_words)
```

3. **Data Visualization -** It is the most important aspect as it helps us to speed up the process . The graph plotted by the algorithm helps us to decide which candidate has more keywords under each category, thus implying that they may be good in that domain and thus helps to make the selection procedure much faster.

```
plt.rcParams.update({'font.size': 10})
ax = new_data.plot.barh(title="Resume keywords by category", legend=False,
figsize=(25, 7), stacked=True)
labels = []
for j in new_data.columns:
    for i in new_data.index:
        label = str(j) + ": " + str(new_data.loc[i][j])
        labels.append(label)
patches = ax.patches
for label, rect in zip(labels, patches):
    width = rect.get_width()
    if width > 0:
        x = rect.get_x()
        y = rect.get_y()
        height = rect.get_height()
        ax.text(x + width / 2., y + height / 2., label, ha='center', va='center')
plt.show()
```

Results

The code helps us to quickly shortlist the resumes with a few seconds and thus saves a lot of time.