



PAAD: POLITICAL ARABIC ARTICLES DATASET FOR AUTOMATIC TEXT CATEGORIZATION

Dhafar Hamed Abd¹

¹*Department of Computer Science
University of Technology, Baghdad and
Al-Maarif University College, Al-Anbar,
IRAQ
Dhafar.dhafar@gmail.com*

Ahmed T. Sadiq²

²*Department of Computer Science
University of Technology, Baghdad,
IRAQ
Drahmaed_tark@yahoo.com*

Ayad R. Abbas³

³*Department of Computer Science
University of Technology, Baghdad,
IRAQ
ayad_cs@yahoo.com*

Abstract - Now day's text Classification and Sentiment analysis is considered as one of the popular Natural Language Processing (NLP) tasks. This kind of technique plays significant role in human activities and has impact on the daily behaviours. Each article in different fields such as politics and business represent different opinions according to the writer tendency. A huge amount of data will be acquired through that differentiation. The capability to manage the political orientation of an online article automatically. Therefore, there is no corpus for political categorization was directed towards this task in Arabic, due to the lack of rich representative resources for training an Arabic text classifier. However, we introduce political Arabic articles dataset (PAAD) of textual data collected from newspapers, social network, general forum and ideology website. The dataset is 206 articles distributed into three categories as (Reform, Conservative and Revolutionary) that we offer to the research community on Arabic computational linguistics. We anticipate that this dataset would make a great aid for a variety of NLP tasks on Modern Standard Arabic, political text classification purposes. We present the data in raw form and excel file. Excel file will be in four types such as V1 raw data, V2 preprocessing, V3 root stemming and V4 light stemming.

Keywords - *Arabic Political Article; Orientation; Sentiment Analysis; Natural language Processing; Opinion Mining.*

I. INTRODUCTION

Nowadays more and more Arabic political is presented in the form of electronics. Arabic political inform us about the current event and explain situations, political articles include education, war, politics, economy and so on. Political articles also records people's opinion and action objectivity from our situations and Ariba countries have many situations as Iraq, Syria and Lebanon and so on. So, this area will reach for Arabic political articles and we have to make analysis.

The Arabic Language is considered one of the most powerful and effective language around the world. According to the latest report, it is the 5th widely used languages around the globe. There are roughly 422 million people as a mother tongue and 250 million an additional language [1]. Arabic alphabet consists of 28 letters. The orientation of writing in Arabic is from right to left [2]. Compared to the high number of studies conducted on English sentiments, opinions, attitudes, and emotions, the number of similar studies on the Arabic language is very small.

In this paper will present four corpus such as V1, V2, V3, and V4 for each corpus will create process then make these corpora available online for who interest in NLP filed. For each corpus will using process except corpus V1 this original corpus but another will make process such as preprocessing, root stemming and light stemming. For these corpora will make statistical analysis for each one by using statistical analysis. Statistical analysis is considered very effective tools to determine any research work. This kind of methods can be applied for a number of research studies that propose some techniques for carrying out comparisons among various algorithms [3-5].

In this research paper, the data analysis applications are concentrated on machine learning models that association with the exploration of the statistical properties of the variables. This can be obtained by plotting the scatter of data, which summarize each class for visualization. In order to obtain the scatter visualization by using to undertake a visualization of the utilised data in these experiments, it computed with summary statistics, followed by visualisation methods including t-distributed Stochastic Neighbourhood Embedding (t-SNE) and Principal Component Analysis (PCA) [6]. Although PCA and t-SNE are powerful in most of advanced statistical methods, they have the great advantage of making distribution of the examined data. This research is presented scatter plots for each input variable and three outputs.

II. LITERATURE REVIEW

Annotation is the process of manually or automatically adding information into text for a given purpose. In computational linguistics, humans called annotators or taggers [7]. Annotation, and its companion activity of corpus creation, has become an important activity in computational linguistics since the widespread application of machine learning algorithms and lexicon. One of the most important preconditions for building an efficient model is to understand the input data characteristics. The specialized models always have potential to outperform the general one. The real contribution of this work is the exploration of characteristics in the data and its application on the process of building a classification model. For languages using corpus in different language for political as table below.

TABLE 1
SUMMARY OF POLITICAL CORPUS IN DIFFERENT LANGUAGE FROM 2015 TO 2020 EXCEPT ARABIC LANGUAGE.

Reference	year	language	Source	Description	public
Chambers [8]	2015	English	Tweeter	Identifying political relations between nation states	N/A
Du et al [9]	2015	Russian and Chinese	News papers	Extraction sentence from Russian and Chinese news	N/A
Rubtcova [10]	2015	Russian	News papers	The corpus collected from newspapers is used for context of political institutions	N/A
Stranisci [11]	2016	Italian	Tweeter	Online irony debate for Italian political	N/A
Burnap et al [12]	2016	English	Tweeter	Predict UK president in 2015	N/A
Ahmed et al [13]	2016	English and Indian	Tweeter	Indian political election on 2014	N/A
Rashkin et al [14]	2017	English	Newspapers	Analyzing language in fake news and political	N/A
De Smedt [15]	2018	Germany	Tweeter	German political debate	N/A
Stier et al [16]	2018	German	Tweeter and Facebook	Online campaigning of German politicians	N/A
Lai [17]	2018	Italian	Tweeter	Political debate	N/A
Hu [18]	2019	China	Newspaper	Chinese democracy strategy in political language	N/A
Mehta and Kavi [19]	2019	English	Newspaper and TV website	Categorize ideological frames	N/A
Falck et al [20]	2019	English	Newspaper	Measuring between	N/A

				newspapers and political parties	
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There are many papers published for political the most of them collect from tweeter [21-23] and few from newspaper [24]. In table above as we can see from different natural language most of researchers using tweeter because ease to collect text because of API [25-27]. In this case we search from 2015 to 2020 for Arabic corpus as we can below in table 2 the years and Arabic corpus with purpose and it publish or not also the source with type of the corpus.

TABLE 2
SHOW THE RELATED WORK WITH ARABIC LANGUAGE CORPUS

Author	Year	Source	Description	public
Elsayed et al [28]	2015	News	This corpus building from news from al-youm7	N/A
Ahmed et al [29]	2017	Website king Abdullah	Political parallel corpus for Arabic and English	N/A
Chouigui et al [30]	2018	Tunisian web radio sit	This corpus for Arabic news	ANT ¹
Abooraig et al [31]	2018	Website, social network	This corpus collects from different place and using for classifying political orientation (Arab nationalist, brotherhood, Islamic Shia, liberal and socialist)	N/A
Zeroual et al [32]	2019	News websites	This corpus for Arabic news	CLARIN ²

In this survey by zaghouani and wajdi [33] all the corpus published none of them with political also the survey for Arabic corpus from 2005 to 2015 by Al-thubaity [34] none of them political as we will work for Arabic and another language from 2015 to 2020 also the close paper and also political by Abooraig et al but the category different and also not available online that's make as to prepper our corpus and special with M,S and T because each one will solve problem for human right now. Some problems within Arabic corpus become apparent when examining the previous work. The simple reason that much work is being done on non-public corpus. From the comparison shown in tables 1 it can be seen that of the evaluated 13 corpora none of them publish. In table 2 there are 2 from 5 corpus online. The corpora used also came from several different domains, including newspaper and tweeter.

¹ <https://antcorpus.github.io>

² <https://www.clarin.eu>

III. METHODOLOGY

The important unistructural data so have to collect then have to clean and change to structural data steps below show that in figure 1.

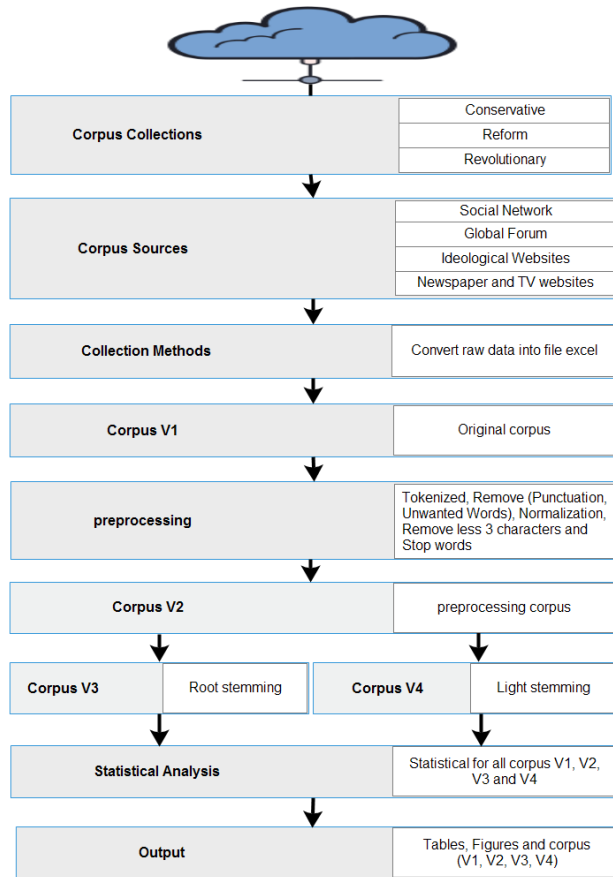


Fig 1: General Model

A. Corpus Collection

There is a crucial challenge during the search on internet for the Arabic articles. This challenge includes the absence of a standard Arabic dataset, so had collected and construct own dataset used in this study. collect 206 political Arabic articles called (PAAD). The dataset is collected from different places such as (social network, global forum, website ideologies, newspaper and TV). PAAD was distributed among three categories such as (conservative, reform, and revolutionary). PAAD has a total number of 206 articles. These categories are summarized in table 3. This corpus available free on Mandalay repository³.

TABLE 3
NUMBER OF ARTICLES WITH LABEL

Label of articles	Articles number	Arabic meaning
Conservative	28.2% (58)	التيار المحافظ

³ <https://data.mendeley.com/datasets/spvbf5bgjs>.

Reform	38.8% (80)	التيار الاصلاحى
Revolutionary	33.0% (68)	التيار الثوري
Total	206	

As shown in Table 4, there are three types of articles (short, medium and large).

TABLE 4
Types of articles

Articles	Number of articles	percentage
shortest article	15	7.281%
Medium article	36	17.475%
longest article	155	75.242%
Total	206	100%

The gathering of online articles was based on Modern Standard Arabic. The vast majorities of modern Articles that written in the colloquial Arabic were excluded. A number of different sources was considered to build the corpus manually. There are roughly 60% of our corpus gathered was during Arab Spring revolution, while the 30% for the period preceding the Arab Spring revolution. The remaining percentage 10% is specific for beliefs and ideas that founded the party thought and for the political events.

B. Corpus sources

In this section, we discuss the procedure of our dataset collection resources.

1) *Social network*: Social networks are considered very effective tools for spreading news and information at any area around the world. Facebook⁴ was used for crowd gathering during the Arab Spring revolution. There are a number of people are using these platforms to express their support for to the revolution, while other used to express their opposing views. The main purpose of this experimental study is to collect these posts and understanding ideologies and trends in the Arab world.

2) *Global forums*: The global forums are forums that do not require from a user to be of the same ideology as the forum members, to be a member. We chose global because specific ideological forums due to any member from other ideologies. We also considered collecting the writings of users in global forums source of our dataset. In addition to that, Arab policy forum⁵ is an example of these forums.

3) *Ideological websites*: There are a number of ideological websites with various opinions. This kind of website always discuss political events throughout distribution articles or news. The admin of this website is frequently having the same ideology. Eventually, in order to collect articles from ideological websites, it should contain articles of party members.

4) *TV websites and Newspaper*: TV websites and newspaper have corners page that is specified in the articles. We gathered a number of online articles from such sources.

⁴ <https://www.facebook.com>

⁵ [https:// www.alsiasat.com](https://www.alsiasat.com)

Here we will mention to these sources such as BBC⁶. Table 5 shows the numbers of articles from various sources

TABLE 5
SOURCE OF OUR DATASET

Source	Numbers of articles	percentage
Social network	21	10.194%
Global forum	38	18.446%
Ideological website	93	45.145%
Newspaper and TV	54	26.213%
Total	206	100%

C. Collection Method

The collected data is formatted in three folders (Reform, Conservative and Revolutionary). Each folder involves a list of text files numbered sequentially, in which a file corresponds to one whole article. The articles contain some English symbols, punctuation, digits, and Arabic diacritics as figure 2. There are five important steps that used in our study for collection data. Firstly, we extract and collect online Arabic articles manually using various internet sources. Secondly, it is very significant to remove the unwanted components. Thirdly, correct words that comprise bad mistakes or spelling. Fourthly, place every article in one folder, and then collects the documents that belong to the same ideology in one folder. Finally, raw data will be available for preprocessing.

Reform25.txt
<p>ان أي عملية اصلاح ، هو تحقيق اهمى قدر من المنافع والتقليل من اثارها السلبية على العمل والاحتراف عن المسار ويعني الانتقال من مرحلة أو حالة غير منتجة إلى مرحلة أو حالة أخرى منتجة وفاقعة وبمعامل أكثر وضوح يفترض فيها أن تكون أكثر ايجابية وينتطلب جيوداً متواصلة ومضنية من المنظمات المدنية ومن المدبرين العاملين في التخطيط لمعالجات الإصلاح ومجابهة ردود الأفعال الناجمة عنها . من هذا المنطلق يتطلب اتخاذ خطوات فعالة للتعامل مع هذه التغييرات بشكل دائم وتحديد وتصميم الاستراتيجيات المناسبة لنجاح العملية وتجنب فشل الإصلاح أو الإيجاد حل مناسب لأي اضطراب في التنفيذ خاصة إذا كان هدفنا البناء ولا يمكن أن تكون الأيول مسائل الصحيحة وتبديها مجموعة سليمة بعيدة عن المصالح الضيقة والكفيلة بتأمين الاجماع وتكون الاعتراض حول خطوات التغيير أو لا يؤول، وتحطيا بحزام الأمان من أي اختراق خارجي ، والا كانت العمليات قائمة ، بل ودرسا في الضحك على النقون . بناء المؤسسات ليست لعبة الكروية تحضى منها المكاسب الفردية يقوم بها الحالمون في زوايا البيوت وادارتها بالوقوف القنالة أو الاجزة الحديثة ، انما بالممارسة العملية والتواجد في ساحة العمل للتفكير الجدي في المحافظة على الاستمرار بالشراكة في المستقبل القريب والبعيد بحيث كل ما كان هناك عاملين كفاءه ومحميين للعمل كل ما كان تحقيق الاهداف بسهولة والوصول لتتحقق المكاسب اسرع ويوقت أقل والموارد البشرية نور كبير في مجال التقييم وتحسين الأداء ودراسة امكان الضعف والعمل على حلها وتسطيع تحليل الوظائف وتصميمها في المستقبل الكفاءات واختيارها وتعيينها في اداء والمزايا والتعويضات وبدلات تطوير الموارد البشرية ونظام تحفيز العاملين إلى جانب تخطيط الموارد البشرية وفي وضع الصلاحيات والمسؤوليات مع تحديث الهيكل التنظيمية لوضع أنظمة السلامة ودراسة مشاكل العاملين ومعالجتها بهدف ادارة الموارد البشرية الاستراتيجية وتحولها لتوظيف المهارات والكفاءات العالية الترتيب والمتحفزة مادية ومعنوية وهي الساليب ونخطط مدروسة بفعل ممارسات على مستويات متعددة تحتاج في التنفيذ إلى السهر والحرص وداب وعرق وتزيف في اجنادا كثيرة</p>

Fig 2: Example of reform political article

D. Building corpus

Despite of the labelling process is straightforward and simple; it is crucial part of data preprocessing in Machine learning algorithms. The labelling process requires to be carried out precisely, as any error can render the quality of the dataset, and the general accuracy performance for various kind of machine learning approaches. The articles were collected using excel file and Python scripts written specifically for scraping three class. So, we read the folder from the excel file and read each article as shown figure 3.

Articles	lable
المحافظون على أمن تكليتون ويسبقون، ولكن مع ذلك تكفوا مع الزمن وأهلهم، وضوا أولويات المصنع في مقدمه اهتمامهم: الإقتصاد والتربية والتكوين والصحة وتنمية المجتمع...	Conservative
عرف الحزب في القرن السابع عشر باسم "توريز" أو "الشيخ بتبديله الملكة" وبعرضه لتوجهات غريبة السياسي في حينها حزب "ويج" والذي حين على الحياة السياسية البريطانية	Conservative
قد تمسك نصف أعضاء الحزب في حينها بيمينية التجارة، فيما طالب النصف الأخر بحصبة مصالح الرراعين . Image caption كتب ويسون ترسل صفه القائد الوطني خلا	Conservative
الانتماء بالحكم السور ، واخر امسادة النقون . المحافظه على استقرار الوطن وأمنه وصون الوحدة الوطنية وعدم التمييز بين المواطنين . الانتماء بأساس الديمقراطية واحترام التعددية الا	Conservative
ان المحافظين اعد الاخراب السياسية الفرية المؤثرة في المجتمع السياسي المصري والتي تهتم بالشأن المصري على عده محور أهمها تأهيل وتمكين الشباب . وأوضح صراحة أن اختياره	Conservative
تكون لفسدة حزب المحافظين على تضامن مجموعة من الأعضاء المؤتمنين بيماني الحزب ويسعون لتحقيق أهدافه بطريقة سؤولة من خلال رؤية مصر بمثابة خط اضاعي واستور لاح	Conservative
أرى الحزب أن انظر ما يواجهه المجتمع المصري الآن هو اختلال منظومة القيم الأخلاقية، كنتيجة مباشرة لتفول عبثه بالفساد. ويؤمن الحزب أن العيشة الصالحة لا تكون الا في دولة م	Conservative
بداً بماضيا للبعس أن يعن وزير الخزانة البريطاني جيب هوموند، عند اطلاقه موازنة السنوية، عن انتهاء العمل بالكفء المالي، وبالتالي عن رصد مليارات الجنيهات لتفويض الضمان	Conservative
الذات واضداً ليس في بريطانيا فحسب، بل في صوم أوروبا وفي العالم، ان الساعات الكفاءات الاقتصادية سبب بارز وراء الصعود الشعبي القومي المتطرف . أما في بريطانيا فحسب،	Conservative
للحزب السياسية المحافظه في الدول الغربية مواقف متباينة في مجال السياسة والإقتصاد والمجتمع والتربية والتعليم، ولكن هنا على سبيل المثال حزب المحافظين في بريطانيا، والحز	Conservative
ان أكثر المجتمعات والشعوب التي يمكن ان نمر فيها الأفكار والاعتقادات المحافظه، هم من يتصفون بالمثابرة والخيال والروحانيات والاساطير والحرفاات ، والسجد صديق فيهم	Conservative
وع من الفسدة السياسية يتبتم بالمحافظة على القيم التقليدية الثابتة في المجتمع ، وهايا بشكل عدم ضد التسليم، وضعية بلاد العلم مستوحاه ومختلفة، لكن من الاختلافات دي الا ان المدا	Conservative
كثيراً ما يوصف الإسلاميون بأنهم تيار "محافظ" والشعوبون بأنهم "محافظون" ، وبعضهم يعتبر بكونه "محافظاً" ويراد وصفه إيجابياً بأن على الاستقامة والأصالة. هل هو فعلاً كذلك؟	Conservative
إذا كان حلقة الفكر والسياسة المشيئة في أمريكا تسمى إلى الكفك مع مستجات الحرة، نجد بان الفكر المحافظ الليبرالي قدم الكثير من المنهج الكروي في المجال السياسي والإضاعي و	Conservative
هذه الفكرة ماضوية الفكر لم تقتصر على المحافظين، وإنما سلمات الليبراليين الذين ذهبوا أكثر نحو اعادة الفكر الليبرالي، حيث يرون بان الحكومة يجب ان تتدخل لصالح الإنسان	Conservative
تأكيد استمرار اية الإصلاح السياسي والثقافي في مختلف الجوانب ومنها تنكيه مبادئ الحكم الجيد واخذاه في الشافية والمحابية والمسؤولية وتحقيق دولة المؤسسات في أرض الواقع، حوا	Conservative
تكون لفسدة حزب المحافظين على تضامن مجموعة من الأعضاء المؤتمنين بيماني الحزب ويسعون لتحقيق أهدافه بطريقة سؤولة من خلال رؤية مصر بمثابة خط اضاعي واستور لاح	Conservative
حزب المحافظين بمنهج الليبرالي المحافظ سياسياً واقتصادياً، وتمسكه بالنظام الشكلي في بريطانيا، وبقاذه المستنبت عن بناء العرش البريطاني، ورفضه أي تغيير سياسي أو ادا	Conservative

Fig 3: excel file example for label articles

when building excel file, we get our dataset so have to build four datasets as table 6 below. will present the methodology used for building the dataset. The corpus V1 dataset is raw data but put in Excel. From V1 will built three new versions table 6 shows the various dataset.

TABLE 6
show the dataset we build

Corpus	Description
Original V1	It is the version that is built
Pre-processing V2	It is the version that is built with pre-processing
ISRI stemmer V3	It is stemming Appling on V2
Light stemmer V4	It is light stemming Appling on V2

1) Preprocessing for building corpus V2

In this step after building V1 then will building V2 for make clean from unwanted words, noise words and stop words. The V2 is important for see the effective preprocessing on text classification. Corpus V1 need to be cleaned and prepared the text for further classification. The online articles comprise a number of uninformative and noise data like HTML tags and scripts, or advertisements, which hinders the extraction of words. Furthermore, the presence of special Arabic characters or punctuation marks is also not accurately determined. Figure 4 shown the preprocessing steps.

⁶ <https://www.bbc.com/arabic>

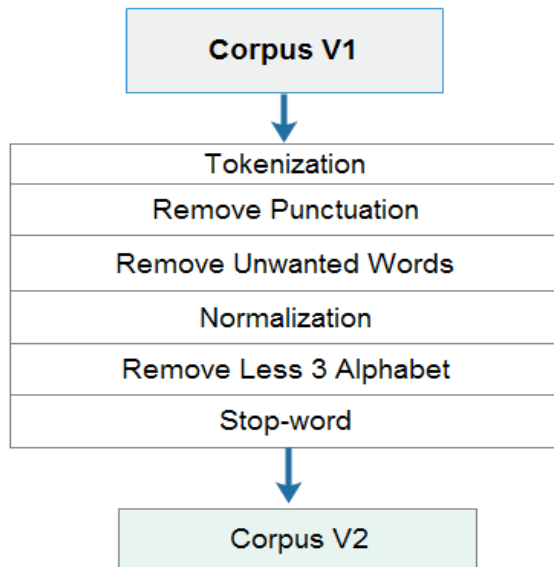


Fig 4: preprocessing steps

The first step is tokenization that will break our sequence of text into pieces such as words. So, the input of our tokenize become the output for another process. The second step is remove punctuation this step is very important because will remove all punctuation such as (:,"'! ? ; _ - ' ' { } /* // ... [],). In third step will remove unwanted words that will show in table 7 by using list of regular expression.

TABLE 7
LIST OF REGULAR EXPRESSIONS

Regular Expression	Results
[a-zA-Z]+	Remove English characters
[0-9]+	Remove English numbers
[0-9]+	Remove Arabic numbers
#\$% @^~(&*)+	Remove another

The most important step in preprocessing for Arabic language is normalization. This important because Arabic language has many shapes for write so our methods involve three steps such as (Diacritics, Tatweel and Letter). Beginning with the removal of a diacritics from an Arabic word, and culminating in the conversion of an alphabetic word into another. An example of this process is displayed in figure 5. If we don't remove then we have many words for same words then vector become large and we need more articles for building then will take time example "تعبيرا" and "تعبيرا" so these words if we remove ("") then we have only one word.



Fig 5: The diacritics have to eliminate

Tatweel in Arabic language we can for some character make it long as (—) this use for make the shape of word pretty so this become problem because for same words we can write in many ways example "الاصلاح", "الاصـلاح", and "الاصلاح" its same word "الاصلاح". This become when press shaft and ("ت") so we have to remove this tatweel for make lass words. The final step in normalization will make unique letter for some letters. In Arabic language there are many ways for write characters as table 8.

TABLE 8
NORMALIZATION LATTER OF ARABIC LANGUAGE

Original	Become	Example	Example
إِصْلَاحٌ	ا	الإصلاح "reform"	الإصلاح "reform"
قَوِي	ي	قوى "strong"	قوي "strong"
أَدَاءٌ	ء	ادائه "performance"	اداءه "performance"
يَتْلَعُ	ء	يتلائم "fits"	يتلاءم "fits"
ثَوْرِيَّةٌ	ه	ثورية "Revolutionary"	ثوريه "Revolutionary"

When complete all steps above then remove any word content only two characters then we can remove. because in Arabic language two words dos not make any sense. Final steps stop words the Arabic stop word can be filtered from an article by removing the token, and matching the word with the stop words listed. The stop words list is a built-in NLTK library. In NLTK all words are sign words.

E. Root Stemming for Building V3

In this section will building from V2 the root stemming corpus V3. Stemming [35] is very important because removal affixes and suffixes then will reduce the number if feature of words to the same stem generated. There are different stemming approaches proposed for many languages. Arabic language is very complexity language that is why need strong stemming to process its complexity morphological. In this study will using Information Science Research Institute's (ISRI) stemmer [36]. This algorithm has 7 steps such as the following algorithm for ISRI stemmer.

Algorithm 1: ISRI

- Input**
Remove diacritics which represent Arbc short vowels such as (َ, ِ, ُ)
Remove stop words ISRI have 60 stop words
Remove length three and two prefixes
- Remove length three and two suffixes
Remove connecting و if its in begin word
Replace (أ, إ, ؤ) with ا

If $4 \leq \text{length}(\text{word})$ and $\text{length}(\text{word}) \leq 7$ then

- a. If $\text{length}(\text{word}) == 4$ then
Extract match the list patterns such as
فاعل فاعول فعلة
- b. If $\text{length}(\text{word}) == 5$ then
Extract match the patterns list such as
تفاعل فعال تفعيل
- c. If $\text{length}(\text{word}) == 6$ then
Extract match patterns list such as
استفعل مفعال افتعال
- d. If $\text{length}(\text{word}) == 7$ then
Remove one character suffix and prefix
if match

Pattern list such as ل ت ن ا ك

If $\text{length}(\text{word}) == 6$ then

Goto c step

3 Output

Corpus V3

F. Light stemming for building V4

From corpus V2 will using light stemming to build corpus V4. In light stemming all rules we have here taken from ISRI stemmer. Using light stemming if we looking for the meaning word and keep it clear for human to understand the word. ISRI Light stemmer, which is a number of conditions that determine how to apply the stemming on a certain word or not, the rules of removing suffixes, prefixes and waw. The table 9 show the three conditions with length of words that would be stem.

TABLE 9
RULES OF LIGHT STEMMING FOR WAW, PREFIX AND SUFFIX

Condition	Length of word	Remove from word	Letters
Waw	w >= 4	1	و
Prefix	p >= 6	3	كال , بال , ولل , وال
	p >= 5	2	لل , ال
Suffix	s >= 6	3	تمل , همل , تان , كمل , تين
	s >= 5	2	ون , ات , ان , ين , تن , كم , هن , نا , يا , ها , تم , كن , ني , وا , ما , هم

The conditions will be applying of the rule. The first apply waw and prefix finally suffix.

G. Statistical analysis

Statistical is very important for make analysis for data and see the data is good or not. In this case will using tables to show the frequency words belongs to each class and another thing. Also, will using visualization such as PCA, t-SNE and cloud word. Corpus visualization is very important step in the different approach in opinion mining, allowing the human advisor to gain an intuition of the data and the potential learn ability of such data. The results from corpus visualization can

be used to guide the modelling phase, since a major component of learn ability is known to be a function of the correspondence between the different approaches and the type of representation it is supplied with. To undertake a visualization of the utilised data, it computed with summary statistics, followed by visualisation methods t-SNE and PCA. The main visualization analysis tools are discussed in the following sections.

1) Principal component analysis (PCA)

PCA can reduce the dimensionality of the data easily by discovering the orthogonal linear integrations from the original feature with the largest variance[37]. Given a sample of P observations on vector N variables to $\{x_1, \dots, x_p\} \in R^N$. For each observation, nm dimensional vector representing the nm features. The main purpose is to find the mapping form xx to, where zz is mm dimension. In order to identify the initial principal component of the sample by the linear transformation in Equation 4 [38, 39].

$$z' = W^T x_j = \sum_{i=1}^N w_{i1} x_{ij} \quad j = 1, 2, 3, \dots, p.$$

Where the vector

(4)

$$w_1 = (w_{11}, w_{21}, w_{31}, \dots, w_{N1})$$

$$x_j = (x_{1j}, x_{2j}, x_{3j}, \dots, x_{Nj})$$

Var $[z_1]z_1$ selected as maximum.

So, it is required to choose the feature where the variance of $z_1 z_1$ is maximum. The value of $W^T W^T$ for which projection that obtain correspondence to the largest variance of $z_1 z_1$. The principal component analysis is an effective process in terms of selecting a suitable number of features with accurate mapping dimensional space. In order to recover the original instances from the reduced presentation, the principal components are constructed error rate with minimum value[39].

2) T-distributed Stochastic Neighborhood Embedding (T-SNE)

A popular method for exploring high-dimensional data is something called t-SNE, introduced by Van and Hinton in 2008[40]. Exploratory analysis is considered vital step in the machine learning algorithms, permitting the humankind to acquire an intuition of the data and the potential learn ability of such data. In addition to that, the outcomes from data exploration can be utilized to monitor the modelling level, since a major component of learn ability is known to be a function of the correspondence between the algorithms and the type of representation it is supplied with.

3) Word Cloud

In this paper will introduce words cloud that will visualization most frequency words in corpus also provide simple and effective meaning to visualize the most frequency words in corpus [41, 42].

IV. EXPERIMENTAL RESULT

In this result will using python language for all building corpus and test. Our test will be occurred in four steps because we have four corpus and for each corpus will make test.

A. CORPUS V1

In this empirical study, we presented in details the statistical analysis and characteristic of V1. The characteristics are illustrated in Table 10. Revolutionary articles are the longest in terms of both the number of sentence and the number of digits, followed by Reform articles and then Conservative articles, whereas Conservative articles are the shortest. The same applies to the number of punctuations the Reform articles are the longest followed by Revolutionary articles and Conservative articles. Now, regarding the length of English words, Reform articles have the longest words, followed by Conservative articles and less English words for Revolutionary articles. For the number of unique words, the longest unique words are for Reform articles, then Revolutionary articles and Conservative articles have the less words. For the number of longest words, the longest words are for Reform articles, then Revolutionary articles and Conservative articles have the less words.

TABLE 10

SHOW THE DIFFERENT STATISTIC FOR EACH CLASS FOR CORPUS V1

statistical	Conservative	Reform	Revolutionary	Total
Number of articles	58	80	68	206
Number of sentences	511	738	873	2122
Highest article sentence	53	40	56	149
Lowest article sentence	1	3	1	5
Number of all token	14111	29607	23853	67571
Highest article token	626	1130	1208	2964
Lowest article token	54	82	63	199
Number of unique tokens	3246	6782	5303	15331
token occurs more than one time	1997	3319	2646	7962
Number of English words	65	110	7	182
Number of punctuations	616	1271	1054	2941
spatial character is dot.	370	586	705	1661
How many Digits	88	207	211	506
Word equal six alphabetic	1768	3687	3297	8752
Word less than six alphabetic	7327	14772	12157	34256
Word great than six alphabetic	3101	7289	5067	15457

In table above we have dot ('.') as spatial character this character very important for detection the sentence or split sentence in farther work. The figure 7 show the most frequent words in word cloud.



Fig 6: Most words in word cloud for corpus V1

As we can see in figure above the most frequency words present in cloud words are the commonly Arabic words. The table 11 below show the most 10 frequent words in PAAD corpus V1 for each class.

TABLE 11

MOST 10 FREQUENCY WORDS FOR CORPUS V1 FOR EACH CLASS

No	Conservative	Reform	Revolutionary			
1	في	418	في	782	في	789
2	.	370	من	620	.	705
3	من	306	.	586	من	538
4	على	249	على	384	على	355
5	أن	152	,	361	اليسار	234
6	أو	89	الإصلاح	285	الى	233
7	التي	88	الى	283	و	190
8	الى	82	أن	266	التي	187
9	``	81	أو	260	الثورة	162
10	اما	79	السياسي	233	أن	139

The table above present the high frequency punctuation. In the figure 7 will show articles distribution in corpus V1 for each class.

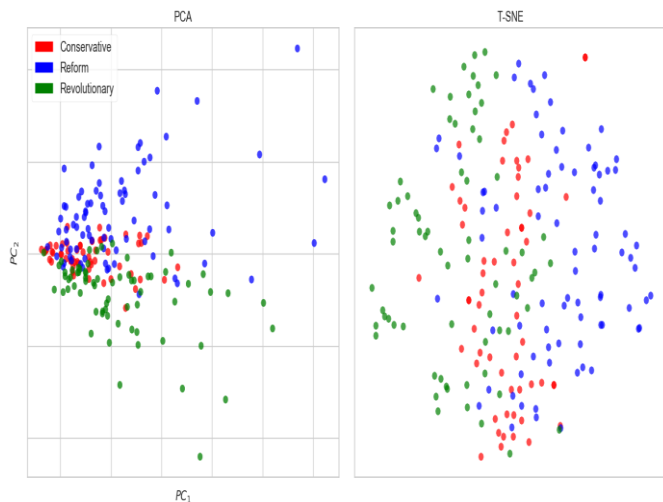


Fig 7: T-SNE and PCA visualization for corpus V1 show the articles distribution cluster view

As we can see in table above for both visualization PCA and T-SNE the articles distribution is non-linear. As we can see the distribution return the scatter plot so for each point will present the article. The distribution shows the similarity clusters of articles as scatter plot.

B. CORPUS V2

In this section show how preprocess steps effect on corpus and reduce number of words also keep only important words after make preprocessing. Table 12 show number of words during the preprocessing steps.

TABLE 12
EFFECTIVE PREPROCESSING STEPS ON CORPUS V1

Preprocessing steps	Conservative	Reform	Revolutionary
Numbers of articles	58	80	68
Tokenize numbers	14111	29607	23853
Remove punctuation	13323	28109	22605
Remove unwanted words	12177	25698	20607
Normalization	12177	25698	20607
Remove less than 3	10681	22553	18504
NLTK Stop words	7663	17796	14781
Final words	7663	17796	14781

As we can see in table above the final words. The highest words with Revolutionary article flow by Reform article and the lest Conservative article. In the figure below show the most frequency words in corpus V2 and present in cloud word.



Fig 8: show the most frequent words in cloud words

The figure 8 show the most frequency words and as we can see the words will affect the decision will presented and different from figure 6 in corpus V1. In table 13 will present the most 10 frequency words belong to each class.

TABLE 13
MOST 10 FREQUENCY WORDS FOR EACH CLASS IN CORPUS V2

No	Conservative	Reform	Revolutionary
1	المحافظين 79	الاصلاح 360	اليسار 237
2	المحافظه 76	السياسي 268	الثوره 165
3	السياسي 73	السياسيه 218	اليساريه 86
4	المحافظ 71	النظام 140	السياسي 80
5	السياسيه 50	المجتمع 80	الاجتماعي 76
6	المجتمع 46	العربييه 71	السياسيه 62
7	الحزب 40	عمليه 70	المجتمع 59
8	التيار 39	التحول 65	الثورات 55
9	حزب 33	العربي 58	الشيويه 54
10	الثوره 32	الدول 58	اليمين 54

As we can see in table above most of words same meaning but the write shape different so in next, we will present root and light stemming for reduce all these words from corpus V2. In figure 9 show the PCA and T-SEN.

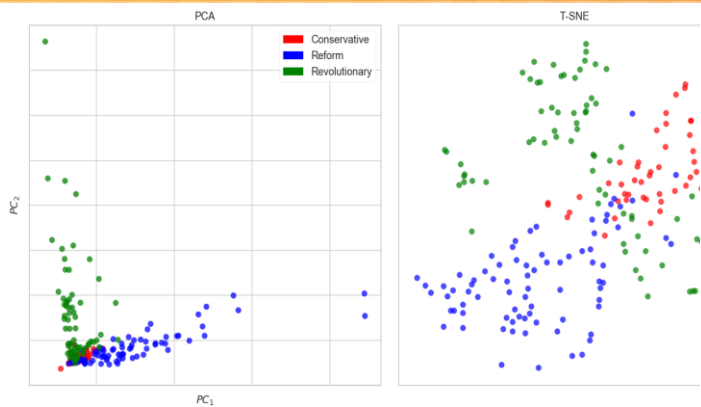


Fig 9: distribution of corpus V2 using PCA and T-SNE

Figure 9 show the distribution of our corpus V2 and as we can see the distribution show corpus V2 non-linear distribution. In this figure the distribution will be better than in figure 7 in corpus V1 that will make decision high accurate.

C. Corps V3

In this section show how root stemming effect on corpus V2 and reduce number of words. Table 14 show number of words when apply root stemming.

Table 14

Most 10 frequency words corpus V3

No	Conservative	Reform	Revolutionary
1	حفظ 326	صلح 659	يسر 482
2	سيس 196	سيس 606	ثور 378
3	جمع 141	نظم 316	سيس 260
4	حزب 118	جمع 302	جمع 260
5	فكر 100	عمل 241	عمل 254
6	تير 87	دول 189	طبق 167
7	حكم 79	حكم 162	حزب 154
8	علم 79	حقوق 151	شيع 137
9	عمل 67	علم 147	علم 124
10	دول 63	عرب 138	نظر 121

In table 13 for corpus V2 there are many words in same root but different shape so after apply root stemming and se we can see in table 14 the words back to the original root. The figure 10 show the articles distribution for corpus V3.

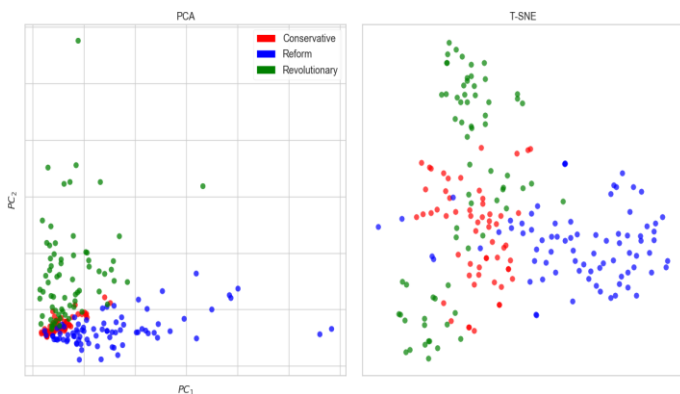


Fig 10: Corpus V3 distribution using PCA and T-SNE

As we can see in figure above the corpus V3 is non-linear distribution.

D. Corpus V4

In this section show how light stemming effect on corpus V2 and reduce number of words. Table 15 show number of words after apply light stemming.

TABLE 15

MOST 10 FREQUENCY WORDS CORPUS V4

No	Conservative	Reform	Revolutionary
1	محافظ 197	اصلاح 507	يسار 299
2	حزب 88	سياسي 294	ثوره 233
3	سياسي 86	سياسيه 248	يساريه 109
4	تيار 86	نظام 212	سياسي 108
5	محافظ 84	مجتمع 149	سياسيه 103
6	مجتمع 78	تحول 92	اجتماعيه 102
7	سياسيه 65	عمليه 92	مجتمع 94
8	دوله 45	تغيير 87	حزب 91
9	تغيير 35	دوله 84	ثور 81
10	ثوره 35	حكم 79	تيار 80

In table 14 for corpus V3 root stemming reduce the root words but the meaning of word occurs almost lost. In table above for light stemming the meaning still there. Figure 11 show the distribution articles of corpus V4.

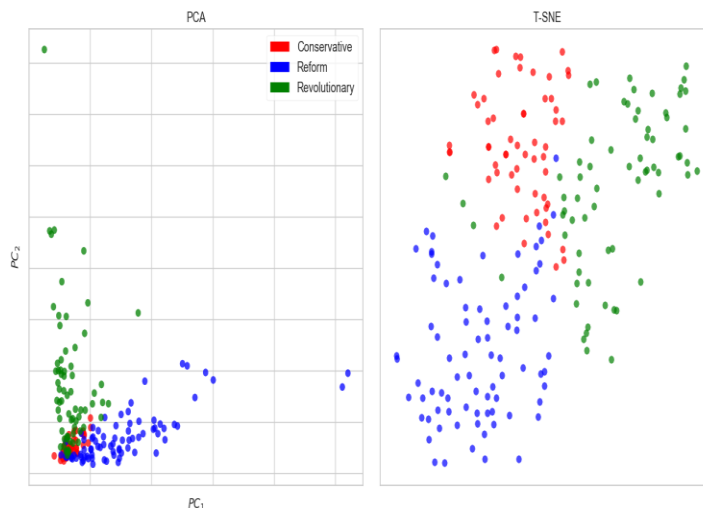


Fig 11: corpus V4 distribution using PCA and T-SNE

CONCLUSION

In this article, we have presented the Political Arabic article dataset (PAAD). We address the research problem by collecting and building four types of corpus from PAAD and make this corpus available online. These corpus as V1 the original raw data and from this corpus will building corpus V2 that will apply on its preprocessing steps. From corpus V2 will building two another corpus such as V3 apply root stemming and corpus V4 apply light stemming. This dataset PAAD will use for how interest in NLP or text categorization.

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