JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125 VOL 7, ISSUE 15, 2020

# FAKE NEWS DETECTION USING MACHINE LEARNING TECHNIQUES

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**ABSTRACT:**

Information preciseness on Internet, especially on social media, is an more and more vital concern, but web-scale data hampers, potential to identify, consider and correct such data, or so referred to as "fake news" present in these systems in the present literature. There exists a giant physique of lookup on the subject matter of computer gaining knowledge of methods for deception detection, most of it has been focusing on classifying online opinions and publicly on hand social media posts and there are many algorithms used for fake information detection, and present authors cannot use benchmark dataset for this detection respectively. In this mini project, we will a suggest a approach for pretend information detection and ways to follow it on LIAR data set, it is a benchmark records set. This approach uses different computing device learning classification models to predict whether the information will be labelled as REAL or FAKE.

**KEYWORDS:** Fake news, LIAR data, real, fake, detection

## I. INTRODUCTION

Fake news; defined as a made-up story with an intention to deceive, has been widely noted as a component which has contributed in the effect of the U.S Presidential Election. Fake news is more and more turning into a risk to the society. It is usually generated for commercial pursuits to attract viewers and accumulate revenue. Fake news is a form of news consisting of deliberate disinformation unfold with the aid of ordinary information media or on-line social media. Digital news has added lower back and elevated the usage of fake news. Fake information is written and posted normally with the intent to lie to in order to damage an agency, entity, or character and/or acquire financially or politically, often the use of sensationalist, dishonest or outright fabricated headlines to increase readership. Similarly, tales and headlines earn advertising revenue from this activity. The relevance of pretend information has increased in post – reality politics. For media outlets, the potential to attract viewers to their websites is fundamental to generate on-line marketing revenue. Publishing a story with false content material that attracts customers advantages advertisers and improves ratings. Easy get entry to to on-line advertisement revenue, expanded political polarization and the recognition of social media, in particular the Facebook News Feed, have all been implicated in the unfold of faux news, which competes with legit information stories. Hostile authorities actors have additionally been implicated in generating and propagating fake news, in particular for the duration of elections. Confirmation bias and social media algorithms like those used on Facebook and Twitter further strengthen the unfold of pretend news. Fake information undermines serious media insurance and makes it extra tough for journalists to cowl huge information stories. Anonymously – hosted fake news web sites lacking acknowledged publishers have also been criticized, because they make it difficult to prosecute sources of pretend news. However, people and businesses with doubtlessly malicious program to provoke pretend news in order to affect activities and policies round the world. It is also believed that circulation of faux information had primary have an impact on on the outcome of the U.S Presidential Election. Fake news is regularly used to refer t fabricated news. This kind of news, located in usual news, social media or faux information websites, has no groundwork in fact, but is introduced as being factually accurate. The intent and purpose of faux information is important. In some cases, what appears to be faux information be information satire, which uses exaggeration and introduces non – factual factors that are meant to amuse or make a point, instead than to deceive. Some researchers have highlighted that "Fake news" may be amazing not just through the falsity of its content, however also the "character of on line circulation and reception". Although many people understand the result of sharing fake news, that is often on a

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conceptual level. Researchers found that the link between dis - information and things like electoral control and democracy is too abstract for users to understand [1].

## II. STATE OF THE ART

In the literature, the researchers have been focusing on the development of new fashions to notice the pretend news. These encompass naïve bayes, neural network with tensorflow and keras, svm(support vector machine) computing device gaining knowledge of algorithms.

Fake news detection is used to discover sincere information sources, hence growing the need for computational tools able to furnish insights into the reliability of on-line content. In our proposed methodology, for detecting pretend news, superior algorithms are used to effectively utilize the strength of the crowd given a set of news and then to formalize our objective as to limit the unfold of misinformation, i.e., how many users quit up seeing a pretend news earlier than it is blocked.

The a variety of techniques used for pretend news detection using the desktop getting to know algorithms are proposed in. The authors proposes a strategy for fake information detection using Naïve Bayes Classifier. This approach was applied as a software program system and examined in opposition to the dataset of Face e book information posts and they executed classification result for that dataset. These outcomes may additionally be increased in countless ways [1].

The authors additionally proposed a technique in which it performs a moderative evaluation over direct and indirect profile facets between these consumer groups, which reveal their workable to differentiate pretend news. We assemble real world dataset which means users stage on fake information and select representative group of both skilled users who are able to recognize faux information gadgets as false and "naïve" users who are greater possibly to consider faux news [2].

It ambitions to present cognizance on characterization of information story in the cutting-edge origin mixed with the one-of-a-kind content material types of information story and its have an effect on on readers. In this section, the discussion is between the types of facts that the information stories are made of; there are four primary formats - they are text, audio, multimedia, hyperlinks in which customers utilize their news. Afterwards, they force into current fake information detection methods that are closely based on textual content based totally analysis and additionally describe pretend news dataset [3]. Recently, fake news detection based on the deep learning algorithm is proposed for the efficient detection.

## III. DATASET DESCRIPTION

The datasets used for this undertaking were drawn from Kaggle. The coaching dataset has about 25000 rows of facts from a number of articles on the internet [12].

A full training dataset has the following attributes:

**ID:** The unique id of the news article.

**Title:** The title of the news article.

**Author:** The author of the news article.

**Text:** The text of the article.

**Label :** A label that marks the article as with the capacity to develop unreliable

1: Untrue.

0: True.

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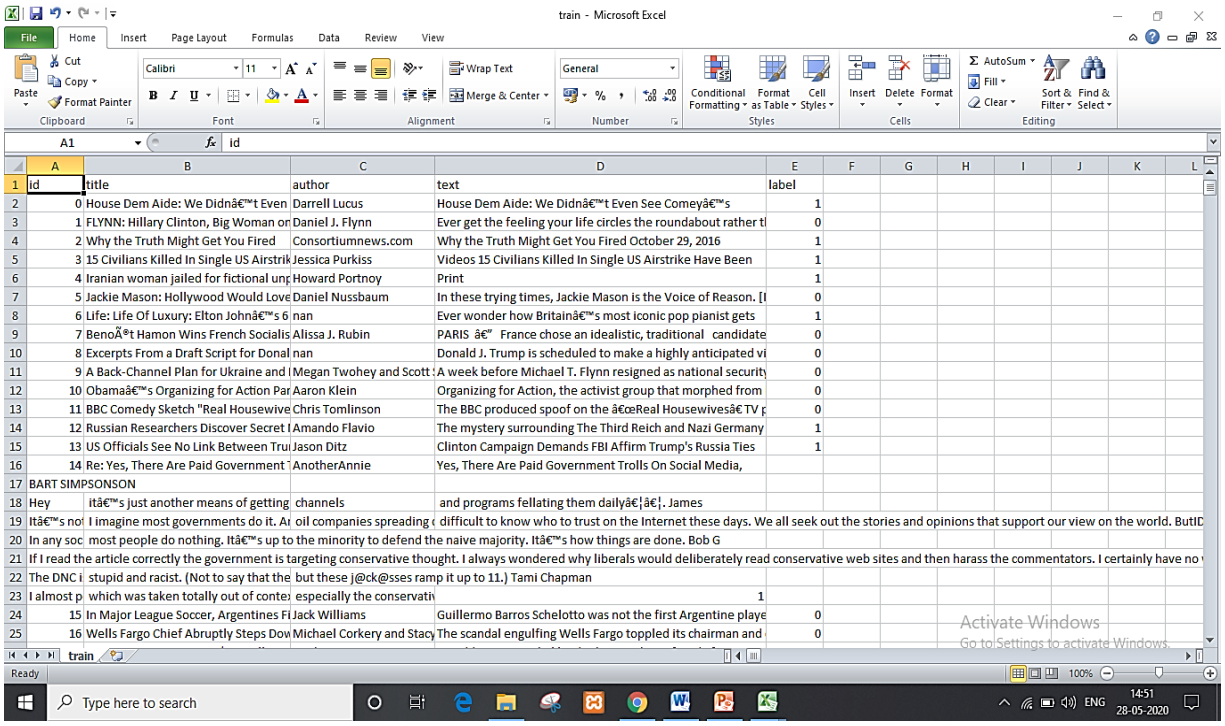
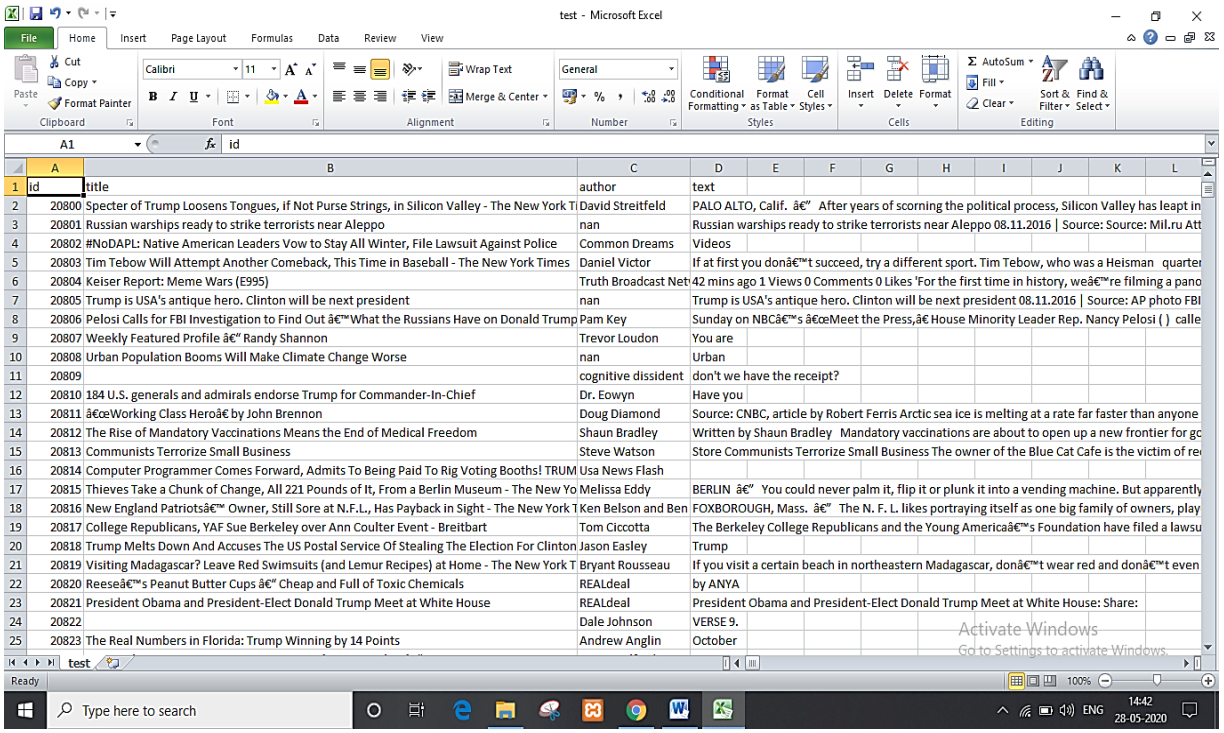
### *A. Training Data*



train - Microsoft Excel

| id | title | author | text | label |
|---|---|---|---|---|
| 0 | House Dem Aide: We Didnâ€™t Even | Darrell Lucus | House Dem Aide: We Didnâ€™t Even See Comeyâ€™s | 1 |
| 1 | FLYNN: Hillary Clinton, Big Woman or | Daniel J. Flynn | Ever get the feeling your life circles the roundabout rather t | 0 |
| 2 | Why the Truth Might Get You Fired | Consortiumnews.com | Why the Truth Might Get You Fired October 29, 2016 | 1 |
| 3 | 15 Civilians Killed In Single US Airstrik | Jessica Purkiss | Videos 15 Civilians Killed In Single US Airstrike Have Been | 1 |
| 4 | Iranian woman jailed for fictional unp | Howard Portnoy | Print | 1 |
| 5 | Jackie Mason: Hollywood Would Love | Daniel Nussbaum | In these trying times, Jackie Mason is the Voice of Reason. [I | 0 |
| 6 | Life: Life Of Luxury: Elton Johnâ€™s 6 | nan | Ever wonder how Britainâ€™s most iconic pop pianist gets | 1 |
| 7 | BenoÃ®t Hamon Wins French Socialis | Alissa J. Rubin | PARIS â€" France chose an idealistic, traditional candidate | 0 |
| 8 | Excerpts From a Draft Script for Donal | nan | Donald J. Trump is scheduled to make a highly anticipated vi | 0 |
| 9 | A Back-Channel Plan for Ukraine and | Megan Twohey and Scott | A week before Michael T. Flynn resigned as national security | 0 |
| 10 | Obamaâ€™s Organizing for Action Par | Aaron Klein | Organizing for Action, the activist group that morphed from | 0 |
| 11 | BBC Comedy Sketch "Real Housewive | Chris Tomlinson | The BBC produced spoof on the â€œReal Housewivesâ€ TV p | 0 |
| 12 | Russian Researchers Discover Secret I | Amando Flavio | The mystery surrounding The Third Reich and Nazi Germany | 1 |
| 13 | US Officials See No Link Between Tru | Jason Ditz | Clinton Campaign Demands FBI Affirm Trump's Russia Ties | 1 |
| 14 | Re: Yes, There Are Paid Government | AnotherAnnie | Yes, There Are Paid Government Trolls On Social Media, | |
| 15 | BART SIMPSONSON | | | |
| 16 | Hey itâ€™s just another means of getting | channels | and programs fellating them dailyâ€¦â€¦. James | |
| 17 | Itâ€™s no I imagine most governments do it. A | oil companies spreading | difficult to know who to trust on the Internet these days. We all seek out the stories and opinions that support our view on the world. ButID | |
| 18 | In any soc most people do nothing. Itâ€™s up to the minority to defend the naive majority. Itâ€™s how things are done. Bob G | | | |
| 19 | If I read the article correctly the government is targeting conservative thought. I always wondered why liberals would deliberately read conservative web sites and then harass the commentators. I certainly have no | | | |
| 20 | The DNC i stupid and racist. (Not to say that the | but these j@ck@sses ramp it up to 11.) Tami Chapman | | |
| 21 | I almost p which was taken totally out of conte | especially the conservati | 1 | |
| 22 | 15 In Major League Soccer, Argentines Fi | Jack Williams | Guillermo Barros Schelotto was not the first Argentine playe | 0 |
| 23 | 16 Wells Fargo Chief Abruptly Steps Dow | Michael Corkery and Stacy | The scandal engulfing Wells Fargo toppled its chairman and | 0 |

### *B. Testing Data*



test - Microsoft Excel

| id | title | author | text |
|---|---|---|---|
| 20800 | Specter of Trump Loosens Tongues, if Not Purse Strings, in Silicon Valley - The New York Ti | David Streitfeld | PALO ALTO, Calif. â€" After years of scorning the political process, Silicon Valley has leapt in |
| 20801 | Russian warships ready to strike terrorists near Aleppo | nan | Russian warships ready to strike terrorists near Aleppo 08.11.2016 \| Source: Source: Mil.ru Att |
| 20802 | #NoDAPL: Native American Leaders Vow to Stay All Winter, File Lawsuit Against Police | Common Dreams | Videos |
| 20803 | Tim Tebow Will Attempt Another Comeback, This Time in Baseball - The New York Times | Daniel Victor | If at first you donâ€™t succeed, try a different sport. Tim Tebow, who was a Heisman quarter |
| 20804 | Keiser Report: Meme Wars (E995) | Truth Broadcast Net | 42 mins ago 1 Views 0 Comments 0 Likes 'For the first time in history, weâ€™re filming a pano |
| 20805 | Trump is USA's antique hero. Clinton will be next president | nan | Trump is USA's antique hero. Clinton will be next president 08.11.2016 \| Source: AP photo FBI |
| 20806 | Pelosi Calls for FBI Investigation to Find Out â€™What the Russians Have on Donald Trump | Pam Key | Sunday on NBCâ€™s â€œMeet the Press,â€ House Minority Leader Rep. Nancy Pelosi ( ) calle |
| 20807 | Weekly Featured Profile â€" Randy Shannon | Trevor Loudon | You are |
| 20808 | Urban Population Booms Will Make Climate Change Worse | nan | Urban |
| 20809 | | cognitive dissident | don't we have the receipt? |
| 20810 | 184 U.S. generals and admirals endorse Trump for Commander-In-Chief | Dr. Eowyn | Have you |
| 20811 | â€œWorking Class Heroâ€ by John Brennon | Doug Diamond | Source: CNBC, article by Robert Ferris Arctic sea ice is melting at a rate far faster than anyone |
| 20812 | The Rise of Mandatory Vaccinations Means the End of Medical Freedom | Shaun Bradley | Written by Shaun Bradley Mandatory vaccinations are about to open up a new frontier for gc |
| 20813 | Communists Terrorize Small Business | Steve Watson | Store Communists Terrorize Small Business The owner of the Blue Cat Cafe is the victim of re |
| 20814 | Computer Programmer Comes Forward, Admits To Being Paid To Rig Voting Booths! TRUM | Usa News Flash | |
| 20815 | Thieves Take a Chunk of Change, All 221 Pounds of It, From a Berlin Museum - The New Yo | Melissa Eddy | BERLIN â€" You could never palm it, flip it or plunk it into a vending machine. But apparently |
| 20816 | New England Patriotsâ€™ Owner, Still Sore at N.F.L., Has Payback in Sight - The New York T | Ken Belson and Ben | FOXBOROUGH, Mass. â€" The N. F. L. likes portraying itself as one big family of owners, play |
| 20817 | College Republicans, YAF Sue Berkeley over Ann Coulter Event - Breitbart | Tom Ciccotta | The Berkeley College Republicans and the Young Americaâ€™s Foundation have filed a lawsu |
| 20818 | Trump Melts Down And Accuses The US Postal Service Of Stealing The Election For Clinton | Jason Easley | Trump |
| 20819 | Visiting Madagascar? Leave Red Swimsuits (and Lemur Recipes) at Home - The New York T | Bryant Rousseau | If you visit a certain beach in northeastern Madagascar, donâ€™t wear red and donâ€™t even |
| 20820 | Reeseâ€™s Peanut Butter Cups â€" Cheap and Full of Toxic Chemicals | REALdeal | by ANYA |
| 20821 | President Obama and President-Elect Donald Trump Meet at White House | REALdeal | President Obama and President-Elect Donald Trump Meet at White House: Share: |
| 20822 | | Dale Johnson | VERSE 9. |
| 20823 | The Real Numbers in Florida: Trump Winning by 14 Points | Andrew Anglin | October |

## IV. PROPOSED METHODOLOGY

This section discuss about the methodology used for the fake news detection in this work. Fig 1 gives the overall architecture of the methodology.

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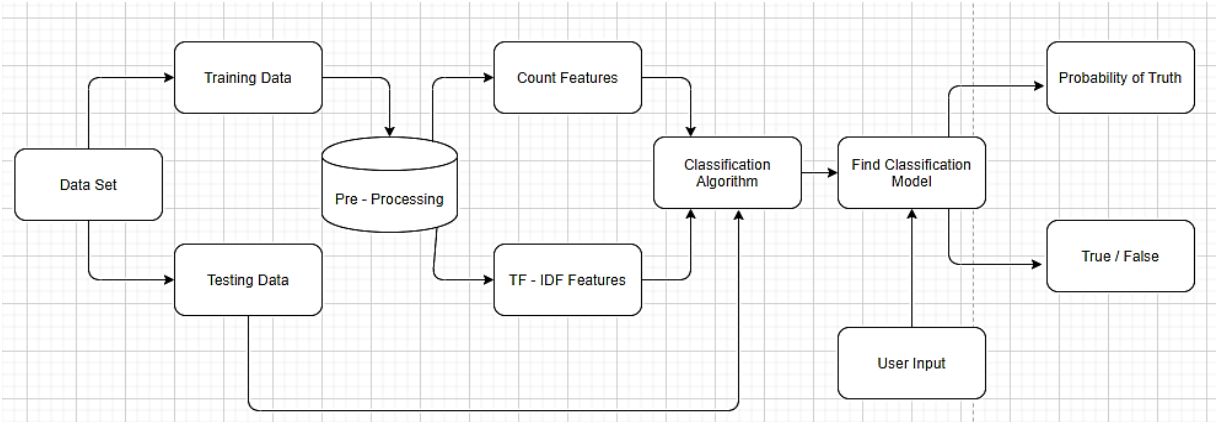


**Fig.1. Proposed architecture**

### *A. Dataset*

The datasets used for this challenge have been drawn from Kaggle. The coaching dataset has about 25000 rows of information from more than a few articles on the internet. We had to do pretty a bit of pre-processing of the data, as is evident from our source code, in order to instruct our fashions [12]. The information set lists values for every of the variables, such as height and weight of an object, for each member of the records set. Each fee is recognized as a datum. Data sets can also consist of a collection of documents or files. The European Open Data portal aggregates greater than half of a million information units In this area different definitions have been proposed however currently there is not an reliable one. Some other problems will increase the concern to reach a consensus about it.

### *B. Training Data*

The education records is an initial set of information used to assist a application recognize how to practice technologies like neural networks to study and produce state-of-the-art results. It might also be complemented through subsequent units of facts called validation and checking out sets. As a rule; "the better the training dataset, the better the algorithm or classifier performs" The coaching set is the material thru which the computer learns how to procedure information. You teach the classifier using education set tune the parameters the use of validation set and then test the performance of your classifier on unseen test set. An essential factor to word is that all through education the classifier solely the coaching and validation set is available. The test set will solely be available. The take a look at set must now not be used in the course of education the classifier. The take a look at set will only be reachable at some stage in checking out the classifier. The coaching records is an initial set of data used to assist a software recognize how to practice technologies. The amount of data you need depends both on the complexity of your problem and on the complexity of your chosen algorithm [12].

### *C. Testing Data :*

Test statistics is the facts which has been particularly identified for the use in tests, generally of a laptop program. Some facts may additionally be used in the confirmatory way, commonly to confirm that the given set of input to the given feature produces anticipated result or not. Test statistics may be produced in the centered or systematic way or by using the usage of the other, less-focused approaches. Test statistics may be produced by the tester or by means of the software or the function that aids the tester. Test data may additionally be recorded for the re-use, or used once and then forgotten The take a look at facts is a set of observations used to consider the overall performance of the model the use of some performance metric. It is necessary that no observations from coaching set are blanketed in the check set. If the check does comprise examples from the coaching set, it will be hard to determine whether or not the algorithm has realized to generalize from the coaching set or has surely memorized it. A check dataset is a dataset that is independent of the education dataset, but that follows the same probability distribution as the education dataset. If a model fit to the education dataset additionally suits the check dataset well. A higher fitting of the coaching dataset as adversarial to test dataset typically factors to over fitting. A test dataset is therefore a set of examples used solely to check the overall performance of a totally particular classifier [12].

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### *D. Pre – Processing:*

Preprocessing describes any type of running carried out on dataset to prepare it for any other processing system [12]. Data practise and filtering steps can take good sized amount of processing time.

Data pre-processing can also have an effect on the way in which outcomes of the final records processing can be interpreted. This factor need to be carefully regarded when interpretation of the outcomes is a key point, such in the multivariate processing of chemical data. There are a variety of different tools and methods used for preprocessing, including:

**Sampling**: This selects a typical subset from a large population of data.

**Transformation**: This edits raw data to produce a single input.

**Denoising**: This removes noise from data.

**Normalisation**: This arranges data for more efficient access.

**Feature extraction**: This pulls out specified data that is important in some particular circumstances.

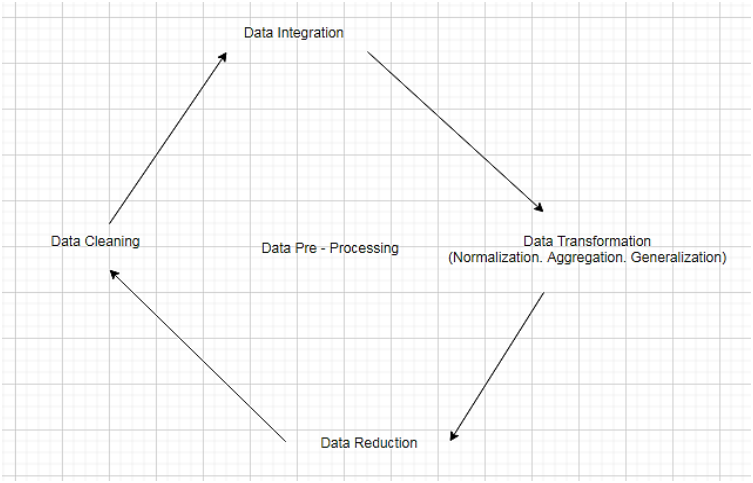


**Fig 2. Pre-processing Diagram**

### *E. Count Features:*

The COUNT feature counts the wide variety of cells that include numbers, and counts numbers within the listing of arguments. Use the COUNT feature to get the quantity of entries in a variety subject that is in a range or array of numbers. Use the Feature Counting Tool to count up to individual features in raster and vector data [13].

### *F. TF – IDF Features:*

TF - IDF stands for term frequency-inverse document frequency, and the tf-idf weight is a weight frequently used in records retrieval and textual content mining. Variations of the tf-idf weighting scheme are regularly used with the aid of search engines as a central tool in scoring and ranking a document's relevance given a person query. The time period frequency suggests the frequency of every of the words existing in the record or dataset. The time period inverse file frequency surely tells us how necessary the word is to the file TF-IDF stands for Term Frequency - Inverse Document Frequency and the tf-idf weight is a weight frequently used in information retrieval gadget and textual content (data) mining. Variations in the tf-idf weighting are used by way of search engines as a tool in scoring and ranking a document's relevance given by using a person query. The tf-idf price increases proportionally to the range of times a phrase seems in the file and is offset with the aid of the wide variety of files in the corpus that incorporate the word, which helps to modify for the reality that some words appear greater often in general.TF-IDF is one of the most popular term-weighting schemes today. A survey conducted showed that 83% of textual content based recommender systems in digital libraries use TF-IDF. Variations of the TF-IDF weighting scheme are regularly used via search engines as a central tool in scoring and ranking a report relevance given a user query.TF-IDF can be efficiently used for stop-words filtering in quite a number difficulty fields, together with text summarization and classification. The idea behind TF-IDF also applies to entities other than terms. [13].

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### *G. Feature Extraction:*

The embedding's used for the majority of our modeling are generated using the Doc2Vec model. The goal is to produce a vector representation of every article. Before making use of Doc2Vec, we operate some fundamental pre-processing of the data. This includes putting off cease words, deleting distinctive characters and punctuation, and converting all text to lowercase. This produces a comma-separated listing of words, which can be enter into the Doc2Vec algorithm to produce an 300-length embedding vector for every article. Doc2Vec is a model developed in 2014 based totally on the present Word2Vec model, which generates vector representations for words. Word2Vec represents archives by combining the vectors of the man or woman words, but in doing so it loses all phrase order information. Doc2Vec expands on Word2Vec by means of including a "document vector" to the output representation, which consists of some data about the record as a whole, and allows the model to examine some information about phrase order. Maintenance of word order information makes Doc2Vec beneficial for our application, aiming to notice refined differences between textual content documents [12].

### *H. Classification Algorithm:*

The notion of classification algorithms is noticeably simple. Predicting the goal class by means of analyzing the training dataset. Use the education dataset to get higher boundary stipulations that should be used to determine every target class. Once the boundary prerequisites are determined, the subsequent undertaking is to predict the target class. The whole technique is known as classification [13].

### *I. Find Classification Model:*

A classification mannequin aims to draw conclusion from determined values. Given one or extra inputs a classification model will strive to estimate the price of one or more outcomes [12].

### *J. User Input:*

Any information or records despatched to an operating device for processing is viewed input. Input or User Input is despatched to an working device using an enter gadget [12].

### *K. Probability of Truth:*

In probability an experiment is one or more tests of a probability situation. An experimental approximate is calculated from commentary as the wide variety of successful exams divided by the whole range of tests. In many tests, the experimental approximate may approach the true probability [13].

### *L. True/False:*

Detecting the news with the algorithms whether it is True or False.

## V. EXPERIMENTAL RESULTS AND ANLAYSIS

Here, discussed about experimental results obtained through the procedure explained in section IV. The algorithms are implemented.

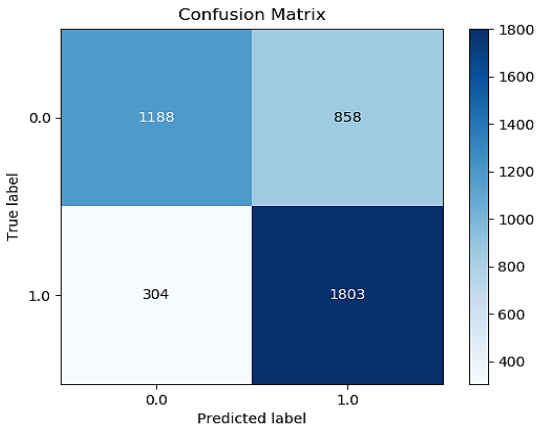


**Fig.3.Naïve Bayes**

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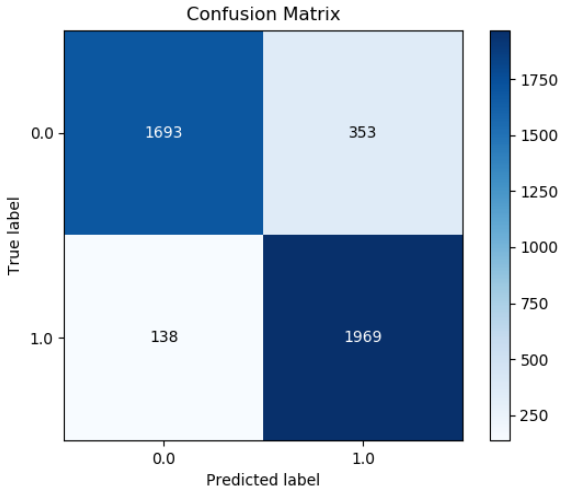


**Fig.4.SVM**

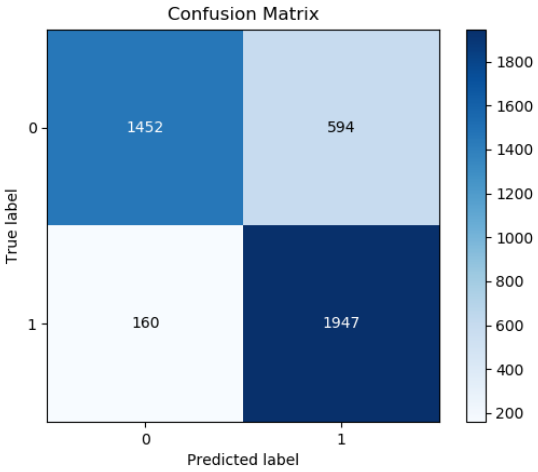


**Fig.5.Neural Network with TensorFlow**

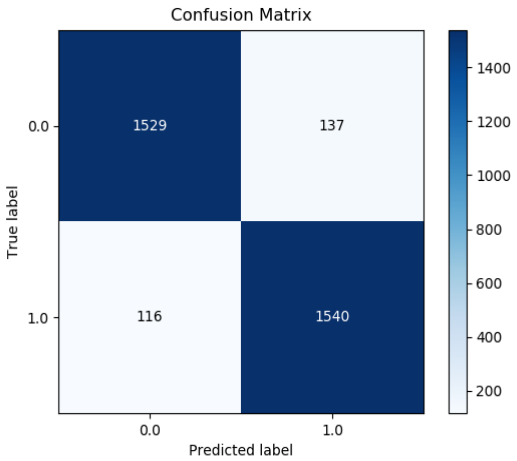


**Fig.6.Neural Network with Keras**

The accuracy assessment of naïve bayes, svm, neural network with tensorflow and keras are given in Table I. It is clear that the accuracy is good with the neural network with keras.

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**Table.1: ACCURACY COMPARISON OF THE ALGORITHM MODELS**

| MODELS | ACCURACY |
|---|---|
| Naïve baYes | 72.94% |
| svm | 88.42% |
| Neural network with tensorflow | 81.42% |
| neural network with keras | 92.62% |

## VI. CONCLUSION

As proposed in the prediction tables, this can be used for detecting fake news. The proposed approach described in the task is an notion for the most correct fake information detection algorithm. In the future, the proposed method is used to test the deep learning algorithms but, due to limited knowledge and time, this will be the project for future.

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