International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

FAKE NEWS DETECTION IN TWITTER DATASETS USING DEEP LEARNING TECHNIQUES

M. Rajakumaran[1], K. Abinaya[2], R. Durgadevi[3], k. Abinesha[4]

[1]Assistant professor, Dept of CSE, E.G.S Pillay Engineering College, Tamilnadu, India
[2]UG student, Dept of CSE, E.G.S Pillay Engineering College, Tamilnadu, India
[3]UG student, Dept of CSE, E.G.S Pillay Engineering College, Tamilnadu, India
[4]UG student, Dept of CSE, E.G.S Pillay Engineering College, Tamilnadu, India

---

Abstract - *The advent of the World Wide Web and the rapid adoption of social media platforms (such as Facebook and Twitter) paved the way for information dissemination that has never been witnessed in the human history before. Besides other use cases, news outlets benefitted from the widespread use of social media platforms by providing updated news in near real time to its subscribers. The news media evolved from newspapers, tabloids, and magazines to a digital form such as online news platforms, blogs, social media feeds, and other digital media formats. Fake news denotes a type of yellow press which intentionally presents misinformation or hoaxes spreading through both traditional print news media and recent online social media. In recent years, due to the booming development of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. With deceptive words, online social network users can get infected by this online fake news easily, which has brought about tremendous effects on the offline society already. An important goal in improving the trustworthiness of information in online social networks is to identify the fake news timely. This project aims at investigating the principles, methodologies and algorithms for detecting fake news articles, creators and subjects from online social networks and evaluating the corresponding performance. This project addresses the challenges introduced by the unknown characteristics of fake news and diverse connections among news articles, creators and subjects. This project introduces a novel automatic fake news credibility inference model using deep learning algorithm. Based on a set of explicit and latent features extracted from the textual information, deep learning algorithms builds a deep diffusive network model to learn the representations of news articles, creators and subjects simultaneously.*

Key Words: Fake news detection, text mining, deep learning, PCA, Chi-square, CNN-LSTM, word embedding…

1. INTRODUCTION

The aim of this work is to present the development of area list virtual model of the human brain that could be used in remember and deliver the secrets to others after the death of the human brain. Human brain, the most valuable creation of God. The man is called intelligent because of the brain. But we loss the knowledge of a brain when the body is destroyed after the death. Virtual brain project will search for insights into how human beings think and remember. The main aim is to upload human brain confidential things are stored to cloud. After the death of the body, the virtual brain website will act as the man's brain. Such models will shed light on how memories are stored and retrieved. This could reveal many exciting aspects of the brain, such as the form of memories, memory capacity and how memories are lost. This project contains VBIOT model, registration, customize relatives, privacy info module, access privileges module, remainder module, notification/info sharing module. Through this website we can store our secret and our intelligence with the help of PC or Mobile. We can use the secret

of a person after the death. This application used to remember things without any effort. It can keep things in memory very secure.

1.1 BACKGROUND

Data mining (the analysis step of the "Knowledge Discovery in Databases" process, or KDD), a field at the intersection of computer science and statistics, is the process that attempts to discover patterns in large data sets. It utilizes methods at the intersection of artificial intelligence, machine learning, statistics, and systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use Aside from the raw analysis step, it involves database and data management aspects, data preprocessing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization, and online updating.

1.2 ORIGINS OF DATA MINING

Data Mining is the process of posing queries to large amounts of data sources and extracting patterns and trends using statistical and machine learning techniques. It integrates various technologies including database management, statistics and machine learning. Data mining has applications in numerous disciplines including medical, financial, defence and intelligence. Data mining tasks include classification, clustering, making associations and anomaly detection. For example, data mining can extract various associations between people, places or words. During recent years there have been many developments in data mining. The process of digging through data to discover hidden connections and predict future trends has a long history. Sometimes referred to as "knowledge discovery in databases," the term "data mining" wasn't coined until the 1990s. But its foundation comprises three intertwined scientific disciplines: statistics (the numeric study of data relationships), artificial intelligence (human-like intelligence displayed by software and/or machines) and machine learning (algorithms that can learn from data to make predictions). What was old is new again, as data mining technology keeps evolving to keep pace with the limitless potential of big data and affordable computing power. Various data mining techniques have been developed. These include techniques for extracting associations, neural networks, inductive logic programming, decision trees, fuzzy logic and rough sets. Furthermore, data mining has gone beyond mining relational databases to mining text and multimedia data. Also, data mining is being applied to areas such as information security and intrusion detection. While there have been many practical developments, we still have major challenges. One of the most important challenges is scalability. If data mining is to be useful we need to mine very large databases. Therefore, it is critical that we need to understand the limitations of the data mining algorithms. To understand the limitations, we need to study the foundations of data mining. We need to explore the time and space complexity of the algorithms. There are techniques such as inductive logic programming and rough sets that have underpinnings in logic and mathematics. One needs to explore these techniques for data mining and examine the computational complexity aspects. We also need to understand the complexity of the various search algorithms being used for market basket analysis.

1.3 MACHINE LEARNING

Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to perform the task. Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop a conventional algorithm for effectively performing the task. Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a field of study within machine learning, and focuses on exploratory data analysis through unsupervised learning. In its application across business problems, machine learning is also referred to as predictive analytics. Machine learning tasks are classified into several broad categories. In supervised learning, the algorithm builds a mathematical model from a set of data that contains both the inputs and the desired outputs. For example, if the task were determining whether an image contained a certain object, the training data for a supervised learning algorithm would include images with and without that object (the input), and each image would have a label (the output) designating whether it contained the object. In special cases, the input may be only partially available, or restricted to special feedback. Semi-supervised learning algorithms develop mathematical models from incomplete training data, where a portion of the sample input doesn't have labels. Classification algorithms and regression algorithms are types of supervised learning. Classification algorithms are used when the outputs are restricted to a limited set of values. For a classification algorithm that filters emails, the input would be an incoming email, and the output would be the name of the folder in which to file the email. For an algorithm that identifies spam emails, the output would be the prediction of either "spam" or "not spam", represented by the Boolean values true and false. Regression algorithms are named for their continuous outputs, meaning they may have any value within a range. Examples of a continuous value are the temperature, length, or price of an object. In unsupervised learning, the algorithm builds a mathematical model from a set of data that contains only inputs and no desired output labels. Unsupervised learning algorithms are used to find structure in the data, like grouping or clustering of data points. Unsupervised learning can discover patterns in the data, and can group the inputs into categories, as in feature learning. Dimensionality reduction is the process of reducing the number of "features", or inputs, in a set of data.

1.4 DEEP LEARNING

A deep neural network (DNN) is an artificial neural network (ANN) with multiple layers between the input and output layers. The DNN finds the correct mathematical manipulation to turn the input into the output, whether it be a linear relationship or a non-linear relationship. The network moves through the layers calculating the probability of each output. For example, a DNN that is trained to recognize dog breeds will go over the given image and calculates the probability that the dog in the image is a certain breed. The user can review the results and select which probabilities the network should display (above a certain threshold, etc.) and return the proposed label. Each mathematical manipulation as such is considered a layer, and complex DNN have many layers, hence the name "deep" networks. DNNs can model complex non-linear relationships. DNN architectures generate compositional models where the object is expressed as a layered composition of primitives. The extra layers enable composition of features from lower layers, potentially modeling complex data with fewer units than a similarly

performing shallow network. Deep architectures include many variants of a few basic approaches. Each architecture has found success in specific domains. It is not always possible to compare the performance of multiple architectures, unless they have been evaluated on the same data sets. DNNs are typically feed forward networks in which data flows from the input layer to the output layer without looping back. At first, the DNN creates a map of virtual neurons and assigns random numerical values, or "weights", to connections between them. The weights and inputs are multiplied and return an output between 0 and 1. If the network didn't accurately recognize a particular pattern, an algorithm would adjust the weights.

1.5 NEURAL NETWORKS

A neural network is structured like the human brain and consists of artificial neurons, also known as nodes. These nodes are stacked next to each other in three layers:

- The input layer
- The hidden layer(s)
- The output layer

Data provides each node with information in the form of inputs. The node multiplies the inputs with random weights, calculates them, and adds a bias. Finally, nonlinear functions, also known as activation functions, are applied to determine which neuron to fire.

2. PROBLEM DEFINITION

2.1 PROBLEM STATEMENT

A different way to detect fake news is through stance detection which will be the focus of our study. Stance Detection is the process of automatically detecting the relationship between two pieces of text. In this study, we explore ways to predict the stance, given a news article and news headline pair. Depending on how similar the news article content and headlines are, the stances between them can be defined as 'agree', 'disagree', 'discuss' or 'unrelated'. We experimented with several traditional machine learning models to set a baseline and then compare results to the state-of-the art deep networks to classify the stance between article body and headline Fake news can be come in many forms, including: unintentional errors committed by news aggregators, outright false stories, or the stories which are developed to mislead and influence reader's opinion. While fake news may have multiple forms, the effect that it can have on people, government and organizations may generally be negative since it differs from the facts. Detecting fake news is hard for many reasons. First, manual task of identifying fake news is very subjective. Assessing the veracity of a news story is a complex and cumbersome task, even for trained experts. News is not only spread through traditional media outlets anymore but also through various social media channels. Automated solution requires understanding the natural language processing which is difficult and complex. These complexities make it a daunting task to classify text as fake news.

2.2 EXISTING SYSTEM

Fake news detection is a difficult problem due to the nuances of language. Understanding the reasoning behind certain fake items implies inferring a lot of details about the various actors involved. We believe that the solution to this problem should be a hybrid one, combining machine learning, semantics and natural language processing. The purpose of this project is not to decide for the reader whether or not the document is fake, but rather to alert them that they need to use extra scrutiny for some documents. Fake news detection, unlike spam detection, has many nuances that aren't as easily detected by text analysis. Besides detecting fake news articles, identifying the fake news creators and subjects will actually be more important, which will help completely eradicate a large number of fake news from the origins in online social networks. Generally, for the news creators, besides the articles written by them, we are also able to retrieve his/her profile information from either the social network website or external knowledge libraries, e.g., Wikipedia or government-internal database, which will provide fundamental complementary information for his/her background check. Based on various types of heterogeneous information sources, including both textual contents/profile/descriptions and the authorship and article subject relationships among them, we aim at identifying fake news from the online social networks simultaneously. We formulate the fake news detection problem as a credibility inference problem, where the real ones will have a higher credibility while unauthentic ones will have a lower one instead.

DEMERITS

- Accuracy is less
- Need large number of datasets to train the data
- Provide high number of false positive rate
- Only done supervised classification

2.3 PROPOSED SYSTEM

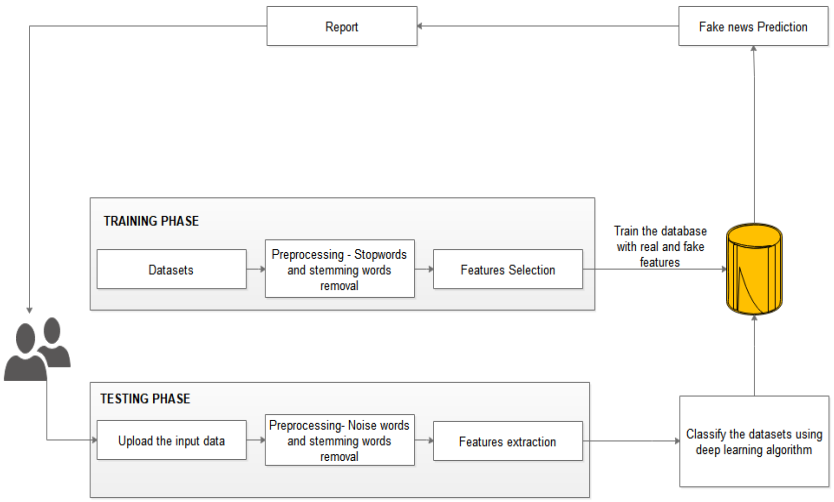
"Fake News" is a term used to represent fabricated news or propaganda comprising misinformation communicated through traditional media channels like print, and television as well as non-traditional media channels like social media. The general motive to spread such news is to mislead the readers, damage reputation of any entity, or to gain from sensationalism. Fake news is increasingly being shared via social media platforms like Twitter and Facebook. These platforms offer a setting for the general population to share their opinions and views in a raw and un-edited fashion. Some news articles hosted or shared on the social media platforms have more views compared to direct views from the media outlets' platform. Research that studied the velocity of fake news concluded that tweets containing false information reach people on Twitter six times faster than truthful tweets. Technologies such as Machine learning and Natural Language Processing tools offer great promise for researchers to build systems which could automatically detect fake news. However, detecting fake news is a challenging task to accomplish as it requires models to summarize the news and compare it to the actual news in order to classify it as fake. Moreover, the task of comparing proposed news with the original news itself is a daunting task as its highly subjective and opinionated. In this project, we can implement text mining algorithm to extract the key terms based on natural language processing and also include classification algorithms such as Naive Bayes Gradient Boost Algorithm and also Random forest

algorithm. Finally compare the results in terms of accuracy with confusion matrix. The proposed Naive Bayes algorithm provide improved accuracy rate.

ADVANTAGES

- Reduce the false positive rate
- Analyze all types of features
- Improve the accuracy rate
- Time complexity can be reduced

3. SYSTEMARCHITECTURE



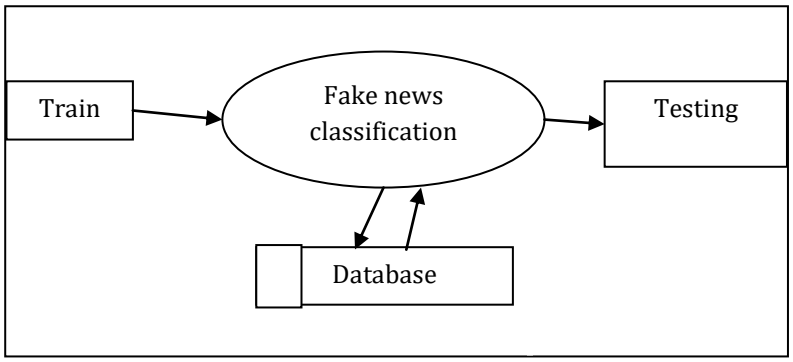
Fake news stance detection using deep learning architecture (CNN-LSTM) to address the aforementioned issue, a hybrid neural network architecture, that combines the capabilities of CNN and LSTM, is used with two different dimensionality reduction approaches, principle component analysis(PCA)and chi-square.

3.1 DATA FLOW DIAGRAM

A two-dimensional diagram explains how data is processed and transferred in a system. The graphical depiction identifies each source of data and how it interacts with other data sources to reach a common output. Individuals seeking to draft a data flow diagram must identify external inputs and outputs, determine how the inputs and outputs relate to each other, and explain with graphics how these connections relate and what they result in. This type of diagram helps business development and design teams visualize how data is processed and identify or improve certain aspects.

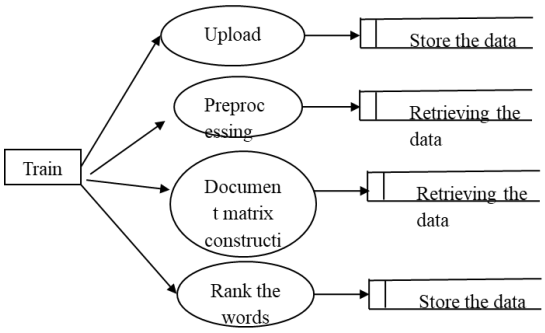
LEVEL 0

The Level 0 DFD shows how the system is divided into 'sub-systems' (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It also identifies internal data stores that must be present in order for the system to do its job, and shows the flow of data between the various parts of the system.



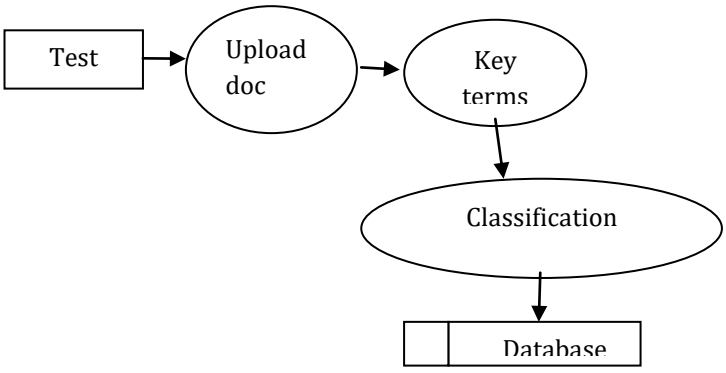
LEVEL-1

The next stage is to create the Level 1 Data Flow Diagram. This highlights the main functions carried out by the system. As a rule, to describe the system was using between two and seven functions - two being a simple system and seven being a complicated system. This enables us to keep the model manageable on screen or paper.



LEVEL-2

A Data Flow Diagram (DFD) tracks processes and their data paths within the business or system boundary under investigation. A DFD defines each domain boundary and illustrates the logical movement and transformation of data within the defined boundary. The diagram shows 'what' input data enters the domain, 'what' logical processes the domain applies to that data, and 'what' output data leaves the domain. Essentially, a DFD is a tool for process modeling and one of the oldest.



4. MODULES DESCRIPTION

4.1 TRAIN THE DOCUMENTS

Today internet contains vast amount of electronic collections that often contain high quality information. However, usually the Internet provides more information than is needed. User wants to select best collection of data for particular information need in minimum possible time. Text summarization is one of the applications of information retrieval, which is the method of condensing the input text into a shorter version, preserving its information content and overall meaning. There has been a huge amount of work on query specific summarization of documents using similarity measure. The any standard text file can be uploaded to this module. In this module, can collect large number of news datasets. In this module we can upload the datasets from users and upload the news group datasets. A data set (or dataset, although this spelling is not present in many contemporary dictionaries) is a collection of data. The data set lists values for each of the variables, such as text of an object, for each member of the data set.

4.2 TEXT MINING

In the first step, the text documents are collected which are present in .TXT.

4.2.1 Document Pre- Processing

In this process, the given input document is processed for removing redundancies, inconsistencies, separate words, stemming and documents are prepared for next step, the stages performed are as follows:

Tokenization: The given document is considered as a string and identifying single word in document i.e. the given document string is divided into one unit or token.

Removal of Stop Word: In this step the removal of usual words like a, an, but, and, of, the etc. is done.

Stemming: A stem is a natural group of words with equal (or very similar) meaning. This method describes the base of particular word. Inflectional and derivational stemming are two types of method. One of the popular algorithms for stemming is porter's algorithm.

4.3 DOCUMENT TERM MATRIX CONSTRUCTION

In this module, can calculate the term frequency and inverse document frequency. In information retrieval, TFIDF, short for term frequency–inverse document frequency, is a numerical statistic that is intended to reflect how important a word is to a document in a collection or corpus. It is often used as a weighting factor in searches of information retrieval, text mining, and user modeling. The TFIDF value increases proportionally to the number of times a word appears in the document and is offset by the frequency of the word in the corpus, which helps to adjust for the fact that some words appear more frequently in general. The calculate the values of entropy and probability of IDF. Entropy gives higher weight to the terms with less frequency in few documents. Normal is used to correct discrepancies in document lengths and also normalize the document vectors. Problem IDF is similar to IDF and assigns very low negative weight for the terms occurring in every document.

4.4 CLASSIFICATION

User can input the news datasets or twitter datasets. In this module, implement convolutional neural network algorithm to classify the extract keywords. CNN is an efficient recognition algorithm which is widely used in pattern recognition and image processing. A Convolutional Neural Network is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a convent is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, convent have the ability to learn these filters/characteristics. The architecture of a convent is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field. A collection of such fields overlap to cover the entire visual area.

4.5 FAKE NEWS DETECTION

Classification of any news item /post / blog into fake or real one has generated great interest from researchers around the globe. Several research studies have been carried out to find effect of falsified and fabricated news on masses and reactions of people upon coming through such news items. Falsified news or fabricated new is any textual or non-textual content that is fake and is generated so the readers will start believing in something which is not true. Based on classification, fake news data are predicted. The proposed system provide improved accuracy rate in fake news detection.

5. CONCLUSIONS

In this project, we have studied the fake news article, creator and subject detection problem. Based on the news augmented heterogeneous social network, a set of explicit and latent features can be extracted from the textual information of news articles, creators and subjects respectively. Furthermore, based on the connections among news articles, creators and news subjects, a deep diffusive network model has been proposed for incorporate the network structure information into model learning. The accuracy metric presumably would be altogether improved by methods for utilizing progressively complex model. It is worth noting, that even with the given dataset, only part of the information was used. The current project did not include domain knowledge related features, such as entity-relationships. The proposed system proves that Naive Bayes algorithm provides improved accuracy rate. We formulated the fake news detection on social media as an inference problem in deep learning model that can be solved using convolutional neural network algorithm. We can conclude that, the proposed system to provide improved accuracy rate in fake news detection. Experiments on well-known benchmark datasets show that the proposed model consistently improves over the state of the art in fake news detection in both the late and early detection settings.

REFERENCES

[1] T. Mihaylov, ‘‘Finding opinion manipulation trolls in news community forums,’’ in Proc. 19th Conf. Comput. Natural Lang. Learn., Beijing, China, Jul. 2015, pp. 310–314. [Online].

[2] T. Mihaylov and P. Nakov, ‘‘Hunting for troll comments in news community forums,’’ in Proc. 54th Annu. Meeting Assoc. for Comput. Linguistics, vol. 2, 2016, pp. 399–405

[3] P. Bourgonje, J. Moreno Schneider, and G. Rehm, ‘‘From clickbait to fake news detection: An approach based on detecting the stance of headlines to articles,’’ in Proc. EMNLP Workshop: Natural Lang. Process. meets Journalism, 2017, pp. 84–89.

[4] G. Bhatt, A. Sharma, S. Sharma, A. Nagpal, B. Raman, and A. Mittal, ‘‘Combining neural, statistical and external features for fake news stance identification,’’ in Proc. Companion Web Conf. Web Conf. (WWW), Geneva, Switzerland, 2018

[5] L. Konstantinovskiy, ‘‘Towards automated factchecking: Developing an annotation schema and benchmark for consistent automated claim detection,’’ 2018, arXiv:1809.08193.

[6] L. Yang, Q. Ai, D. Spina, R.-C. Chen, L. Pang, W. B. Croft, J. Guo, and F. Scholer, ‘‘Beyond factoid qa: Effective methods for non-factoid answer sentence retrieval,’’ in ECIR, 2016.

[7] Y. Yang, W.-T. Yih, and C. Meek, ‘‘WikiQA: A challenge dataset for opendomain question answering,’’ in Proc. Conf. Empirical Methods Natural Lang. Process., Lisbon, Portugal, Sep. 2015, pp. 2013–2018.

[8] Z. Imtiaz, M. Umer, M. Ahmad, S. Ullah, G. S. Choi, and A. Mehmood, ‘‘Duplicate questions pair detection using siamese MaLSTM,’’ IEEE Access, vol. 8, pp. 21932–21942, 2020.

[9] B. Ghanem, P. Rosso, and F. Rangel, ‘‘Stance detection in fake news a combined feature representation,’’ in Proc. 1st Workshop Fact Extraction Verification (FEVER), Brussels, Belgium, Nov. 2018, pp. 66–71. [Online]. Available: https://www.aclweb.org/anthology/W18-5510

[10] Q. Zeng, ‘‘Neural stance detectors for fake news challenge,’’ Stanford Univ., Stanford, CA, USA, Tech. Rep., 2017