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# Identification Systems of Fake News Contents on Artificial Intelligence & Bigdata

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## Abstract

*This study is about an Artificial Intelligence-based fake news identification system and its methods to determine the authenticity of content distributed over the Internet. Among the news we encounter is news that an individual or organization intentionally writes something that is not true to achieve a particular purpose, so-called fake news. In this study, we intend to design a system that uses Artificial Intelligence techniques to identify fake content that exists within the news. The proposed identification model will propose a method of extracting multiple unit factors from the target content. Through this, attempts will be made to classify unit factors into different types. In addition, the design of the preprocessing process will be carried out to parse only the necessary information by analyzing the unit factor. Based on these results, we will design the part where the unit fact is analyzed using the deep learning prediction model as a predetermined unit. The model will also include a design for a database that determines the degree of fake news in the target content and stores the information in the identified unit factor through the analyzed unit factor.*

## 1. INTRODUCTION

Due to the development of the Internet, recent news consumption has tended to take place through news portals on the Internet. Among the news provided on the news portal is news that an individual or organization intentionally writes something that is not true to achieve a particular purpose, so-called fake news. Such fake news is sophisticated, making it difficult for news users to see if it is true, confusing news users if it is delivered to them, and social damage can occur if news users believe such fake news without filtration. In particular, the recent spread of news through social media such as Facebook, Twitter, blogs, or cafes can cause serious damage if fake news is spread through social media because it is also very fast. Therefore, there is an increasing need for fact checking to ensure that news distributed online is true. For example, a fact-checking service is available through the United States' PolitiFact. The fact-checking service provided through the PolitiFact is a way for reporters to verify the facts of the news themselves and provide the results through the website.

As such, conventional fact-checking services, including fact-checking services provided through U.S. PolitiFact, require a lot of time and money to deliver the results, as most of them are personally verifying the authenticity of the news. Although the existing fact-checking service is attempting to acquire a unit fact by extracting one or more natural languages in each sentence and recombining the extracted natural languages into each sentence, the limitations of natural language processing techniques are still limited. In addition, it is difficult to accurately identify complex forms of fake news by limited judgment, for example, that the title and content of the news are inconsistent or that the content contains different content.

## 2. RELATED WORKS

Nowadays, companies and institutions are using a number of Artificial Intelligence [1-4] technologies to collect and process Bigdata [5-15] to produce meaningful information. In addition to quantitative statistical methods, Artificial Intelligence techniques are widely used in predicting the future, separating data, and identifying data. In addition, Text Mining [16-23] techniques, which are text-based semantic excavation techniques, are also being studied and developed a lot. In this chapter, we will look at Artificial Intelligence and Text Mining technologies, which are elemental technologies that apply to fake news discrimination.

### 2.1 Techniques of Artificial Intelligence

Although the term Artificial Intelligence has been around for a long time, it is an area that is being studied very actively today thanks to quantitative growth in data, advanced algorithms, hardware improvements, and price cuts. Artificial Intelligence automates repetitive learning and data discovery through Insight. It is a different concept from hardware-based robot automation, which goes beyond automating manual tasks and simplifies repetitive, high-volume computing tasks. This type of automation requires the effort of personnel to constantly set up the system and communicate the right questions. Moreover, the technology adds intelligence to existing products. Artificial Intelligence will rarely be sold as an individual application. Instead, just as Siri has added a new feature to Apple's new product, the product will be improved with Artificial Intelligence capabilities in place. Automation, conversation platforms, bots, and smart machines combine with massive amounts of data to improve many technologies at work and home, including security intelligence and investment analytics. And Artificial Intelligence improves itself through incremental learning algorithms and helps data perform programming. Artificial Intelligence finds the structure and regularity of the data and helps algorithms learn it, making the algorithm a conditioner. These algorithms can find users' online purchase product recommendations just as they can learn how to play chess on their own. In addition, as new data is entered, it is learned and its performance. Reverse propagation is an Artificial Intelligence technique that the model can improve itself through new learning and further data analysis if the first answer is not appropriate. In addition, this technology utilizes neural networks with different layers hidden to analyze more data in depth. A few years ago, developing a fraud detection system with five hidden layers was almost impossible, but now it's possible thanks to its enormous computing power and Bigdata. Deep learning models need a large amount of data because they learn directly from the data, and the more data they enter, the more accurate they become.

Through deep neural network analysis, Artificial Intelligence offers surprisingly improved accuracy, which was previously impossible. For example, Alexa, Google Search, Google Photos and user interactions are all leveraging deep learning technology, and the more users use these services, the more accurate they can get the results they want. In the medical field, Artificial Intelligence technologies such as deep learning, image classification, and object recognition are utilized for MRI image analysis, and results are as accurate as

experienced radiation technicians. And data utilization can be maximized by Artificial Intelligence. When an algorithm performs self-learning, the data itself can be intellectual property. The answer to all the problems lies in the data, so Artificial Intelligence can be applied to the data to find the answer. With the role of data becoming more important than ever, data can be a competitive advantage, and in a highly competitive industry, even if you have similar technologies, the best data companies will win.

### 2.2 Techniques of Text Mining

As human speech is lexical and grammatical in each language, Text Mining technology is based on Natural Language Processing technology. Natural language processing technology is a technology that analyzes and understands the structure and meaning of human language expressed in letters by computer. Not only is it unique, but the current state of expression is so diverse and complex that it is often difficult to define as a package rule, and it has a characteristic that changes constantly depending on the environment in which the language is used. Although this field has been constantly studied since the development of computers, it is considered a technology field where many challenging goals remain due to the complexity of language. Text Mining is simply a mining technology that finds information that has value and meaning in unstructured text data. Text Mining techniques enable users to obtain more than just information retrieval, such as extracting meaningful information from a vast pool of information, identifying links to other information, and identifying categories that text has. In order for computers to deeply analyze the information described in human-speaking languages and discover the information hidden in them, large-scale language resources and complex statistical and regular algorithms must be applied.

In order to manage numerous books, librarians have grasped the contents of each book and manually classified it according to the set classification system. One of the oldest disciplines that has dealt with document classification is bibliography. However, the development of digital technology and the activation of the Internet have enabled the production and distribution of tremendous information, making it almost impossible to classify and manage vast information inside and outside the organization in a conventional way. In particular, the implementation of automatic classification technology of knowledge content with heterogeneous purposes and forms has been recognized as a very challenging task until recently, with a large number of information distributed within the organization being interlinked. With document clustering techniques, users can effectively review documents of interest in order of relevance, as well as quickly and easily access information hidden in vast documents through example-based queries. A group of documents is a technology that identifies the characteristics of each knowledge content and groups contents that are similar, shaped, or highly interrelated. Common document clustering techniques are implemented by extracting differentiated important features through linguistic analysis of target documents, comparing them to other documents' characteristics (similar calculations), and linking them together. Various statistical-based, rule-based algorithms have been studied for accurate similarity calculations and effective clustering.

Information extraction is a technology that automatically extracts information that has important implications from text documents. Through information extraction techniques, users can extract and utilize a variety of structured information from unstructured documents, such as critical keywords, key concepts, specific events, personalities, nominations, dates, situations and conditions, conclusions, etc. Basic information, such as keywords, becomes an important factor directly used in automatic classification, clusters, etc., and a variety of other details become a critical sentence component in automatic summarization. Recently, information extraction technologies have been highlighted as competitor information analysis, development of risk management systems within an organization, development of technologies that attach semantic

information to unstructured text documents, and improving the performance of existing information systems. Automatic summarization systems are based on feature extraction and information extraction techniques, and can be distinguished from extractive summarization methods that extract and reconstruct sentences that represent the document throughout the text and generate sentences using important information extracted. Automatic document summarization technology is designed to help each user quickly understand and utilize information by effectively reducing its complexity and length while maintaining the core meaning of the document.

Given that data mining is a technology field that finds patterns of interest in vast structured and realistic databases, Text Mining is a technology field that finds meaning in text that is structured and natural. Text Mining is a different area from data mining. Typical examples of data mining are often seen in consumer pattern surveys such as "where a particular item is most sold when it is located on a shelf." Data analysts also have records of a large number of card users to identify common card usage patterns among users.

## 3. THE MODEL OF FAKE NEWS CONTENTS IDENTIFICATION

In order to establish a system to determine the contents of fake news, it is necessary to define the components and steps that make up the system first.

### 3.1 Architecture of the Proposed Model

Figure 1 is a schematic drawing of each configuration of a fake news Artificial Intelligence identification system. Therefore, Figure 2 is a schematic drawing of each stage of a fake news Artificial Intelligence identification system based on the components of Figure 1.
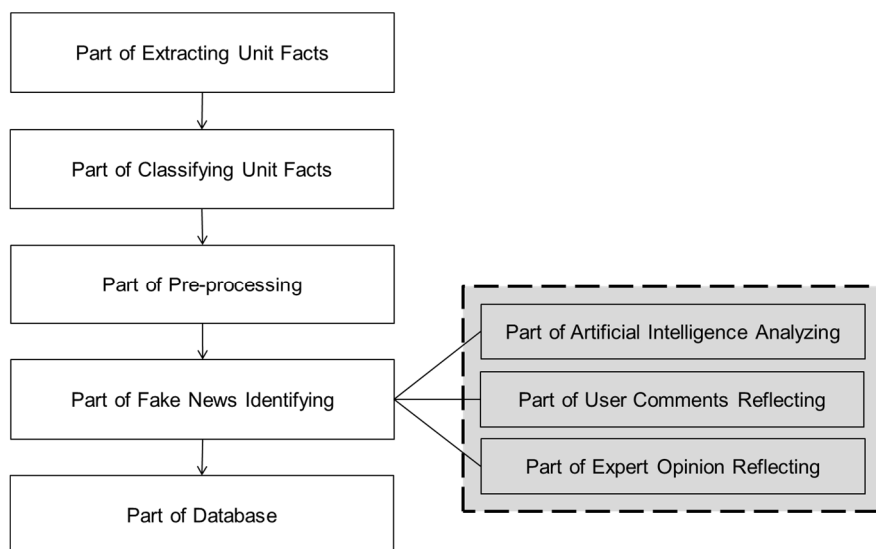


**Figure 1. Phase of the System**

Figure 1 shows the model with major components; Part of Extracting Unit Facts, Part of Classifying Unit Facts, Part of Pre-processing, Part of Fake News Identifying, and Part of Database. Part of Fake News Identifying is composed of three minor components: Part of Artificial Intelligence Analyzing, Part of User

Comments Reflecting, and Part of Expert Opinion Reflecting. And also, Figure 2 shows the model with major phase; Phase of Extracting Unit Facts, Phase of Classifying Unit Facts, Phase of Pre-processing, Phase of Fake News Identifying, and Phase of Storing. Phase of Fake News Identifying is composed of three minor components: Phase of Artificial Intelligence Analyzing, Phase of User Comments Reflecting, and Phase of Expert Opinion Reflecting.
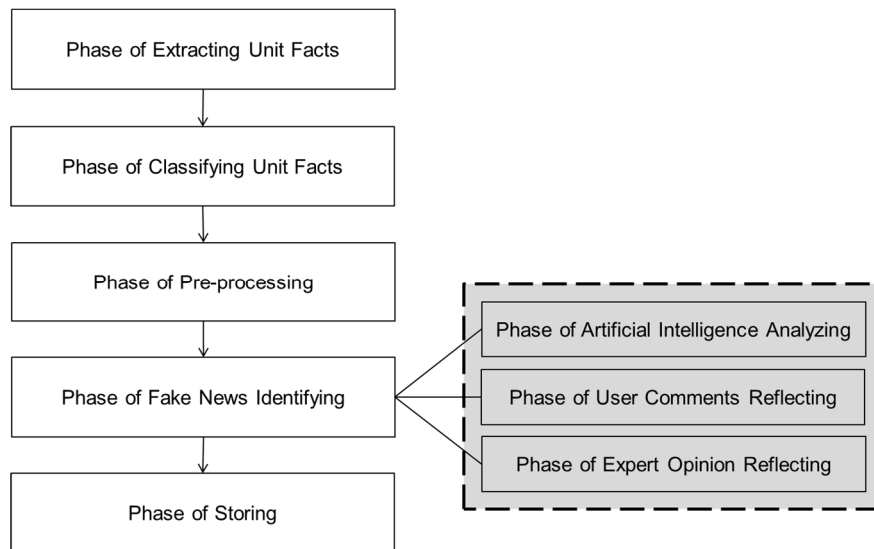


**Figure 2. Parts of the System**

### 3.2 Notion of the Proposed Model

Part of Extracting Unit Facts that extract multiple unit packs from target content; Part of Classifying Unit Facts; Part of Pre-processing that analyzes unit packs and parses only the required information; uses a pre-set art-processing model to predict the unit packs.ng; and a Part of Database that stores information about the identified unit factors.

Part of Fake News Identifying can analyze the association between unit packs extracted from the subject of the target content and unit packs extracted from the target content, and unit packs extracted from the content of the target content. Part of Artificial Intelligence Analysis applies Deep Neural Network (DNN), Recurrent Neural Network (RNN), and Convolutional Neural Network (CNN) techniques to the deep learning prediction models, and can merge results produced through at least some of the techniques. Part of Artificial Intelligence Analysis can allow the deep learning prediction model to be applied with the Recurrent Neural Networks (RNN)-based Long Short Term Memory (LSTM).

Part of Artificial Intelligence Analysis can learn the information of a unit fact stored in the Part of Database in the deep learning prediction model. Part of Extracting Unit Facts can extract images of the target content, search for comparative target content with the same image, extract multiple unit packs from the comparative target content, and analyze the association between unit packs extracted from the target content. Part of Fake News Identifying may further include Part of User Comments Reflecting, which reflects the user's opinion on the authenticity of the target content or the unit fact. According to an embodiment of this study, the Part of Fake News Identifying may further include Part of Expert Opening Reflecting, which reflects expert opinion

on the authenticity of the unit factors. Part of Expert Opening Reflecting may classify experts according to the classified type and predetermined perspective of verifying the authenticity of the unit fact, and may reflect their opinions on the type of unit fact to which the expert belongs. Part of Expert Opening Reflecting may provide the expert with the user's opinion reflected in Part of User Comments Reflecting regarding the authenticity of the unit fact. Part of Fake News Identifying may incorporate expert opinions on the authenticity of the unit factors reflected in the Part of Expert Opening Reflecting in the weight parameters of the deep learning prediction model . Part of Fake News Identifying selects 1-N (usually one or two) best real news with direct association with the news as recommendations from experts and users (readers) to determine the title and content of the best real news, frequencies of key keywords, and distances between green and real news.

Part of Database shows that the information in the determined unit fact is a source of target content, media, press reputation, SNS influence, video, etc., politically/economically sensitive issue, news suddenly spikes on a specific media for a short period of time, blogging or repeating the same content.

Fake News Artificial Intelligence Identification Method (a) Steps in which Part of Extracting Unit Facts extract multiple unit packs from target content; (b) Steps in which Part of Classifying Unit Facts classify unit packs into different types; (c) Steps in parsing only the necessary information by analyzing unit packs; (d) Part of Pre-processing. It may include the steps in which the information in the unit fact is stored.

Step (d) allows Part of Fake News Identifying to analyze the association between unit packs extracted from the target content title and unit packs extracted from the target content, and unit packs extracted from the target content. It applies Deep Neural Network (DNN), Recurrent Neural Network (RNN), and Convolutional Neural Network (CNN) techniques to deep learning prediction models, and results produced through each of the techniques can be merged. This step can be applied to a deep learning prediction model with current neural networks (RNNs) based long short term memory (LSTM). It may further include the step in which Part of Artificial Intelligence Analysis learns the information of a unit fact stored in Part of Database in a deep learning prediction model.

Step (a) may further include the steps in which Part of Extracting Unit Facts extracts images of target content, searches for comparative target content with multiple unit packs from comparative target content, and (d) step (part of Fake News Identifying) analyzes the association of unit packs from target content. The step (d) may include more Part of User Comments Reflecting and more steps to reflect the user's opinion on the authenticity of the unit factor. Step (d) may include more Part of Fake News Identifying and more steps to reflect expert opinion on the authenticity of the unit fact. This Step (d) allows Part of Expert Opening Reflecting to classify experts according to the type classified and predetermined perspective of verifying the authenticity of the unit fact, and to reflect their opinions on the type of unit fact to which the expert belongs. It may include further steps for Part of Expert Opening Reflecting to provide experts with the user's comments reflected in Part of User Comments Reflecting on the authenticity of the unit fact. And also it may further include the step of reflecting expert opinion on the authenticity of the unit factor reflected in the Part of Expert Opening Reflection in the weight parameters of the deep learning prediction model. Step (e) may store information from a unit fact identified by Part of Database along with information about at least one of the target content sources, media, press reputation, and SNS influences of the unit fact extracted by Part of Extracting Unit Facts.

## 4. THE DESIGN OF FAKE NEWS CONTENTS IDENTIFICATION

Figure 1 is a schematic drawing of each configuration of a fake news Artificial Intelligence identification

system. In addition, Figure 2 is a schematic drawing of each stage of a fake news Artificial Intelligence discriminating system. In Figure 1, fake news identification systems include Part of Extracting Unit Facts, Part of Classifying Unit Facts Part of Pre-processing, Part of Fake News Identifying, and Part of Database. Part of Fake News Identifying could include Part of Artificial Intelligence Analyzing, Part of User Comments Reflecting, and Part of Expert Opinion Reflecting.

Part of Extracting Unit Facts can extract multiple unit facts from target content. Here, content may be news articles distributed online, such as websites and social networking sites, and unit facts may be elements that have units, such as sentences, that are subject to fact-checking within target content. For example, a unit fact can be extracted from a variety of target content, such as new news information, media portals, or external news information collection systems. This Part can collect various target contents that exist online directly through Crawling and obtain unit factors from the collected target contents. Alternatively, this part can acquire a unit fact from the entered target content once the target content is entered to be verified by the user or an external server. Unit Facts can be extracted from new news information for the purpose of detecting existing news, collecting trends in producing fake news from media portals, and understanding new fake news information from external news information systems. Part of Extracting Unit Facts can extract multiple sentences contained in the target content by unit fact. Alternatively, in different embodiments, Part of Extracting Unit Facts can acquire a unit fact by extracting one or more natural languages contained in each sentence in each of the sentences that make up the target content, and recombining the extracted natural languages into each sentence.

Part of Classifying Unit Facts can classify unit facts into different types. This Part can classify whether a unit fact corresponds to text, portal, or photo, or video, depending on the type of unit fact. In addition, Part of Classifying Unit Facts can be classified by media, news reporter, elemental, or, for example, by areas of healthcare, law, economy, etc. In addition, it can separately classify new fake news information identified from external news information collection systems. Here, a unit fact can be categorized according to whether the target content to which the unit fact belongs is fake news, unknown hidden news, new news, or quoted news. In addition, this part can be classified by extracting and labeling events such as full citation modulation, text modification, image modification, date modification, or document addition, depending on the modulation type of the unit fact.

Part of Pre-processing can parse only the necessary information by analyzing unit factors. For example, in this part, the steps to analyze the unit factor may include at least some of the steps to refine, transform, standardize, merge, and dedupe the required information. In this, the information in the parsed unit fact can be stored in the memory data store and exchanged with Part of Database.

Part of Fake News Identifying includes Part of Artificial Intelligence Analysis, which uses a deep learning prediction model as a predetermined unit, to determine the degree of fake news in the target content. In addition, the Part of Database stores information about the identified unit parts. Here, the pre-established units can be set as a proposition or contextual basis, and can be set as any unit, such as title, content, or context. At this point, Part of Fake News Identifying can analyze the association between unit packs extracted from the subject of the target content and unit packs extracted from the target content, and unit packs extracted from the target content. This allows Part of Fake News Identifying to detect proposition-based factual inconsistencies in unit facts, context-based factual inconsistencies, subject and content inconsistencies in target content, or content irrelevant.

## 5. CONCLUSIONS

This study can provide a fake news Artificial Intelligence discrimination system that can effectively determine the authenticity of content distributed over the Internet and its methods. In addition, the research model provides a fake news Artificial Intelligence identification system and its methods that allow AI, users, and experts to participate to determine the authenticity of target content in various aspects. According to this study, the authenticity of content distributed over the Internet can be effectively determined using a deep learning prediction model. In addition, the authenticity of target content can be determined in various respects by reflecting Artificial Intelligence in fake news crawl, detecting fake news by users' suspicious recommendations, and performing an analysis of the authenticity of unit factors according to various perspectives of experts in the field. Based on the news that experts judged as the best real news among certain topics, additional judgments can be made through distance, connection, and correlation of suspected fake news.

## Acknowledgement

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