

A MULTI-STRATEGY APPROACH FOR CLICKBAIT DETECTION USING DEEP LEARNING

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ABSTRACT

Online media outlets have begun using click bait strategies to get readers to their stories in order to raise their revenue through ad monetization. Nevertheless, the claims made in the headline are frequently not fulfilled by these strategies. Neural networks provide a more reliable solution than the feature engineering-based approaches employed by conventional click bait detection techniques, which can be constrained by the dataset used. In this work, we suggest a novel method that takes into account all the data in a social media post. To determine how much each word contributes to the click bait score of the post, we employ a bidirectional LSTM with an attention mechanism. Additionally, we use a Siamese net to identify similarities between the source and target data and convolutional neural networks to learn image embeddings. The outputs from these three components are then combined and fed into a fully connected layer. Our strategy performs better than other approaches, scoring an F1 of 65.37% on a test corpus of 19538 social media posts.

Keywords: Click bait, Neural Network, Attention-Mechanism, Siamese Net.

INTRODUCTION

The utilization of clickbait by authors and news organizations increases the number of clicks on their content. It involves coming up with startling, eye-catching headlines that frequently don't adequately reflect the article's content. The goal of clickbait is to get readers to click on the story and increase website traffic, which could result in more subscriptions or ad income. Although clickbait can be a successful marketing strategy, it has also come under fire for being deceptive and manipulative. Clickbait headlines can oversimplify or exaggerate the article's content, setting the reader up for disappointment. In the long run, this may result in the news organization or writer losing credibility. Our search engine is built on the codified idea of clickbait, which use informational tidbits to persuade readers to click on hyperlinks that frequently point to questionable content. By purposefully overstating or misrepresenting the substance in a headline or on social media, clickbaiting leaves a void in the knowledge that can be filled with profit. However, this frequently leads to connections that lead to unoriginal stories with recycled or skewed data. Our clickbait detection engine is made up of three essential parts. Initially, we use neural networks to sequentially model text by taking the article title and turning it into a series of word vectors that can be embedded at the character level. The associated attention layer of a bidirectional LSTM model using this input is then used to handle each word in the title differently. In order to spot clickbait, the second component examines how well an article's title matches its actual content. The engine then evaluates how closely any attached images resemble the article title, giving a thorough assessment of possible clickbait content.

Headlines	Description
"Woman swims with sharks without protection; what follows next is incredible."	Users are often attracted by headlines that are shocking, extra ordinary,or unbelievable. These headlines are intended to grab readers' curiosity and encourage interaction with the text.
"Whatever happened to the actress who played Hermionein" Harry Potter"? She won't look like her!"	Teasing phrasing is frequently used in celebrity gossip headlines to attract readers to click on the content.
"Only people who have a high IQ can respond to these challenging questions, so put your brain to the test!"	IQ-testing headlines can make us feel anxious and curious to learn more. Yet, the article's actual content did not exist as stated in the Head line.

Table1: Examples of Click bait Headlines The main contributions of this paper are as follows:

- Using document formality metrics like FScore and Coh-Metrix can help you differentiate between clickbait and non-clickbait headlines. This is caused by the fact that clickbait articles frequently have lower ratings on these metrics, typically as a result of weak phrase structure. It is able to more accurately classify titles as clickbait or non-clickbait by using these metrics.
- A word-to-vector methodology can be used to determine the similarity level between clickbait and non-clickbait texts in order to make a distinction between them with accuracy.
- The clickbait headline detection methods described above can be used to develop and validate a hybrid model. The model can successfully classify headlines as clickbait or non-clickbait by means of a variety of machine learning methods, improving the accuracy of detection.

RELATED WORKS

- Praphan Klairith and Sansiri Tanachutiwat," Thai Clickbait Detection Algorithms using Natural Language Processing with Machine Learning Techniques". International Conference on Trends in Electronics and Informatics (ICEI),2018.
- A machine learning method to recognise Thai clickbait has been proposed by Praphan Klairith and Sansiri Tanachutiwat. Thai clickbait is renowned for employing enticing language and withholding details to entice readers. We crowdsourced a dataset of 30,000 headlines for research to add to the clickbait corpus.
- Sarjak Chawda, Aditi Patil, Abhishek Singh, Prof. Ashwini Save," Clickbait Classification using RCNN model and LSTM", International Conference on Trends in electronics and Informatics (ICEI),2019.
- The classification of clickbait using the RCNN model was the main topic of this study. The RCNN model was then enhanced by adding LSTM and Gated Recurrent Unit (GRU) to account for long-term dependencies and boost accuracy above prior state-of-the-art methods. The RCNN model analyses the word meanings in the context of their nearby terms when processing the titles of various articles. The programme ultimately assigns each title a label of "Clickbait" or "Non-Clickbait" based on its content.
- Kai Shu, Suhang Wang, Thai Le, Dongwon Lee, and Huan Liu," Deep Headline Generation for Clickbait Detection". IEEE International Conference on Data Mining (ICDM),2018.

- This research introduces the SHG framework, which generates stylized headlines from actual papers in
- order to increase the precision of clickbait detection. SHG consists of two main dimensions to address the bottleneck in the supervised learning workflow: (1) a generator learning dimension that extracts content and style representations to generate headlines, and (2) a discriminator learning dimension that imposes restrictions on the headline generation process by enforcing pair correspondences, style differences, and transfer maintenance. Importantly, the system's primary goal is to produce brief messages, especially headlines. Our initiative, meantime, focuses on scrutinising thumbnails and determining whether or not they are clickbait.
- Suhaib R. Khater; Oraib H. Al-sahlee; Daoud M. Daoud and M. Samir Abou El-Seoud4,"Clickbait Detection".Association for Computing Machinery,2018.
- This study sought to address the problem of Clickbait classification by highlighting the importance of social media post elements in the classification procedure. The researchers showed that the method can be carried out using an acceptable number of features and included new features that improved the performance of the classification process. A thorough explanation of the research's methodology was provided, and the effectiveness of the machine learning-based binary classification was assessed using a number of standard criteria. Yet unlike our effort, this study didn't use a multimedia strategy.
- Deepal Santosh Thakur; Swapnali Kurhade," Context-based Clickbait identification using Deep Learning".International Conference on Communication, Information & Computing Technology,2021.
- The study makes a proposal to overcome the shortcomings of current clickbait-detection systems, which mainly rely on feature engineering and find it difficult, because of the absence of context identification, to accurately separate clickbait from regular headlines. The suggested method uses a Recurrent Convolutional Neural Network (RCNN), which takes into account all of a sentence's properties in order to more accurately determine its context. The results of the experiments demonstrate that the suggested approach outperforms other established clickbait-detection algorithms and models in terms of accuracy. It is important to note that this strategy does not use a multimedia component like our project does.

PROPOSED SYSTEM

- Our suggested clickbait detection solution uses a multi-strategy approach that scores and categorises online headlines using both textual and visual data. To detect similarities between distinct post features, our system uses Siamese networks and a neural attention method. In order to increase the system's performance, we also intend to investigate better photo embedding techniques. Our multimodal technique enables for more precise classification of clickbait headlines by assessing both textual and visual elements. Bi-LSTM with attention, Siamese Network on Text Embeddings, and Siamese Network on Visual Embeddings make up the three primary parts of our system.

- **BI-LSTM with attention:**

- Recurrent neural networks (RNNs) may process sequential data in both forward and backward directions. One such RNN is the bidirectional LSTM (BI-LSTM). For each direction, two different hidden layers are used, and their outputs are combined to achieve this. By doing this, the BI-LSTM can include context from the past as well as the future while making predictions. Performance can be further enhanced by the attention mechanism, which enables the network to concentrate on those input sequence segments that are most crucial to the task at hand.

Siamese Network on Text Embeddings:

Siamese networks are trained on pairs of inputs and have identical sub-networks with shared weights. They are frequently employed in tasks that measure the distance or similarity between two input pairs. By encoding two texts into a fixed-length vector representation and comparing those representations using a similarity metric, Siamese networks can be trained to compare the similarity of two texts in the context of text embeddings.

Siamese Network on Visual Embeddings:

Siamese networks are frequently used to classify images, but they may also be used to identify text similarity and do other text classification tasks. Siamese networks use pairings of text data as input and learn to categorise the data as similar or dissimilar rather than taking input images. The network architecture processes each text input simultaneously using identical sub-networks, comparing the results using a similarity measure, like the Euclidean distance, to get a prediction.

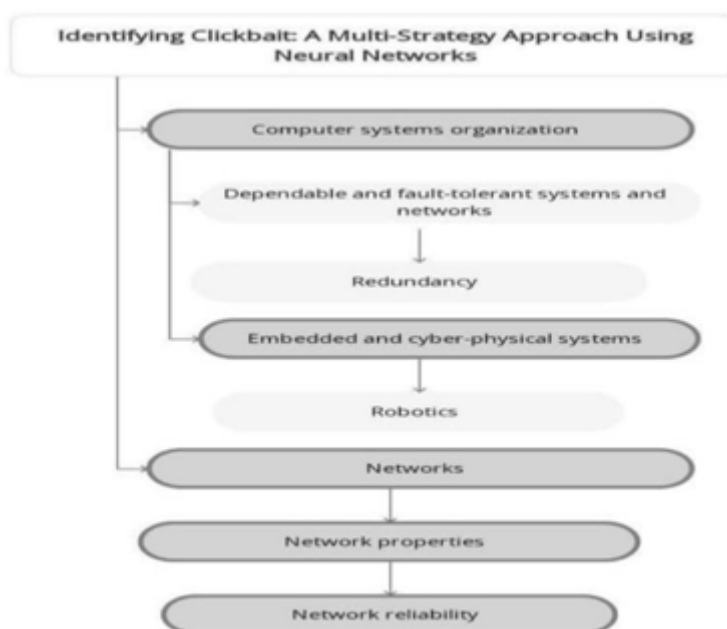
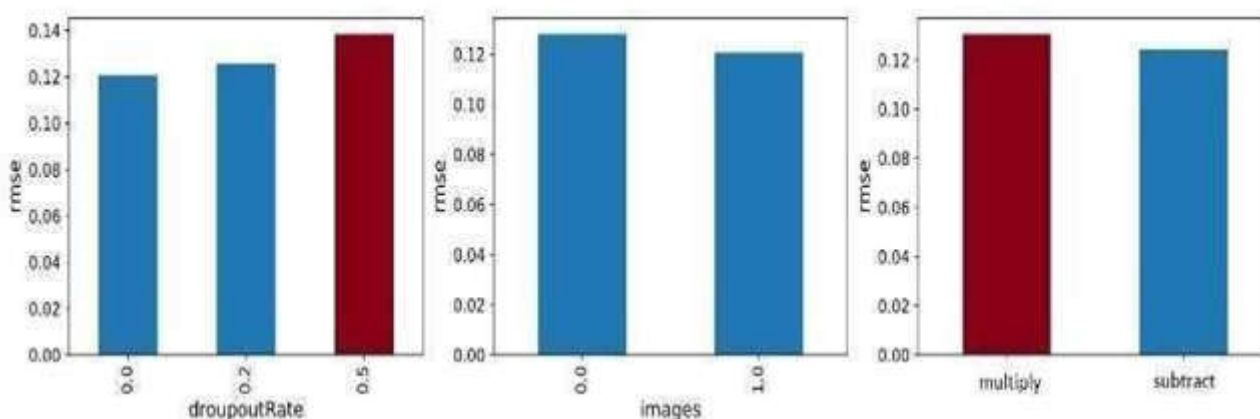
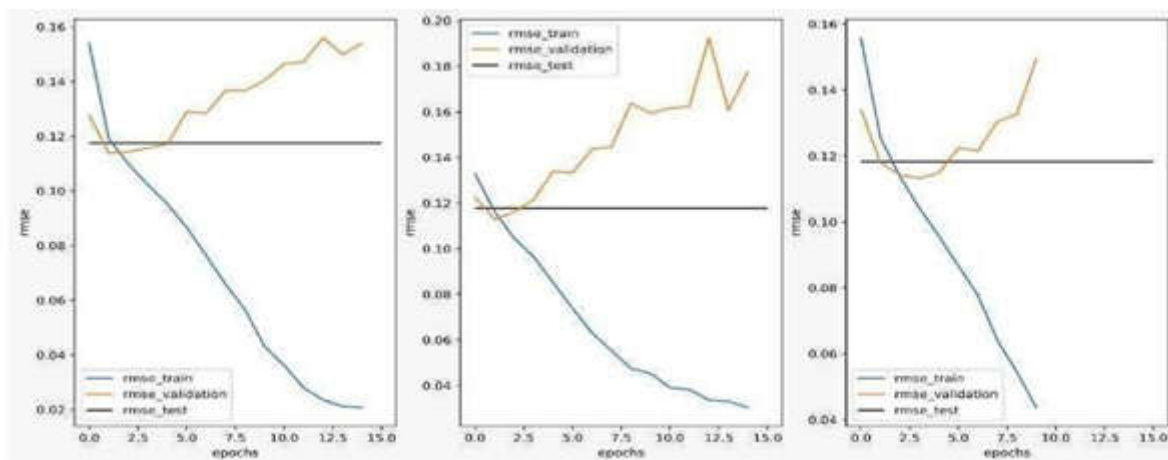
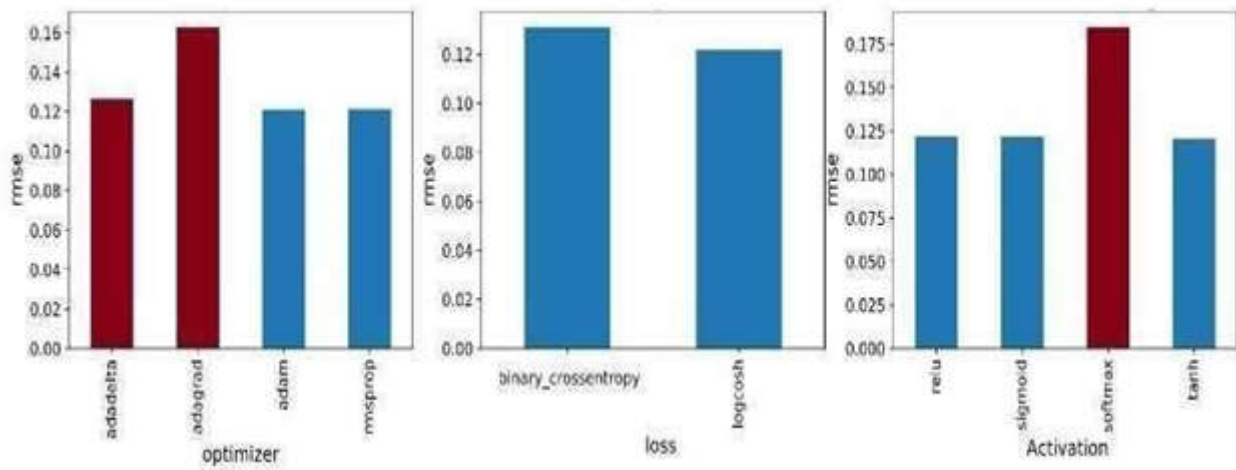


Fig1: Identifying clickbait using neural networks

RESULTS AND ANALYSIS





	mean_squared_error	accuracy	precisionM	recallM	f1M	loss	learning_rate	lActivation	images	comparison	droupoutRate	epochs	optimizer
2	0.118426	0.831969	0.673187	0.569636	0.601294	binary_crossentropy	0.001	tanh	1.0	subtract	0.0	5.0	rmsprop
0	0.118728	0.830263	0.747092	0.443858	0.536395	binary_crossentropy	0.001	tanh	1.0	subtract	0.0	2.0	adam
1	0.119003	0.829239	0.657504	0.594057	0.606634	logcosh	0.001	tanh	0.0	subtract	0.2	4.0	rmsprop
4	0.122641	0.836575	0.683714	0.594454	0.618491	logcosh	0.001	relu	1.0	subtract	0.0	5.0	rmsprop
3	0.123756	0.828386	0.715055	0.481406	0.553483	logcosh	0.001	sigmoid	0.0	subtract	0.0	4.0	rmsprop

CONCLUSION

- The model can collect a wider range of information that might be suggestive of clickbait content by including both textual and visual elements. While Siamese nets can make it easier to compare various post qualities, the introduction of attention mechanisms can also assist the model in focusing on the most pertinent portions of the input. The ability of the model to assess the visual components of the content may be further improved by enhancing the image embedding methods.

FUTURE SCOPE

- It would be intriguing to investigate how to detect clickbait in other languages by extending the project's preview. It would also be beneficial to investigate how well the suggested approach works with various web resources, such as social media posts or adverts. Investigating how the suggested method will affect user behaviour and interaction with clickbait content is another possible direction. The technology may also be included in a browser extension or mobile application, giving consumers a useful tool to steer clear of clickbait.

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