

SMAI PROJECT



TOPIC :

SIMILARITY AWARE DEEP ATTENTIVE MODEL FOR
CLICKBAIT DETECTION
(INVOLVES USING BI-DIRECTIONAL LSTM MODEL)

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AIM

To determine if a particular web-link is news or clickbait by examining its title and body(content) by determining the similarity between them.

MODEL USED - Bi-Directional Long Short-Term Memory (LSTM)



THEORY

Clickbait is a type of web content advertisements designed to entice readers into clicking accompanying links. Usually, such links will lead to articles that are either misleading or non-informative, making the detection of clickbait essential for our daily lives.

Little attention has been paid to the relationship between the misleading titles and the target content, which we found to be an important clue for enhancing clickbait detection.

In this work, we propose a similarity-aware attentive model (Bi-Directional LSTM Model) to capture and represent such similarities with better expressiveness.



MODEL DEFINITION

- The model represents local similarities as vectors to combine them with other features for the future prediction easily.
- We introduce the ways of either using only similarity information or combining the similarity with other features to detect clickbait. We further employ an attention-based bidirectional Long Short Term Memory(LSTM) model to obtain robust representations of textual inputs.
- We evaluate our framework on a dataset of clickbait challenge
- The experimental results demonstrate its effectiveness in detecting clickbait and its competitive performance against the baselines



DATASET

Clickbait Challenge is a benchmark dataset for the clickbait detection

(<https://www.kaggle.com/c/clickbait-news-detection/overview>).

The training , validation & testing dataset contains over 25000, 3550 & 5600 labelled pairs of posts respectively.

The 3 columns of dataset are : id(1,2,3,4...), title(title of the web link), text(content of the web page linked to), label(clickbait or news).

We assigned the label 'news' as 1 and 'clickbait' as 0.

For testing of dataset : a lower score stands for the lower probability of a post being clickbait. Then we regard the post with the mean score under 0.5 as news, else clickbait.



EXPERIMENTATION

In this paper, we define a piece of information as clickbait when the title does not match the content.

Given:

1. set of titles $H = \{h_1, h_2, \dots, h_N\}$
2. their bodies $B = \{b_1, b_2, \dots, b_N\}$

GOAL : Predict a label $Y = \{y_1, y_2, \dots, y_N\}$ of these pairs, where $y_i = 0$ if headline i is a clickbait.

Our framework includes three parts: learning latent representations, learning the similarities, and using the similarity for the further predictions.



EXPERIMENTATION STEPS

PRE-PROCESSING (LEARNING THE LATENT REPRESENTATION)

- Preprocess the dataset by removing the rows with empty heading and/or empty body.
- Then remove all the punctuation and stop words, make the sentence in a lower form, and did word lemmatization
- Convert these cleaned input (heading, body) to vectors using DOC2VEC.



EXPERIMENTATION STEPS

THE MODEL (LEARNING THE SIMILARITY)

- An architecture with two parallel RNN model (BiDirectional LSTM Model) is created, each taking a different input (one taking heading vector as input, another taking body vector as input), whose output will be used for the future model.
- The final model is created using a Lambda layer, with the above 2 created architectures and a distance (a keras Tensor Object) computed using the cosine similarity between the 2 corresponding vectors of a web-link (title and body)
- This model is now trained for epochs = 100 , optimizer = Adam, loss = contrastive loss & early stopping algorithm (callbacks).



EXPERIMENTATION STEPS

THE PREDICTIONS

- The model is now used to predict values for the testing dataset (which was also pre-processed).
- A lower score stands for the lower probability of a the pair (heading and title) of being a clickbait (due to cosine similarity between the two, more the similarity - more they are related and thus not a clickbait).
- So, we regarded the post with the mean score under 0.5 as news, otherwise as clickbait.



RESULTS

The trained model gave the following results on validation data:

- ACCURACY : 78.81%
- PRECISION VALUE : 0.7
- RECALL VALUE : 0.79
- F1-SCORE : 0.71

Similarly, we predicted values for data(testing dataset from the clickbait challenge).



INDIVIDUAL CONTRIBUTION

All the work(the code and the ppt making) has been together equally by the 3 of us together on a common team's calls.

THANKYOU!