# Project Outline Document : Identify a clickbait and Un-clickbait it

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## 1 Problem Statement

Online and digital life has become the new normal. Clickbaits occur very frequently in social media posts and news feeds which mislead and urge users to view the content by clicking on them. There is a need to regulate such misleading clickbait articles for better user experience in social media. Our problem is to identify clickbait titles and nullify the misleading part of the clickbait.

We also plan to implement a browser extension which will identify a clickbait and then change its title so that it is not a clickbait. So, if a user is browsing through an article, then the browser extension will predict if there is clickbait present in the title, and if there is, then it will notify the user and make him/her aware of a better title that is suitable for the given article.

## 2 Overview of our Approach

The pipeline of our approach consists of three parts: Predict, Generate and Evaluate.

### 2.1 Predict

In the first part, we predict if the title of an article is clickbait by using an existing state-of-the-art clickbait classifier.

### 2.2 Generate

- If the title was predicted to be clickbait, then the second part consists of using the content of the article to generate a headline which is not clickbait (or at least, has a lower clickbait strength than the original title). We plan to use some of the following methods to generate the new headline:
  - By extracting keywords and generating a headline based on that.
  - Headline generation using extractive/abstractive summarization of the article.
  - Using Masked Language models such as BERT or traditional Language Models.
- We keep the title unchanged if it is predicted to be non-clickbait.

### 2.3 Evaluate

To evaluate the outputs of our model(s), we would predict the clickbait strength of the new title using existing state-of-the-art model of predicting clickbait strength of articles and compare it with the clickbait strength of the original title.

A lower clickbait strength of the output would mean that the new title is less clickbaity than the original one. The one with the lowest strength will be chosen as generated title.

## 3 Details of our Approach

### 3.1 Dataset(s)

1. Clickbait Prediction Dataset - It consists articles scraped from popular clickbait sites such as ScoopWhoop, BuzzFeed, Upworthy, etc. It contains a large collection of clickbait and non-clickbait titles. Most of the samples also contain the content of the article along with it. If the content is not present, crawling and fetching them is a trivial task that will be done.

2. Summarization Dataset: All the news dataset - It contains 143,000 articles from 15 American publications. It contains a bunch of information, but we extract only the title and the content out of it. At a later point in the project, we may change the dataset with a better one if we find any that is more suitable for the task of headline generation.

### 3.2 Models

- A pre-trained model trained on the clickbait datasets will be used to classify articles as clickbait or non-clickbait for the first stage of the pipeline.
- Keyword Generation and Headline Generation: Pre-trained GPT-2 models for keyword generation and textgenrnn for sentence generation.
- Using Masked Language models such as BERT or traditional Language Models for generating headlines.
- Headline generation using extractive/abstractive summarization of the article by training on the Summarization Dataset.
- A model pre-trained on Webis Clickbait Corpus will be used to predict the strength of the clickbaits, to help in judging the generated headlines.

## 4 Problems that will be tackled

- The newly generated title for the content will be relevant to the article, non-clickbait and describing the main topic. Having multiple approaches also helps to complement each other in solving the task.
- Familiar varieties of clickbait include top ten lists, fact pieces, interviews, and many other familiar tropes. Here the content is about a single topic but it is spread across multiple entities, and the generation of a proper non-clickbait title is expected in these cases.
- Few of the clickbait headings are negative, perhaps it is due to the negativity bias present in humans. The newly generated non-clickbait title is expected be positive or neutral in most of the cases, unless the content expects so.
- There are available chrome extensions which warn us about clickbaits and prevent us from clicking on clickbaits. One of them, 'Stop Clickbait', helps identify clickbait titles, and gives an option to block similar clickbaits for future, similar to an ad blocker. It also provides an option to report misclassified clickbaits to improve their model. In our prototype, we would like to implement the following functionality.
  - Identify clickbait titles and warn the user.
  - Display a non-clickbait version of the title to the user.
  - Help user block clickbaits for a personalized experience.

## 5 Problems that may arise but won't be tackled

A reliable title might not be generated in the following cases:

- If the article spans across multiple topics.
- If the article length is too less.
- In a few instances, the keywords generated may not be coherent, and the generated title may not be syntactically correct but a human should be able to comprehend it on a single read.