

Advertisement Recommendation using Machine Learning

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Abstract— We proposed a context aware advertisement recommendation system for video platforms that analysis the advertisement video with the help of which user gets recommendation for Ads. Advertisements can be made more specific, in order to get the user’s attention. If a user plays a video then he/she will be able to get the right recommendation according to the content of the video they are going to watch. In this paper we assume that we know the content which a user is going to view according to pre-classified attributes. For analysis of our advertisement video we are using python version 3.6 with including the library files such as ImageAI and for Speech Recognition we are using Speech Recognition packages in python. For text analysis we are using spark machine learning algorithm.

Keywords: ImageAI, Speech Recognition, PySpark, OpenCv

I. INTRODUCTION

A. How Machine Learning Is Daily Developing In Field Of Computer Science?

Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition and effective web search. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it. Many researchers also think it is the best way to make progress towards human-level AI.

In other words it is a method of training computers to improve predictions or features based on some input data. Input data depends entirely on the problem. It could be information obtained from the machines like computers connected to the same network or the different network, results obtained from the program as an input to the other program. In this paper we present an approach used to classify the ads dynamically as per the list of classified videos (our input). This could be a method for relevant advertising and proactive recognition of viewer’s interest. This may help advertisers build better ads as per the type of content watched by consumers.

B. Recent Studies/Survey of Youtube Advertisements

Studies have shown that, over 4 billion videos are being viewed a day, from YouTube as a stand-alone source, hence the scope of this approach is huge. Current issue faced is the poor recommendation of advertisements with respect to the content being viewed. The right recommendation of ads, based on the content, and the history of views of a user, can prove to be a win-wins situation for the advertiser and the user. This may also help improve the sales of a product.

II. EXISTING SYSTEM

We gone through many papers but one research paper we found to be similar to our content what we are making.

They did Context-aware Advertisement Recommendation on Twitter through Rough sets.

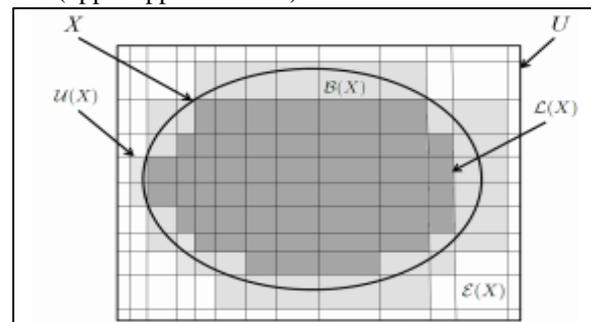
They have used rough sets algorithm.

A. Introduction about this Paper

Nowadays, social networks have become the most used platforms in daily life. Every day people create, share, and exchange posts on these platforms. This has driven most companies at the use of social media for the advertising campaign. A central problem, in this context, is making sense of the unstructured information content shared by users along the time to find the closest matching between the interests of a user and a set of given advertisements, in order to choose the ads to show. In this work we attempt to predict advertising interests by interpreting users’ tweets, in different time slots. The method could be used to drive marketing campaigns on social media, for instance it may be used by the ad network for ad targeting or for estimating the most profitable advertisement and when it should be sent for engaging the user. In particular, we examine the flow of posts of a set of users (we take into consideration Twitter as social network where the posts are called tweets, for its easiness in retrieving data).

B. Rough Sets Algorithm

Social networks. Rough sets allow to approximate sets according to an equivalence relation. More exactly, given an equivalence relation R on a universe U , any subset X of U determines a pair $(L(X), U(X))$ (called rough set) consisting respectively of the union of all equivalence classes fully contained in X (lower approximation) and the union of all the equivalence classes that have at least an element in common with X (upper approximation).



C. Working of the Model/Process

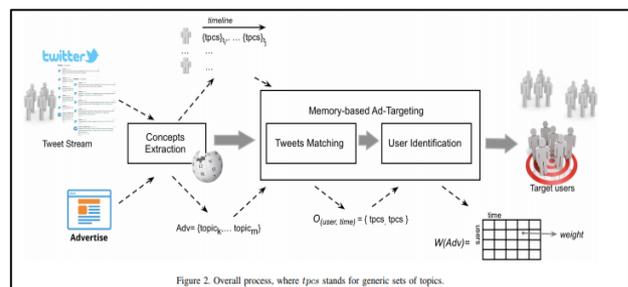


Figure 2. Overall process, where tpcs stands for generic sets of topics.

III. PROPOSED SYSTEM

We recognize the context of the advertisement by running object and voice recognition algorithms for a video and video's audio respectively. The algorithm first extract the last few frames of the video and last few seconds of the audio, this is done, as most advertisements display the actual product, name-of-company towards the end of the ad. The frames obtained are scrutinized and ensured of no repeating frames, this is done by creating a hash code for each frame, object recognition algorithm is then run on these frames. Speech recognition algorithm on the extracted audio. Both these programs will return the words recognised from the two inputs. From frames it may be words that are in the frames, or words that describe the objects in the frame, similarly from the audio it would be the words that are recognized. Here we are keeping our subset to the English language alone. These words were then fed into another machine learning algorithm which predicted the context of these words, essentially it is a text analyser. We used the newspaper article analyzer to obtain the final result, which is the class of the video advertisement.

A. Advantages of our Proposed System

- Here we are analysing the content of advertisement. So it will be easy to match them with content of the video.
- We can make our algorithm less error by providing right training set.

1) Algorithms We Used

A Frame and Audio extraction

We are using OpenCV in python to extract the some frames of video

B. Object Recognition

For object recognition If we want to detect any object through an image. So we are using python and also implementing the ImageAI library.

Steps for image detection and ImageAI library installation:-

- 1) Step 1 – Create an anaconda environment with python version 3.6.
->conda create -n retinanet python=3.6 console
- 2) Step 2 – Activate the environment and install the necessary packages.
- 3) Step 3 – Install the ImageAI library.
- 4) Step 4 – Download the pretrained model of RetinaNet.
- 5) Step 5 – Copy the downloaded file to your current working folder.
- 6) Step 6 – Download the image form this link. Name the image as image.png.
- 7) Step 7 – Open jupyter notebook.

C. Speech Recognition

For speech detection we are using python 3.6 with including the library files of the speeches.

So we need to include these packages in the python environment like – apai, assemblyai, google-cloud-speech, pocketsphinx, Speech Recognition, wtason-developer-cloud, wit.

So among these packages we are using Speech Recognition because it is easy to use and get efficient results.

The flexibility and ease of use of the speech recognition package make it an excellent choice for any python project.

D. Text Analysis

We are using Spark Machine learning library in PySpark for analysing the text for knowing the content of the video.

We are classifying our advertisement into 40 pre-defined categories.

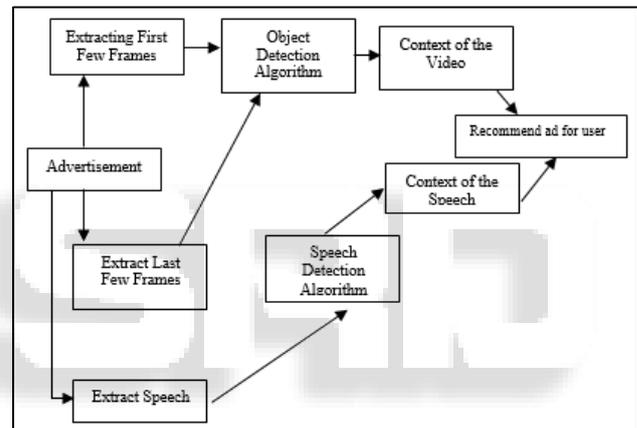
For data ingestion and extraction we are using Spark CSV Packages.

So from spark machine learning pipelines we will tokenization.

By using StringIndexer encodes a string column of labels to a column of label indices. The indices are in [0, numLabels), ordered by label frequencies, so the most frequent label gets index 0.

So we are using Logistic Regression algorithm for machine learning because it is giving higher accuracy than other algorithms.

E. Block Diagram

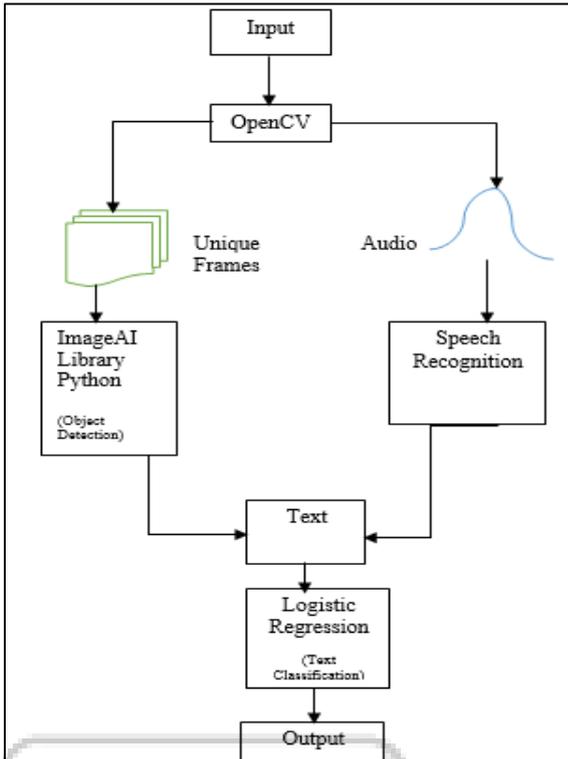


First we will cut our advertisement first few frames and extract last few frames and extract speech as well as.

Then by Object Detection Algorithm we will detect the last and first few frames and by speech detection algorithm we can be able to extract the speech.

Then it moves to context of the video and context of the speech by combining this we will be able to recommend ads for users.

F. Backend Model of our Project



This is our backend model of our project where you will see the process steps of our model.

IV. IMPLEMENTATION

A. Unique Frame Extraction

```
import cv2
def FrameCapture(path):
    vidObj = cv2.VideoCapture(path)
    count = 0
    success = 1
    while success:
        success, image = vidObj.read()
        cv2.imwrite("frame%d.jpg" % count, image)
        count += 1
if __name__ == '__main__':
    FrameCapture("C:\\Users\\Admin\\PycharmProjects\\project_1\\openCV.mp4")
```

B. Object Recognition

```
from imageai.Detection import ObjectDetection
import os

execution_path = os.getcwd()

detector = ObjectDetection()
detector.setModelTypeAsRetinaNet()
detector.setModelPath( os.path.join(execution_path , "resnet50_coco_best_v2.0.1.h5"))
detector.loadModel()
custom_objects = detector.CustomObjects(person=True, car=False)
detections = detector.detectCustomObjectsFromImage(input_image=os.path.join(execution_path , "image.png"),
output_image_path=os.path.join(execution_path , "image_new.png"),
custom_objects=custom_objects, minimum_percentage_probability=65)

for eachObject in detections:
    print(eachObject["name"] + " : " + eachObject["percentage_probability"] )
    print("-----")
```

C. Text Analysis

```
from pyspark.ml import Pipeline
from pyspark.ml.feature import OneHotEncoder, StringIndexer, VectorAssembler
label_stringIdx = StringIndexer(inputCol = "Category", outputCol = "label")
pipeline = Pipeline(stages=[regexTokenizer, stopwordsRemover, countVectors, label_stringIdx])
# Fit the pipeline to training documents.
pipelineFit = pipeline.fit(data)
dataset = pipelineFit.transform(data)
dataset.show(5)

from pyspark.sql import SQLContext
from pyspark import SparkContext
sc = SparkContext()
sqlContext = SQLContext(sc)
data = sqlContext.read.format('com.databricks.spark.csv').options(header='true', inferschema='true').load('nutrients.csv')
```

D. Speech Recognition

```
import speech_recognition as sr

AUDIO_FILE = ("audio.wav")

r = sr.Recognizer()

with sr.AudioFile(AUDIO_FILE) as source:
    audio = r.record(source)

try:
    print("The audio file contains: " + r.recognize_google(audio))
except sr.UnknownValueError:
    print("Google Speech Recognition could not understand audio")
except sr.RequestError as e:
    print("Could not request results from Google Speech Recognition service; {0}".format(e))
```

V. CONCLUSION

Further we can increase the accuracy of results with improvements in algorithms and the correct dataset which will be used for training the classifier in text analysis these things can also speed the computation and it will help us in recommending advertisement.

Hence, We came into conclusion that these approach is quite feasible for recommending advertisement for our video platforms.

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