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|  | **Sri Lanka Institute of Information Technology** |

Project Topic Assessment – 2021

TMP-21-095

Topic

Artificial Intelligence Based Business Strategy for Optimized Advertising

Abstract (200 Words Max):

Currently television advertisements are a passive form of advertisements which does not take into account the information about the users, who are viewing the television at a specific time. This results in irrelevant advertisements for the user, thereby reducing the user engagement and reducing the sales conversions, which is the end goal of any advertisement campaign. As a solution for this, a user-based advertising strategy is proposed through this research. User centric advertisements are commonly used in many online platforms. To bring about the advancements, which has been adopted by the digital marketing industry to the television advertisement market. Through this research it is expected to bring these developments to the television advertisement industry, which will be targeted based on user demographics such as age, gender the user profile of the users who are viewing the screen at a given time. This will result in more relevant advertisements for the users, thereby making television advertisements more user friendly. This will in turn result in higher sales conversion for the marketing agency, which is placing the advertisement.

**Supervisor should fill this part**

Continuation of Previous Year Project?

Supervisor: I certify here that co-supervisor and myself can guide this students to acquire required knowledge skills and attitudes pertaining to above sub domains of his/her specialization.

Supervisor: **Ms. Dinuka Wijendra**

Signature

If yes, state the Project ID and year

Co-Supervisor: **Ms. Jenny Kishara**

Signature

External Supervisor: **Mr. Anju Nissanka Seneviratne**

Signature

Team Members:

|  |  |  |
| --- | --- | --- |
| Student Name | Student ID | Specialization |
| Leader: Kannangara K K A L | IT18507652 | IT |
| Member 2:Samaranath T I | IT18085686 | IT |
| Member 3:Kumara G D S H | IT18041408 | IT |
| Member 4:Thathsarani W C | IT18158564 | IT |

Research Problem:

Considering the swiftly changing technological development, marketability and advertising of products have been evolved over the period, but significant changes in advertising have been implemented on specific areas like Social media and E-commerce platforms. But in television, the traditional methods of advertising are still in present, which is carried out in a way that does not follow users’ engagement, which directly affect in reducing sales conversions. The satisfaction rate of users with respective to the targeted advertisements, which are telecasted in each time duration tends to be low with the lack of understandability between the users’ intention and the aspects of each advertisement [1-3]. Due to the unavailability of technologies to investigate the target audience emotions [4] and to ensure the privacy of users’ data [5], the target-oriented advertising has become a difficult process to be addressed. Therefore, a methodology of overcoming the traditional advertising by using a user centric mechanism have to be developed to overcome the problems related with advertising marketability and the user satisfaction ratio.

[1]A.A.G.A.K Perera , R.P.E.T Jayarathne , B.Y Thilantha , S.I.G Kalupahana , P.S Haddela and A. Kiripananda , E.A.T.D Edirisinghe , “Ads-In Site: Location based advertising framework with social network analyzer”, 2014 14th International Conference on Advances in ICT for Emerging Regions (ICTer) <https://ieeexplore.ieee.org/document/7083889/authors#authors>

[2] Y. Fu, G. Guo, and T. S. Huang, “Age synthesis and estimation via faces: a survey”, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 32, no. 11, pp. 1955–1976, 2010. <https://ieeexplore.ieee.org/abstract/document/5406526?casa_token=Le4diIq7WF8AAAAA:j-eiXi4ieSW9dKf7KsDH4xQCp5V-QF41r6dWHa9e3-pI88lPo3XBaWvARpARkwhE4ha-Kuqb3M1N2g>

# [3] Gokhan Ozbulak,Yusuf Aytar and Hazim Kemal Ekenel , “How Transferable Are CNN-Based Features for Age and Gender Classification” , 07 November 2016

# <https://ieeexplore.ieee.org/document/7736925>

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# [4] Rohit Pathar, Abhishek Adivarekar, Arti Mishra, Anushree Deshmukh , “Human Emotion Recognition using Convolutional Neural Network in Real Time” , 2019 1st International; Conference on Innovations in Information and Communication Technology (ICIICT)

# <https://ieeexplore.ieee.org/document/8741491>

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# [5]Elie F. Kfoury, David J. Khoury , “Secure End-to-End VoLTE Based on Ethereum Blockchain” , 2018 41st International Conference on Telecommunications and Signal Processing (TSP)

# <https://ieeexplore.ieee.org/abstract/document/8441204>

Solution proposed:

To adhere the above problem, it is proposed to implement a system using Image Processing and Machine Learning techniques to capture user data, which directly involved in advertising. The solution can be divided into the following sub parts:

1. Use of an object detection algorithm to capture user demographic data such as age gender and related peer group.

* Identification of the users and their demographic data. (age and gender)
* Categorize the users depending on their peers (Ex: Family, Friends, Kids, Teen groups)

1. The advertisements placed by the advertising firms are classified using related tags and by considering the demographic data captured in the first phase.

* Identification of the tags of the advertisements and recommending 5 best advertisements
* Classification of advertisements by considering the age, gender and peer group of the audience
* Selecting the most suitable advertisement out of 5 recommended advertisements by considering demographic data collected in stage 1 (age, gender and peer group)

1. Identifying user impressions with regard to the advertisement placed using emotion detection, which will benefit in forecasting future advertisements.

* Identification and verification of the user emotions
* Analyze and report statistic to the advertising firm

1. Ensure privacy issues by securing sensitive user data and advertisements with the use of blockchain integration(smart contract).

* Secure the advertisements that are given by the advertising firm and the users video clips that are collected by the smart device

System Overview Diagram for the solution proposed. Recommended to draw using [draw.io.](https://app.diagrams.net/) Note: This is not an activity/flow (UML) diagram

1. **Man components including the data sources, stakeholders, interaction among the stakeholders, etc.**
2. **Interconnection among the components**
3. **Major SW and HW components**

Diagram

Description automatically generated

Objectives (1 main objective and 4 sub objectives):

**Main Objective:**

Hosting of advertisements is done through the variation of time scheduling. The aim is to categorize and classify user preferred, user relevant and peer relevant advertisements on the television, which will benefit both the targeted audience and the advertising firms.

**Sub Objective 1:** Advertising firms will have the facility to only pay for the audience the advertisement is placed. This will be an advantage, since the advertisement is placed according to the status of the audience. The current advertising mechanism is not user centric such that the expected profit of telecasting a particular advertisement may not end up with the targeted profit.

**Sub Objective 2:** Recommended advertisements are considered based on the demographic data of the user and the tags generated for each advertisement. This feature is important to give the optimized advertisement for the audience according to their preference.

**Sub Objective 3:** Generate feedback report considering users emotions and impressions regarding advertisements to forecast future advertisements. This feature will be important for advertising firms to decide which advertisements gives the best user engagement.

**Sub Objective 4:** Ensure privacy issues and secure user data. The video data transferring through the API should be more secured so that the privacy of the users is protected.

Task divided among the members

**Kannangara K K A L - IT18507652**

* A current snapshot of the audience infront of the television will be taken into account for live detection, which will be captured through a camera embedded to the Smart TV.
* Gather data using an online data set to train the algorithm to detect lively present human and their age, gender and the peer group.
* Once the snapshot is taken, it will go through an algorithm to detect the audience and predict the age and gender(Output 1).
* Depending on the head count and the output of the algorithm(Output 1) , the audience will be further classified into individuals or peers associated with each other.

**Samaranath T I - IT18085686**

* Building an API to send and receive data throughout the process.
* The data sorted and classified in stage 1 will be merged with the advertisements containing tags which will be provided by the advertising firm.
* Once the tags of the advertisements are matched with the classified data of the audience, with the aid of a recommendation algorithm the audience will be able to view the preferred and recommended advertisements with the classifications done in stage 1.

**Kumara G D S H - IT18041408**

* Training a data set related to human emotions using an online data set.
* Capture snapshots of the video to obtain the emotion and compare it with the trained data set and classify the emotion that suits the advertisement.
* The emotions are detected by considering several factors which appear in the face such as curves and wrinkles.
* Eye with curved shape (happy/good)
* squeezed eyebrows, slender and stretched eyelids(anger/bad)

**Thathsarani W C - IT18158564**

* Ensure privacy issues by securing sensitive user data and advertisements with the use of blockchain integration(smart contract).
* Smart contracts use software code to automate tasks, thereby shaving hours off a range of business processes. Smart contracts save money since they knock out the presence of an intermediary.
* Secure the advertisements that are given by the advertising firm and the users video clips that are collected by the smart device

Technologies to be used:

Object detection , Age and Gender prediction – CNN , TensorFlow, OpenCV,Python

Advertisement Classification - ML , Python ,Collaborative filtering method

Emotion detection -CNN, OpenCV,Python

Data Security - Ethereum Based Blockchain Application(Smart Contract)

If the supervisor States that this year is a continuation of previous work, state the further work the students should do compared to the previous years.

(NOTE: This part has to be filled by the supervisor)

The section to mention that this research project is a continuation of pervious work, is selected by mistakenly.

**This part will be filled by the Topic Screening Panel members**

Acceptable: Mark/select as necessary

|  |  |  |
| --- | --- | --- |
| Acceptance/  Rejection | Correction State | |
| Minor Correction | Major Corrections |
| Accepted |  |  |
| Resubmit |  |  |
| Rejected |  | |

Corrections (if necessary)

**This is marked as a continuation of a previous research, so the supervisor has to indicate more references and the details needed.**

Improve the clarity of the objectives to explain what exactly is done under each objective.

Details of the task divided among the members are not clear. Elaborate more what the students will do throughout the year.

The demographic data collection procedure is unclear. Students need to clearly mention how the data collection step is carried out.

IT18507652 - The scope/depth of the functions doing by is not enough.

The emotion detection is unclear. Students need to clearly mention how user emotions are captured.

Students have to mention whether they are using existing APIs or implement their own APIs for the project.

Major changes proposed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_see the corrections cage.

Any other Comments:

There are some unclear parts in the individual functions as mentioned above. Please discuss with the supervisor before resubmit.

Approved by the review panel:

**Panel 01:**

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| --- | --- |
| **Member’s Name** | **Signature** |
| Ms Sanvitha Kasturiarachchi |  |
| Ms. Madhuka Nadeeshani |  |
|  |  |

**Panel 02:**

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| --- | --- |
| **Member’s Name** | **Signature** |
| Prof . Koliya Pulasinghe |  |
| Dr. Pradeepa Samarasinghe |  |
| Mr. Nalaka Dissanayake |  |

**Important**:

1. According to the comments given by the panel, do the necessary modifications and get the approval by the **same panel**.
2. If the project topic is rejected, find out a new topic and inform the CDAP Group for a new topic pre-assessment.
3. A form approved by the panel must be attached to the **Project Charter Form**.

**Appendix 1**

Text

Description automatically generated

**Appendix 2**

Text

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