**ARTIFICIAL INTELLIGENCE BASED BUSINESS STRATEGY FOR OPTIMIZED ADVERTISING**

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Project Proposal Report

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# **Declaration**

We declare that this is our own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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| **Student ID** | **Name** | **Signature** |
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The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

-------------------------------------------- --------------------- Signature of the supervisor: Date:

# **Abstract**

In this Document, the main focus is on Human emotion detection and recognition. The purpose of this paper is to analyze how human emotion to the advertisement. Generate feedback reports to predict potential ads by considering consumer emotions and advertising experiences. For advertising agencies, this function would be critical in determining which ads have the greatest user engagement.

This study mainly recognized human emotions (happy, sad, anger, surprise, fear, disgust, and neutral) in response to advertisements shown by us. Firstly, detect human face and next detect human emotions. Further preparation of a human emotion data set using an online data set. Capture video snapshots to get the emotion and compare it with the trained data set and categorize the emotion that matches the commercial. Finally, we get the feedback and generates separate reports on what kind of feelings are expressed in the advertisements we show and sent to the advertising company.

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# **Introduction**

## **Background**

Feelings or emotions take on the main role in human life and We can see what the user is trying to mean from those feelings and emotions. This is something that is used in day-to-day life. We will benefit a lot from knowing human feelings and emotions. If these human emotions are categorized, we will split them down into several groups. For example, Happy, Sadness, Anger, Fear, Disgust, Joy, Surprise, and many more. [1]

Today, most of the people in the world watching television. Almost every household has a TV nowadays. So, everyone watches TV regardless of age. There can be different kinds of people in front of the TV. If we categorize them we can group them to family, friends, age below 18, kids and etc. and they respond to ongoing TV shows/films/advertisements/songs using their different kinds of emotions and reactions. In this case, mainly focused on TV advertisements. So based on these facts, we are trying to combine these human emotions with technology and get the emotions by the users in advertisements shown on the TV.

First Track incoming video data and captures people's emotions and reactions. Then compare the advertisement displayed with the video data to see how the advertisement has an impression. Then it makes a report and sends it to the advertising company. From this, the advertising company can know the reactions of the people to the relevant advertisement It allows them to decide whether or not to show first Track incoming video data and captures people's emotions and reactions. Then compare the advertisement displayed with the video data to see how the advertisement has an impression. Then it makes a report and sends it to the advertising company. From this, the advertising company can know the reactions of the people to the relevant advertisement It allows them to decide whether or not to show.

In this era have a lot of advertising agency and also very busy people in this modern society. So Advertising agency shows imaginary advertisements all day in different time sections on TV. Some people in front of the TV are watching these advertisements and some are not. Also, we can Saw on this user’s side, some advertisements are important to them and some are not. That unwanted advertisement is a waste of the user’s time and a weakness of the advertising agency because the advertising agency failed to show an effective advertisement to the user. Considering these facts, we give the best solution. We are introducing a new system that is important for both the advertising agency and the user. This is very effective for an advertising agency. Because they can see what kind of impression users have on their advertisement and select the advertisement they want to show to the user.

## **Literature Review**

In the past literature shows a different kind of attempts taken by researchers to identify human emotions. Also, several applications found which have been used to detect human emotion in the literature survey.

**A Face Emotion Recognition Method Using Convolutional Neural Network and Image Edge Computing [2]**

HONGLI ZHANG, ALIREZA JOLFAEI, AND MAMOUN ALAZAB proposed a system a facial expression recognition method using a CNN model which extracts facial features effectively. Their detailed experimental study reveals that the proposed algorithm will to some degree increase the detection rate of facial expressions in complicated backgrounds relative to previous literature. Compared to FRR-CNN and R-CNN versions, the convergence pace in dynamic context conditions, the model suggested is much quicker. Also, a higher identification rate is obtained by the proposed methodology. We will also concentrate on how to minimize network structure complexity and attempt to understand dynamic expressions using 3D convolution technology.

**An Attentive RNN for Emotion Detection in Conversations [3]**

Navona Majumder, Soujanya Poria, Devamanyu Hazarika, Rada Mihalcea, Alexander Gelbukh, Erik Cambria proposed a system an RNN-based neural architecture for emotion detection in a conversation. We present a new approach based on recurrent neural networks in this paper that keeps track of the individual party states in the discussion and uses this data for the classification of emotions. On two distinct datasets, their model outperforms the state of the art by a large margin. On two different datasets in both textual and multimodal contexts, our model outperforms the present state-of-the-art. Our strategy is planned to be flexible for more than two speakers in multi-party environments, which we expect to pursue in future work.

**Real-Time Emotion Recognition from Facial Expressions Using CNN Architecture [4]**

Mehmet Akif OZDEMIR, Berkay ELAGOZ, AysegulALAYBEYOGLU, Reza SADIGHZADEH, and Aydin AKAN proposed a system low cost and functionality method for real-time classification of seven different emotions by a facial expression based on LeNet CNN architecture. The effect of unimportant pixels outside of facial expressions was minimized by using the Haar Cascade library. Single-depth positioning, moreover, in addition to lack of performance rate, the pixels in the images to networks have decreased training time and a number of networks. Using a custom database has provided higher validity and research accuracy than practicing in existing databases. The feature of the real-time test model is to question any picture that occurs every second. They hoped that this thesis would be a focus of research that would aid at an early level. Disease recognition from facial gestures and even customer behavior research experiments.

**A Study on Object Detection Method from Manga Images using CNN [5]**

Hideaki Yanagisawa, Takuro Yamashita, Hiroshi Watanabe proposed a system The efficacy of object proposals for manga object identification has been tested. The experimental findings indicate that Selective Search is efficient for objects with clear boundaries and that RPN is effective for objects whose boundaries are clear. The limits are unclear. In addition, it is difficult for SSD to detect manga artifacts in the entire image, so it is important to separate images into small regions.

**Learning Salient Features for Speech Emotion Recognition Using Convolutional Neural Networks [6]**

Qirong Mao, Ming Dong, Zhengwei Huang, and Yongzhao Zhan proposed a system for SER, studying salient, discriminatory characteristics is an important research issue. The key contribution of this study is two-fold. First, SER implements feature learning, in which CNN automatically learns the best feature set for SER by two-stage training: SAE and SDFA. Second, we propose a novel objective feature in SDFA that encourages Saliency, orthogonality, and segregation are attributes. As a consequence, our methodology will isolate effect-salient properties from other noisy variables, such as speakers and vocabulary. Our emphasis in this paper is on the identification of prototypic. Based on demonstrated emotional utterances in experimental environments, manifestations of many specific emotions. In naturalistic and real-world environments, subtle, persistent, and context-specific interpretations of affective utterances are obviously more relevant and more complex research concerns. Feature learning is well-suited to overcome these problems, as an innovative methodology to learn a transformation of raw inputs to a representation that can be easily used by a classifier.

## **Research Gap & Research Problem**

**Research Gap**

Many professionals and researchers have tended to establish human emotion recognition technologies over the past few decades. Any applications that have already been developed to classify human emotions were found during this study. [7] Many of the experiments were carried out by human emotion detections by using the face and the voice. Though most of these are strictly focused on human emotion detection in images and human emotion detection in video. Although a few appliances are based on speech-based emotion detection.

There are no accurate applications identifying the user's emotions in front of a television ad and comparing that emotion with the ad to find out what kind of feedback the ad has. A lot of mobile applications and systems are delivering Human emotions data set and human emotion detection applications but It is not enough for us to see what kind of emotions that are captured image has. Many researchers implement Human emotion detection but did not implement get human emotions and compare that emotion with images and videos and get feedback.

**Research Problem**

The proposed solution is for both users and advertising companies. advertising company gets our report of human impression for related advertisement. We can avoid this to Watch an advertisement without wasting precious time and advertising companies can display any advertisement on TV that the user likes. This is also a turning point for an advertising company to develop their business further.

Considering about background of this study, the problem that could be found is how to find out what the user's emotion is to the related advertisement. Here are difficulties and negative effects that affect this problem:

* The complexity of finding the user's emotion is to the related advertisement.
* Less awareness of accurate machine learning information.
* More time is required to program and find user's emotions is to related advertisements.

# **Objectives**

## **Main Objectives**

The main aim of this project is to increase user preferences by optimizing user-preferred and user-centric advertisements. This means the audience is capable to view advertisements related to their interests. Here factors like age, gender, and peer groups are taken into consideration when determining the most suitable advertisement on the TV during a commercial break. This project will be beneficial for both the audience and the advertisement firm by letting the audience make an interest in interested goods which will be advertised and the ability to advertising firms to create advertisement content based on age, gender, and peer group which will directly affect the users in purchasing goods and services more effectively and efficiently.

## **Specific Objectives**

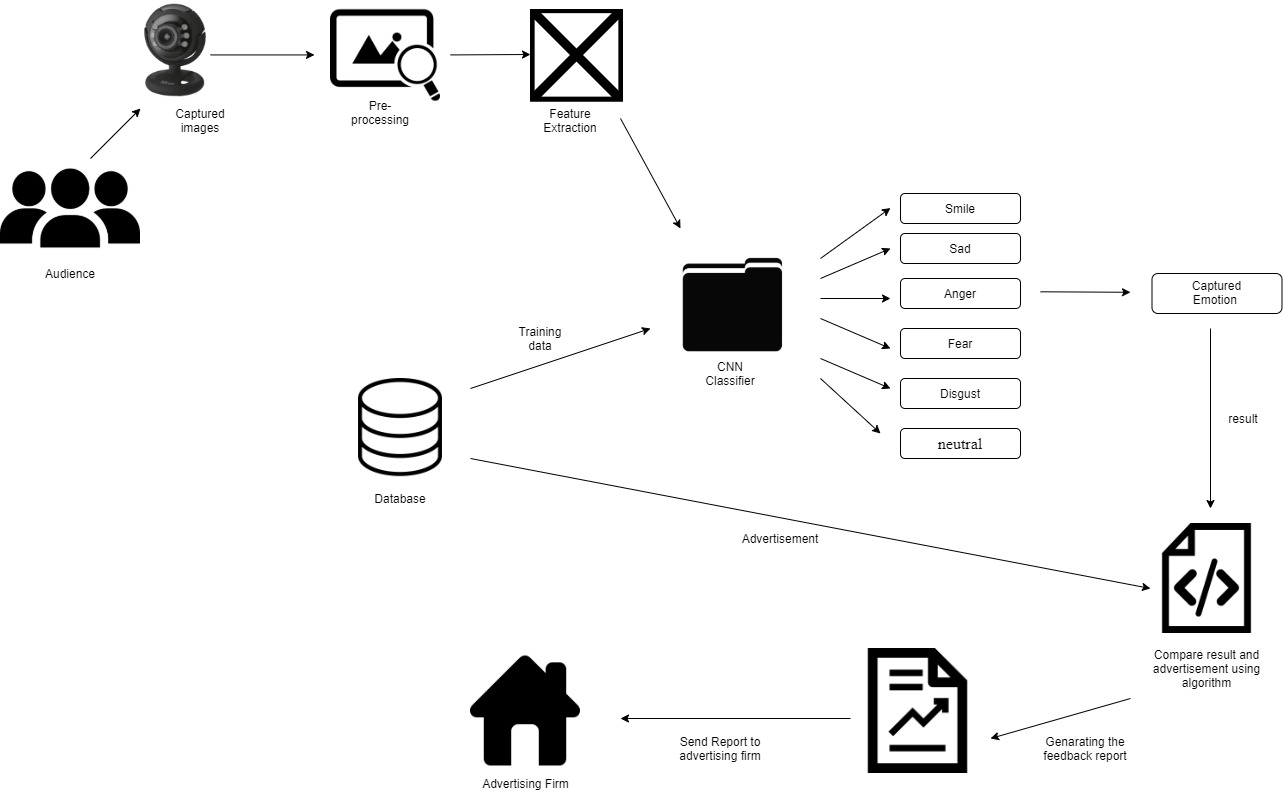
* Detect human emotions from the captured snapshots.
* To place an advertisement that will encourage the user’s purchasing power depending on their positive emotion.
* Aid in increasing advertising firm profit by creating content that emotionally satisfies the audience’s need.
* Ability to the advertising firm to produce quality and fruitful advertisements to the audience.

# **Methodology**

In order to identify the user's emotion is to the related advertisement, this research is suggesting a structure that consists of three major steps.

As the first step need to find data set of the user’s emotions. For example, Happy, Sadness, Anger, Fear, Disgust, Joy, Surprise. The most common method of processing images is the Convolutional Neural Network (CNN). As they have hidden layers, called convolutional layers, CNN is distinct from a multi-layer perceptron (MLP). The input image (taken from the camera or) is extracted from the video. Then, for context elimination, the input image is moved to the first-part CNN. The facial expressional vector (EV) is created after the removal of the context. Following the step trained the model using the data set and added testing data into the model. Following the step is to process the collected data set into pre-processing procedures [8]. As the Second step research will be proposing a critical step which is to get the emotions and stored in our database and Let's see what kind of emotion the users have shown for the advertisement [1]. First, we find out what is advertisement that the user has viewed and get it through in our database and compare with the trained emotions data stored and take it as a percentage. The third step is to get that compared result and the user's emotions for this advertisement are taken as a percentage value and a general report through that. Following the step, a final report will have sent to the advertising company to how to know the emotion of users for their shown advertisement.

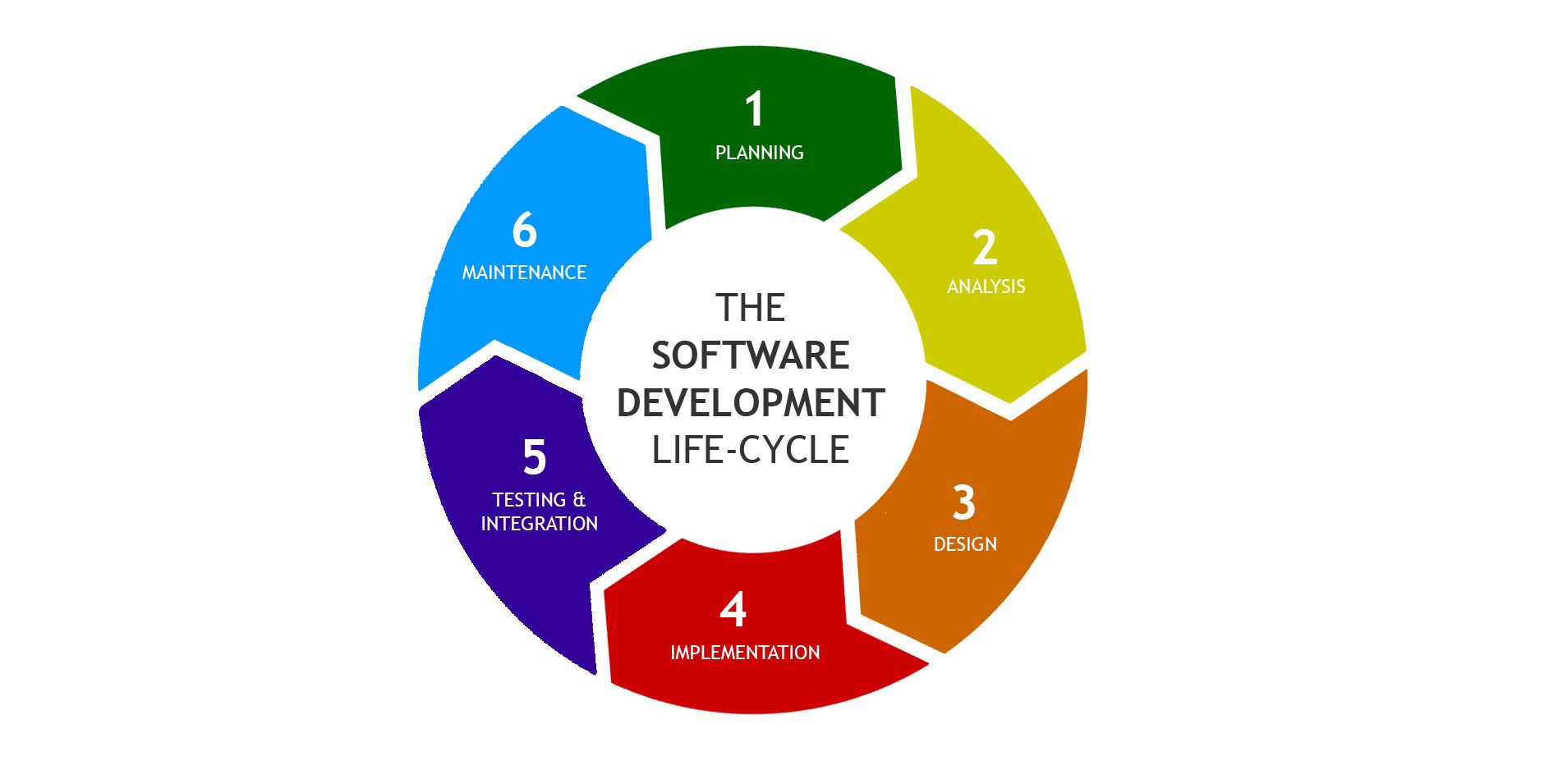
## **System Architecture**



**Figure 3.1: System Architecture**

### **Software Solution**

Choosing the most appropriate and effective software development approach is the first challenge to face when designing designing any software solution. More things need to be considered before choosing the technique, such as the nature of the project, the defined duration, and the possible risks that will be faced during the implementation period. There is a comparatively broad scope for the proposed system and it can be defined as a high-risk project because it involves many complicated algorithms and technologies. The agile approach of software development is therefore the best and the most applicable. The structure of the agile approach is basic, but it is sufficiently efficient to complete the specified timeline with the proposed artifact. Scrum is used as the agile approach in this scheme, since it can be applied to handle and monitor any iterative and gradual project in wider frameworks. The main stages of the technique for agile growth and what will be achieved during each process are as follows:



**Figure 3.4: Software Development Life Cycle**

**Requirement Gathering and Analysis**

Requirement selection is the first step after choosing the subject and the scope. By exchanging a questionnaire with the television audiences and advertising agencies who are the future consumers of the proposed artifact, the initial criteria selection would be conducted. The key features will be tested by the users during this stage and adjustments will be made accordingly after considering their responses.

**Design and Development**

All mock-ups, case diagrams and other structural diagrams will be designed to minimize the complexity of the project structure during this step..

**Testing**

Before the development phase, each component will be tested, and even after the development process, the entire system will be tested with connecting components to ensure the system works as expected.

**Testing Plan**

The agile methodology in software testing involves testing as quickly as possible in the software development lifecycle. It represents one of the main client engagement and testing code as soon as it becomes available. The code should be stable appropriately to take it to device testing. Rigorous regression testing may be performed to ensure the bugs are patched and checked.

**SDLC Test Elements and Tasks**

Test Strategy

* Planning and Test Schedules
* Resource Planning

Test Development

* Unit testing
* Test of data

Managing Defects

* Bug Tracking
* Fixing

Integration Testing

* Combination Testing
* Installation Testing
* Requirement testing

**Feedback**

The software component will be installed during this process to encourage users to use it for usability testing and get their input. From there on, if necessary, improvements will be made.

## **Functional requirements**

* The should provide feedback report by considering the user’s engagement towards the advertisements
* The system should be secured in a way that protects the user’s privacy.
* The system should detect human objects and at the same time should detect static objects and disregard them.

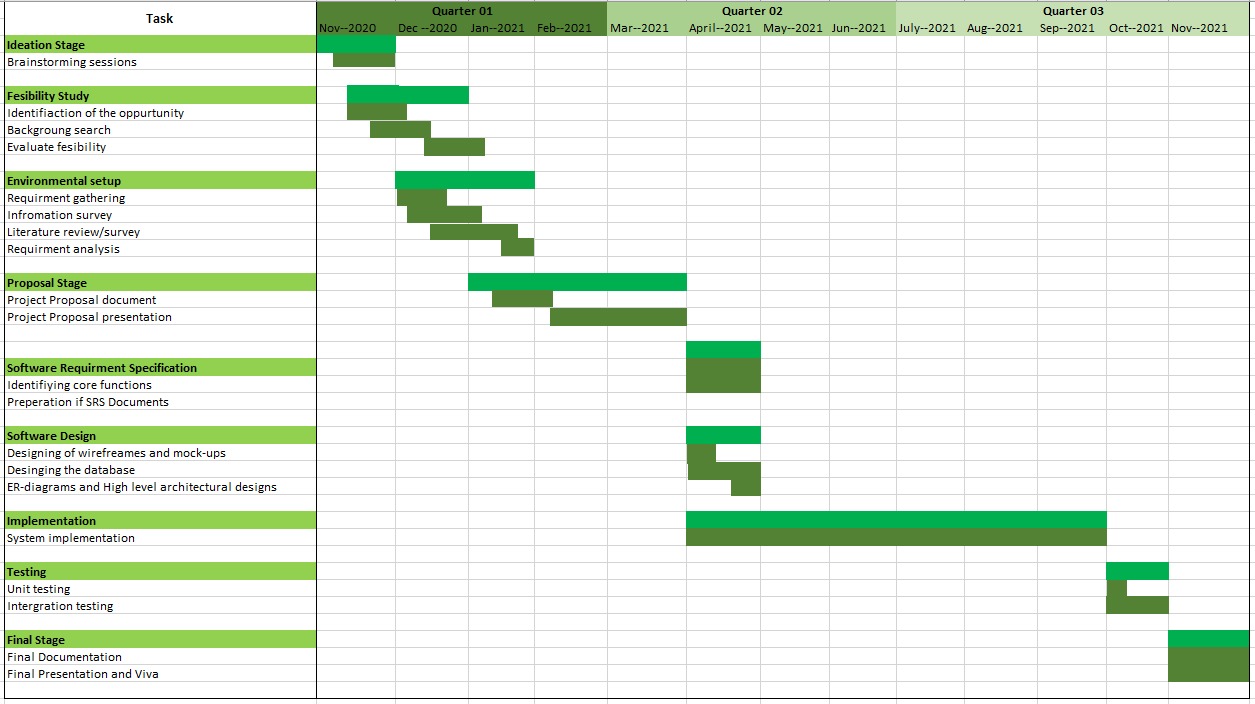
## **Non-functional requirements**

# **Description of Personal and Facilities**

|  |  |  |
| --- | --- | --- |
| **IT number** | **Components** | **Task** |
| IT18041408 | Human emotion detection and get the human impression for related advertisement | Initially Extracting facial features depending on the emotions. |
| From the features captured classification the emotion through an algorithm. |
| Depending on the current advertisement the feedback emotion will be recorded. |
| The stored feedback from the audience will be sent to the advertising firm as a report which will aid in creating a quality advertisement. |

**Table 6.1 Description of personal and facilities**

# **Task and Expected Project Plan**



# **Budget a Budget Justification**

* 1. **Cost of Product**
  2. **Business Plan**

The business model is a major factor that should be considered when creating the business plan. As per the proposed research, the business model of the proposed research software comprises the ability to optimization of advertisements that are displayed on the TV. Here the technology of Artificial Intelligence and other related technologies are used to achieve the goal. This business model caters to both the advertising firms and the users.

Our marketing strategy is to provide our service to the advertising firms which includes a trial period of 3 months, based on the satisfaction they are capable to purchase our product depending on our schemes available.

The business opportunity benefits both the advertising firms and the audience. Our proposed system is capable to display user-centric and user-preferred advertisements which will increase enthusiasm and engagement which will directly affect the higher sales conversions on the point of the advertising firm. As all businesses aim is to maximize their profits, this opportunity will reflect higher profits and incomes to advertising firms and their campaigns.

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