# **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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The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

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

# **Abstract**

After the launch of Bitcoin[Nak09] in 2009, on top of blockchain technology, numerous computer science, and electronic cash were born. The potential of decentralized systems has been of great interest because the blockchain enables the members of a distributed system to agree in a reliable way on a shared view of the system, to track system changes. To ensure that the decentralized blockchain obtains proportionate reimbursement for the truthful parties. Blockchain has been widely associated with digital currencies in the past, notably with Bitcoin. Today, as a secure and cost-effective way to build and administer a distributed database and maintain records for digital transactions of all kinds, blockchain applications are being explored in many industries. There are, however, some questions that remain: "How will the privacy of users and advertising companies be protected?" An AI-based advertisement system that allows users and advertising businesses to securely update and verify the data since the blockchain acts as a peer-to-peer (P2P) network and all data in real-time. So that the expected system will cryptographically be secured. How do we protect the system? "And etc., etc. This research aims to address difficulties in protecting the privacy of advertisers and users.

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# **Introduction**

## **Background**

The distribution of content is a digital transmission or delivery method for multimedia content such as audio, text, animation, and video. Multimedia material has historically been transmitted via the physical exchange of records, compact disks, or DVDs. Multimedia content in the form of digital formats can be published digitally with the technological development and growth of the Internet through digital distribution networks, such as Internet-based delivery platforms[1] or peer-to-peer (P2P) file distribution and sharing systems[2], among others. These online distribution channels have become the de facto benchmarks for the delivery of content that ensure excellent performance, broad availability, and cost-effectiveness. However, the security of advertising content, the preservation of copyright, the traceability of copyright infringers, and the secure distribution of content have become increasingly ubiquitous problems for content owners, advertising producers, and distributors due to the widespread use of these delivery platforms. It is important that advertising content owners can prove their copyrights over the contents after copyright infringement in order to prevent data from being illegally downloaded and shared and to track and punish copyright violators. Many traditional content protection technologies have been designed to protect data copyright or content ownership, such as encryption[6], digital rights management (DRM)[7]. Although some of the distribution systems[6-14] address the issues of copyright protection, traceability, and safe distribution of content, there are several open issues to be addressed: (1) there is no successful proof-of-delivery mechanism; (2) a deposit is required before delivery to place an order for the material, which entails a certain risk that the customer will be able to receive it.

A decentralized and transparent advertising delivery system can be built using blockchain technology, which is commonly recognized as a framework for providing transaction verification. The blockchain[15] is a distributed digital ledger of transactions that are organized into blocks and signed by cryptography. After validation and undergoing a consensus decision, every block is cryptographically linked to the previous one. Older blocks are more difficult to change as new blocks are inserted (i.e., creating resistance against tampering).

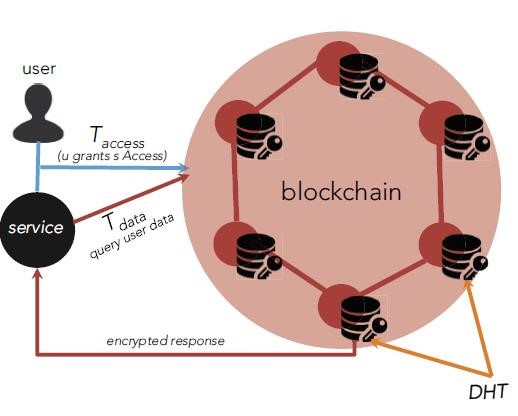
With its wide variety of applications, e.g., banking, health care, supply chain management, or intrusion detection, to name a few, blockchain technology has become a source of new hope in recent years. Recently, in intellectual property or copyright protection applications, its footprint can be seen. Innovative concepts for preserving digital intellectual property and ensuring traceability are the key characteristics of blockchain technology, i.e. openness, decentralization, secure databases, mutual management, trackability, protection and reputation, the digital cryptocurrency, and programmable contracts. The rapid development of decentralized applications based on blockchain technology has been observed in recent years, but researchers have not paid much attention to the combination of content protection and blockchain technologies. In addition to a few commercially available copyright protection platforms based on blockchain[16,17], only a handful of blockchain-based copyright protection schemes can be found in the literature. The authors have recently explored the usage of blockchain technology in various online multimedia applications, such as the music and advertisement industries, healthcare, social media, and content distribution networks. While the descriptive analysis analyzes the features of the current blockchain-based online media platforms (target market, underlying network technologies, consensus protocols, and incentive system), the research direction is not focused on resolving the problems related to the integration of copyright security mechanisms with blockchain technology. Through this research work, we try to explore how problems related to copyright infringement can be solved using blockchain technology. The security of data is another important thing in an AI-based advertisement scheme. So we had to come up with a good solution for the security of real-time updated data. After we had the idea of decentralizing the information, our team chose a blockchain that could be stored Securely have our files.

## **Literature Review**

The security of data is another important thing in an AI-based advertisement scheme. So we had to come up with a good solution for the security of real-time updated data. After we had the idea of decentralizing the information, our team chose a blockchain that could be stored securely have our files.

**Guy Zyskind, Oz Nathan, Alex ’Sandy’ Pentland “Decentralizing Privacy: Using Blockchain to Protect Personal Data”**

Mainly focusing on the protection of the user data. What they planned to do is decentralize all the user data using blockchain. They are planning to develop it as a third-party component so that any other application can use this component to securely protect user data in their system.



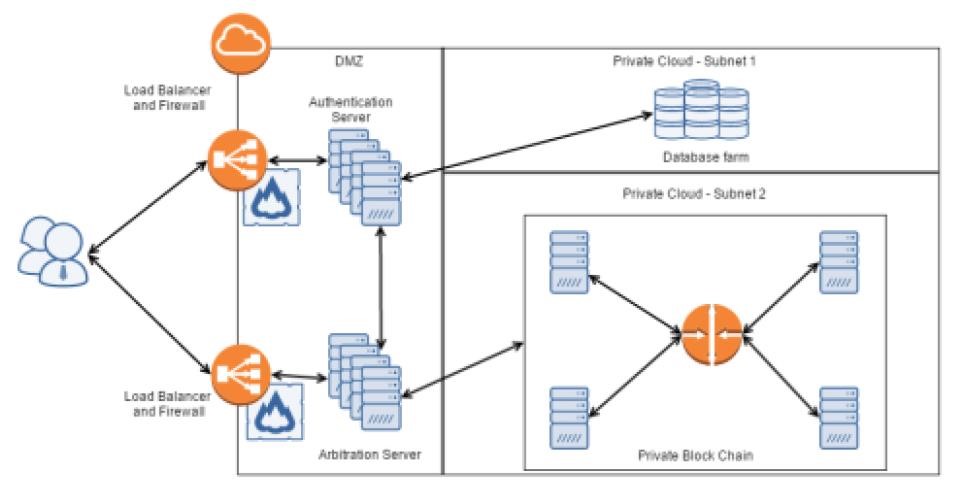
***Figure 2 - Guy Zyskind Architecture Diagram***

The recent increase in reported incidents of surveillance and security breaches compromising users' privacy call into question the current model, in which third-parties collect and control massive amounts of personal data. Bit-coin has demonstrated in the financial space that trusted, auditable computing is possible using a decentralized network of peers accompanied by a public ledger. In this paper, they have described a decentralized personal data management system that ensures users own and control their data and they are going to implement a protocol that turns a blockchain into an automated access-control manager that does not require trust in a third party. Unlike Bit-coin, transactions in our system are not strictly financial and they are used to carry instructions, such as storing, querying and sharing data. Finally, as they have discussed possible future extensions to blockchain that could harness them into a well-rounded solution for trusted computing problems in society [4].

**Sagar Shah, Qaish Kanchwala, Huaiqian Mi, “Blockchain Voting System” Northeastern**

**University**

The proposed system involves a client server architecture integrated with a blockchain system. The minimum requirement needed by a voter is a smartphone or a computer with good internet connection and web cam. If these requirements are not met alternate arrangements such as pop up cyber cafes and computers must provide access to disadvantaged voters.



***Figure 3 - Sagar Shah Architecture Diagram***

The above diagram shows how the user interacts with different parts of the system. The system is divided into two parts explaining functionalities of each part and the processes associated with the system [5].

**Neil McClure and Kermit Lohry, “Electronic voting system”**

The first ever electronic voting system was introduced by David Shanum in early eighties. The system uses the public key cryptography, which was used to cast votes and to keep it anonymous. To make sure there were no links between voters and ballots, the Blind Signature Theorem was used. Since the system was first introduced, many scholars have shown interest in the subject, and a lot of researches have been done. Most of the researches done on the field have focused on the Direct Recording Electronic System and the Internet Voting Systems. The first system is used in polling stations instead of the paper ballot [6].

**Andrew Barnes, Christopher Brake and Thomas Perry, “Digital Voting with the use of Blockchain Technology”**

The aim of this project was to solve the issues of digital voting by using blockchain technology. They have introduced several problems with current voting practices, it then goes into a brief explanation of what blockchain technology is and how it is currently used. For their design they have tried to create a system that doesn’t entirely replace the current voting but rather integrates within a current system. They decided to do their project to allow for as many different ways to vote as possible, this is so voting can be accessed by the majority of the population[7].

**Chris Karlof, Naveen Sastry and David Wagner, “Cryptographic Voting Protocols: A Systems Perspective”**

On this project they have tried to compare two voting algorithms which are Andrew Neff’s Neff Algorithm and David Chaum’s Chaum Algorithm. As they said the centerpiece of these schemes consists of novel and sophisticated cryptographic protocols that allow voters to verify their votes are cast and counted correctly. They have found two weaknesses inside those schemas, mainly subliminal channels in the encrypted ballots and problems resulting from human unreliability in cryptographic protocols. These attacks could potentially compromise election integrity, erode voter privacy, and enable vote coercion. In addition, they have found several detectable but unrecoverable denial of service attacks [8].

**M. Chanson, A. Bogner, F. Wortmann, and E. Fleisch, “Blockchain as a privacy enabler, an odometer fraud prevention system”**

The authors have created a prototype of a system which consists of a dongle, a laptop running a Node.js application, a public Ethereum blockchain and an Amazon NoSQL database. The dongle communicates with the car’s on-board diagnostics II (OBD-II) and retrieves odometer and GPS values. Both values are used in tandem to double check the distance traveled and odometer value. When the odometer value is decreased, it can be detected through the GPS data. Which also means the values are collected often enough to map the GPS values to the odometer values. Data is sent to the on-board laptop which hashes the data, adds a timestamp and a nonce, and then writes it to a public Ethereum blockchain. The data is also encrypted locally using AES and then uploaded to Amazon DynamoDB. When a user needs to verify the odometer values, they request a certificate from their phone application, which communicates with the laptop via REST API. The data is fetched from the Amazon server, decrypted locally on the laptop, verified against the Ethereum blockchain and then a certificate is generated, which can be shared with a third party. The proposed solution faces quite many challenges in the future. The data is vulnerable when traveling from the OBD-II to the application. The application requires a discrete laptop. The authors point out their doubts about the Ethereum scalability and whether it persists more reliably than a government-controlled database. The authors plan to move forward with the topic, with focus end user and interaction with the proposed system [9].

**Anders Martoja, “Blockchain in distributed systems as a privacy enabler”**

Aim of this project is prevent audit data. Blockchain is the technology that he used to build this system. As author says about the blockchain shortest term is list of records that grows when new information is added. The new information is added in a form of records or blocks. Every block contains a pointer to the previous block. In addition to that, a record contains a timestamp, when the action block was added, with the actual data that is meant to be kept in the block. The blocks are encrypted in order to protect them. Altering a record in a blockchain requires the alteration of every block that follows it. For the network to accept the altered blockchain a majority of the systems containing the same blockchain has to be tampered with. This makes the blockchain technology resistant to changes [10]

## **Research Gap & Research Problem**

**Research Gap**

As described above, we found that there are similar systems that have already been developed using the principle of blockchain during the literature review, but in those systems, there are many disadvantages.

In order to perform any action, each blockchain-based application needs to go through the public distributed ledger. Systems with an immense client base need to refer to an incredibly broad ledger in order to conduct any blockchain action. It will create a major problem with results. We plan to use smart contracts within the blockchain to prevent this problem. So that device can, with high protection, process data in a very efficient manner. The Interplanetary File System (IPFS) will be used in our system for file storage and transfer, which also uses the distributed file transfer protocol of the blockchain foundation as the underlying technology. That's also very helpful when we need to securely transmit data on a network.

According to our study, we can find several safety concerns in advertising systems based on AI. Most of the advertising companies Structures distributes ads between TV channels by a physical exchange. Such strategies would create a major security challenge. Instead of this kind of mechanism, the normal way for this phase will be applied through this study. We can store information in a safe way and distribute it when appropriate. Similarly, it is possible to store the information we collect from our viewers in such a way that they do not have to fear anything. In addition to that, IPFS also provides a stable link between network nodes. These mechanisms will ensure user privacy and data security as well.

None of the AI-based advertisement systems currently has proper procedures securely for the store TV viewers' information. Blockchain will give the private data back power. Refer to the existing systems based on the blockchain. In order to drive the answer to the front end, such systems take considerable time. Smart contracts help to receive a very successful response from the blockchain

**Research Problem**

Today AI-based advertising has been introduced to many countries in the world. Instead of playing advertisements unnecessarily with no choice, In most cases, TV viewers skip advertisements or switch channels, or engage in other activities. Time and money are wasted in ways we never thought possible. In many cases, playing advertisements in vain is detrimental to many parties. AI-based advertising system resolves the time-consuming issues. In addition, with the advancement of technology today, it is imperative to secure separate data.

It is a must strictly protect the advertisements provided by the advertising companies. So, it must be concerned about the trust placed in us by those companies. And also need to securely store the data that we collect from TV viewers' TV cameras. when there is any vulnerability and If data is leaked on any issue or in any way it can be the reason for the many violations.

In order to avoid mistakes and shortcomings of the existing advertising methods introduced AI-based advertising system was introduced. This system also has some positive and negative effects on advertising. Blockchain technology resolves most of the drawbacks of the AI-based advertising system. Blockchain technology uses Miners, who can give their computational power to validate each and every transaction of the system. the most important thing in this technology is, each and every advertisement maintains a public distributed ledger that keeps track of all the transactions. Because of these facts, no one can able to attack or change the data in the system.

# **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**

• Securing both initially captured data and advertisements to ensuring privacy issues

• Design and implement an admin panel to upload video advertisement and tags through an API

• Handling the blockchain process using an Ethereum based blockchain

# **Methodology**

The system will create a Smart Contract for each advertisement and gathered data when the election is created from the admin panel. This Smart Contract should support different types of advertisements such as family advertisements, friends advertisements, etc. When creating the advertisement, if the admin panel includes a transparency feature, that companies’ smart contracts will contain information about advertisements. Admin can decide their data is on which public Ethereum networks such as MainNet, Ropsten, Rinkeby, or private network. In addition to that, the system will suggest a network for their data based on their requirements. Also, there are features to activate it is updating or periodic updating system and advertisement publicly available to everyone. Another feature is admin can use their own Ethereum account for managing contracts otherwise the system will do it using a common Ethereum account.

The system will increase user’s trust by providing transaction hashes, contract, and account addresses to track every transaction and see details of any contract or account in public Ethereum network by using EtherScan which is a Block Explorer, Search, API, and Analytics Platform for Ethereum.

**Nodes and Miner Nodes**

Anyone can set up a Blockchain Node or Blockchain Miner Node. The node users will download distributed ledger from peers. After that, they can see the ledger. The miner node also downloads the ledger, but these users have another special functionality to contribute to this blockchain. We will provide tutorial videos to users via our website to set up their blockchain node. It will increase the trust and security of the system.

**Advertisements details**

At the time of creating new advertisements in our system, the system will deploy the main Smart Contract to the Blockchain network, which contains all of the advertisement details such as advertisement companies’ Smart Contract addresses mapped to their names. It is an immutable and secure smart contract.

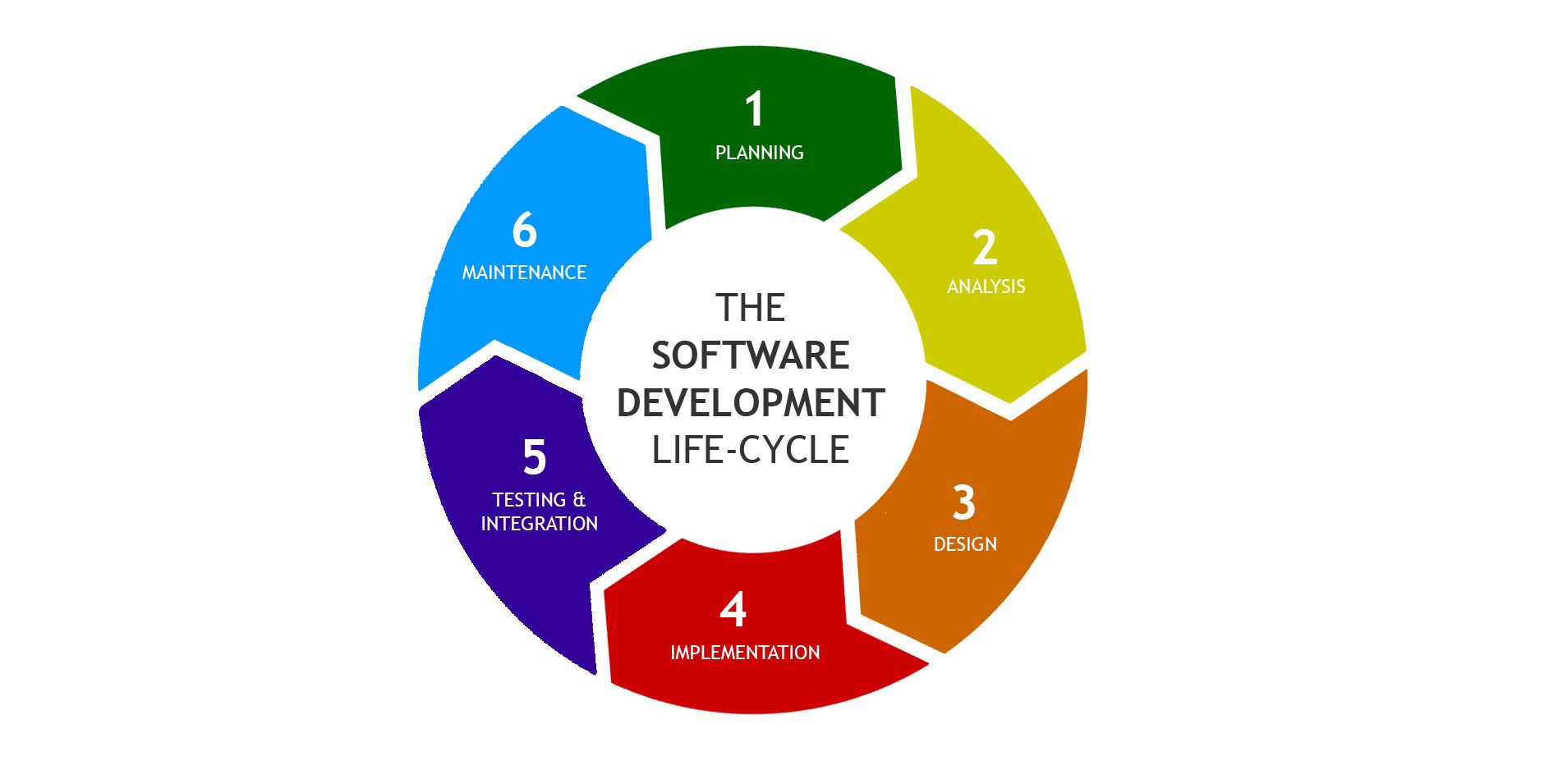
**IPFS**

When the users try to access the voting system through the internet, all the frontend files including .html, CSS, JS, images, videos will be served using Interplanetary File System(IPFS) which makes the system faster and safer. Users will be served frontend data from multiple computers (peers) simultaneously

## **System Architechture**

### **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.

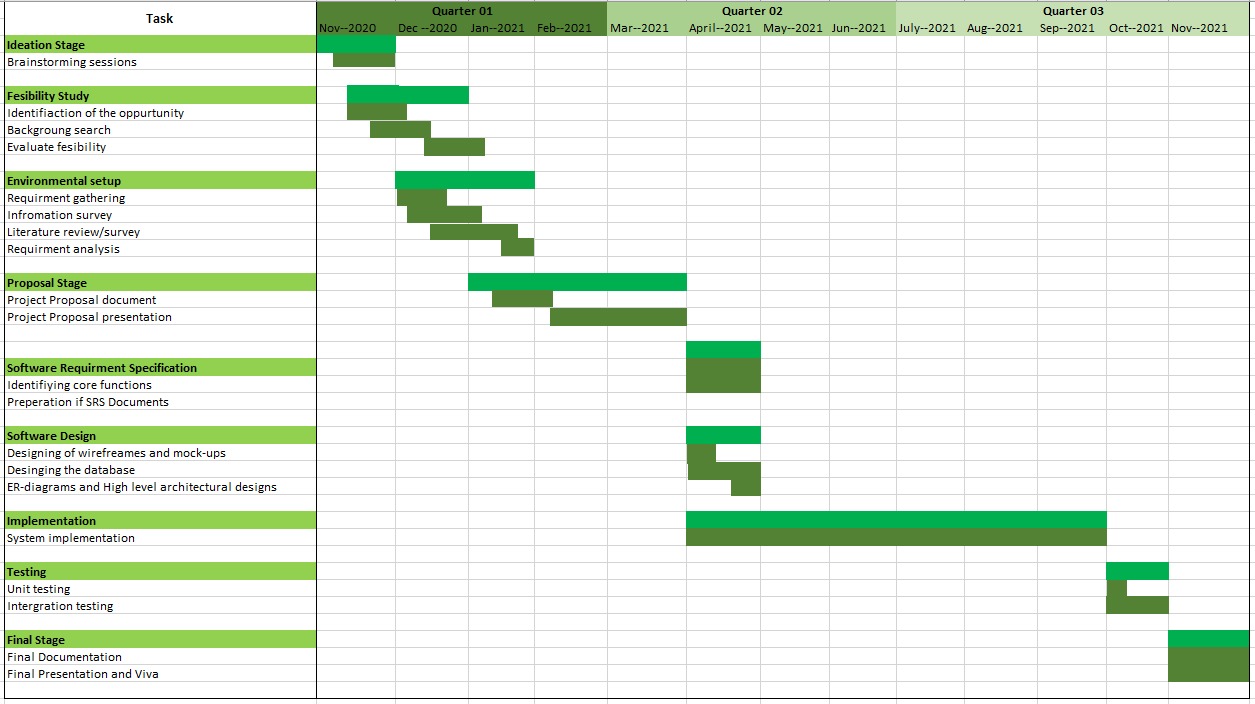
## **Non-functional requirements**

# **Description of Personal and Facilities**

|  |  |  |
| --- | --- | --- |
| **IT NUMBER** | **COMPONENT** | **TASK** |
| IT18158564 | Admin Panel  Ethereum Smart Contract  Management  Blockchain manager | •Admin panel UI  •Create a dynamic system to interact with multiple Ethereum networks.  •Add advertising system data to the smart contract.  •Manage Smart contracts for each advertisement.  •Retrieve data from Smart Contracts.  •Manage smart contract data access.  •Develop blockchain manager   * Design and create a blockchain network. * Create miners and node accordingly. |

**Table 5.1 Description of personal and facilities**

# **Task and Estimated Project Plan**



**Figure 5.1: Gann Chart**

# **Budget and Budget Justification**

## **Cost of Product**

## **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 with the ability of 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 cater 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 the enthusiasm and the 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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