

Sports Match Analysis using Social Media Mining

A PROJECT REPORT

submitted by

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in partial fulfillment of the requirements for the award of the degree

of

Master of Computer Applications



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DECLARATION

I undersigned hereby declare that the project report Sports Match Analysis using Social Media Mining, submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Applications of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by me under supervision of Prof. Jose T Joseph. This submission represents my ideas in my words and where ideas or words of others have been included, I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to ethics of academic honesty and integrity as directed in the guidelines of Institutional ethics committee of the college and have not misrepresented or fabricated any data or idea or fact or source in my submission. I understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously formed the basis for the award of any degree, diploma or similar title.

Place : Trivandrum

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CERTIFICATE

This is to certify that the report entitled **Sports Match Analysis using Social Media Mining** submitted by **Alfin William** to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications is a bonafide record of the project work carried out by him under my guidance and supervision. This report in any form has not been submitted to any University or Institute for any purpose.

Head of the Dept

Project Guide

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ABSTRACT

The increase of social media utilisation has allowed streaming the voice of sports fans that have essentially lead to storing fan-generated, large-scale opinions about sports match and team performance. Although research utilizing social media data for the consumer market studies have sharply risen in the recent decade, there is a lack of studies using social media mining approach to improve team performance. In this paper, an opportunity mining approach is proposed to identify opportunities to improve team performance based on text mining and cluster analysis. This mining approach utilises proven data mining techniques like KNN and TF-IDF to effectively extract and categorize fan suggestions and use it to enhance overall team performance.

One of the most popular and state-of-art methods for team performance analysis is to use video data that are captured from on-field cameras and crunched into thousands of data points per second by providing each players' performance metrics, such as player speed, position and possession time. However, this method of using video data is not cost efficient as data processing and analysis are complicated, computationally burdensome, and slow. More recently, quantitative approaches are applied such as using wearable device including GPS to measuring and calculating team performance based on running speed, distance, time, etc. However, this study proposes new approach to analyze team performance, especially focusing on the fans' perspective. It focuses on the value of the fans as a strategic partner in addressing some of challenges that a team has. In the fields of business and management, the expertise, ingenuity, and creativity of individual members of the public are harnessed as an innovative problem solving approach. In this regards, this study suggests finding the factors associated with winning or losing from outside of the field.

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Chapter 1

Introduction

Aside from great talent, exceptional teamwork, and dedicated training, numerous sports athletes, coaches, managers, teams, and leagues take advantage of Big Data as it has potential to provide insights regarding the critical factors associated with winning or losing. One of the most popular and state-of-art methods for team performance analysis is to use video data that are captured from on-field cameras and crunched into thousands of data points per second by providing each players' performance metrics, such as player speed, position and possession time. However, this method of using video data is not cost efficient as data processing and analysis are complicated, computationally burdensome, and slow. More recently, quantitative approaches are applied such as using wearable device including GPS to measuring and calculating team performance based on running speed, distance, time, etc. However, this study proposes new approach to analyze team performance, especially focusing on the fans' perspective. It focuses on the value of the fans as a strategic partner in addressing some of challenges that a team has. In the fields of business and management, the expertise, ingenuity, and creativity of individual members of the public are harnessed as an innovative problem solving approach. In this regards, this study suggests finding the factors associated with winning or losing from outside of the field. Before, during and after a sporting event, fans share their opinions and unique analysis of the match. Moreover, evaluation and analysis by the experts and sports analysts provide not only useful information and knowledge of team performances but also wisdom to win. Thus, the comments, Op-Eds, and even tweets written by the public can be considered as a unique source of data to assess team performance which is essentially equivalent to "Wisdom of the Crowd". In this respect, this study analyzed online public opinions of the Korean National football team as a case study. In particular, this study uses Outcome-Driven Innovation (ODI) methodology, a strategy and innovation process of making product and marketing decision, to determine potential 'opportunities' with regards to team performance to help teams reach their goals (i.e. providing satisfaction to fans through winning) based on the "Wisdom of the Crowd."

Chapter 2

Requirement Analysis

2.1 Purpose

Millions of tweets , threads and comments are generated real time during a live sports match.This large pool of effective information is left untouched to be forgotten about.The purpose is to retrieve and analyse this unique crowd provided data , analyse patterns in them and effectively use that information as strategies in successive matches to improve overall team performance.

2.2 Requirement Definition

Around the world , hundreds of sports matches of various categories occurs in a day. This matches are well documented using visual and audio means and are analysed accordingly. But an efficient alternative to this conventional economically inefficient methods are the need of the hour.

This methods of using visual and audio analysis of data are proven to be less cost efficient as data processing and analysis are complicated, computationally burdensome, and slow.

Another point is that other more recent methods like using wearable devices to measure player statistics real time needs favourable conditions , needs constant monitoring , maintenance and comes with a constant risk of failure.

Last but not the least,conventional data collection methods heavily depends upon manual human intervention and a chance of missing a significant important event is statistically high as human error can occur in any time of the event.

Sports Match Analysis using Social Media Mining is thus thus need of the century.Using instant web scraping methodologies, we can collect million of fan comments and conclusions real time from social media and compute and sort that data corpus to extract future strategies and suggestions that can significantly improve team performance in successive matches.

The major objectives behind this work are as follows:

- Instant data collection of fan comments that analyse and critic the sports match real time.
- Connecting with fan emotions and accepting feedback from them.
- Using strategies and suggestions given by fans to improve team performance for future matches.

2.3 Overall Description

2.3.1 Hardware Requirements

- Intel Core i3 or equivalent processor
- 4 GB or more RAM
- 750 MHZ or more CPU Speed
- 500 GB or more hard disk space
- Stable Internet Connection

2.3.2 Software Requirements

- Linux/Windows

2.4 Functional Requirements

Functional requirements outline the intended behaviour of the system. This behaviour may be denoted as tasks or functions that the specified system is intended to perform. The proposed system consists of the following parts. They are given below:

2.4.1 Desktop Application Interface

A Desktop Application Interface facilitates the interaction of the users with the system. The interface is quite simple. It can help users submit the thread or tweets link to commence data collection and computation.

2.5 Non Functional Requirements

Non-Functional requirements define the general qualities of the software product. Non-functional requirement is in effect a constraint placed on the system

or the development process. They are usually associated with product descriptions such as maintainability, usability, portability, etc. It mainly limits the solutions for the problem. The solution should be good enough to meet the non-functional requirements.

2.6 Performance Requirements

- Accuracy: Accuracy in the functioning and the nature of user-friendliness should be maintained in the system.
- Speed: The system must have speed at which content is delivered to users, and how responsive the system is.

2.7 Quality Requirements

- Transparency: The system provides correct data to all participants
- Scalability: The software will meet all of the functional requirements.
- Maintainability: The system should be maintainable. It should keep backups to atone for system failures and should log its activities periodically.
- Reliability: The acceptable threshold for the downtime should be as long as possible. i.e.mean time between failures should be as large as possible. And if the system is broken, the time required to get the system back up again should be minimum. .

Chapter 3

Design And Implementation

3.1 Overall Design

Our system is a voice based writing machine.It can also draw pictures.

3.2 User Interfaces

One of the main aims while designing the system was to abstract as much lower level details of the system as possible from the user. This system provides a web interface for its users. The interface is developed using NodeJS's Express framework.

3.3 System Design

The only technology on earth today that could handle all these problems and provide us with immutable, verifiable and trustworthy certificates is 'Blockchain'. The proposed system uses the public blockchain technology called Ethereum blockchain and the highly distributed. Here the focus is on solving non payability of auctions with cryptocurrency as well as providing security and transparency to the tender system .

3.3.1 Creating the auctions

The auctioneer creates auctions.

3.3.2 Place Bid

The bidder places bids incrementally in for an auction.

3.3.3 Finalize Auction

The owner of the auction finalizes the auction for a particular price.

3.3.4 Creating the tenders

Users can make tenders.

3.3.5 Make calls for tender

the bidders calls for tender using some amount value which needs to be secured.

3.3.6 Reveal Tender

the bidder must match his initial values with the hash value inorder to ensure that the values were not changed.

3.4 Data Flow Diagrams for the System

These diagrams gives a clear picture about the privileges of each user. Also the entire working flow was specified in this. The DFDs are as follows:

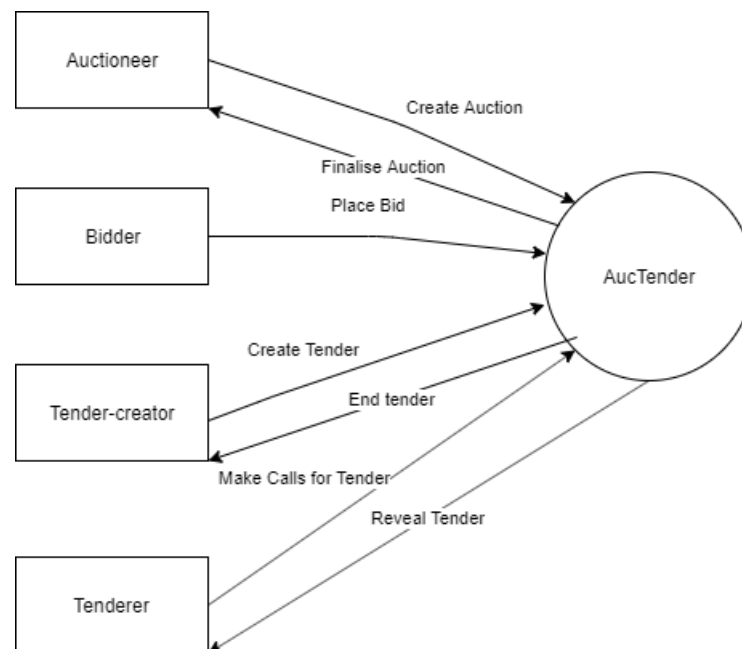


Figure 3.1: Level 0.1 Data Flow

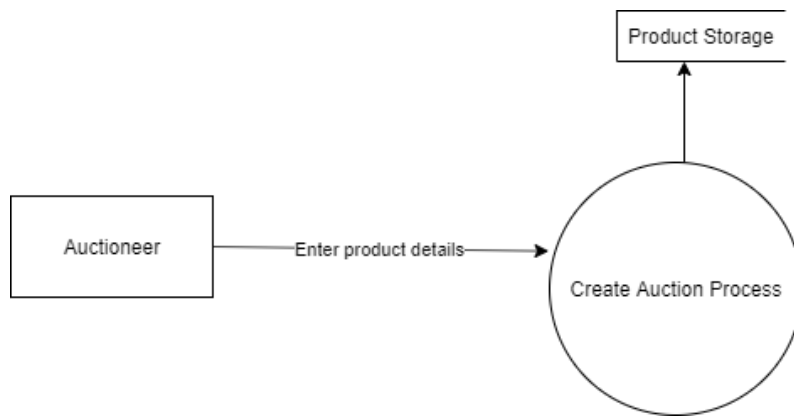


Figure 3.2: Level 1.1 Data Flow

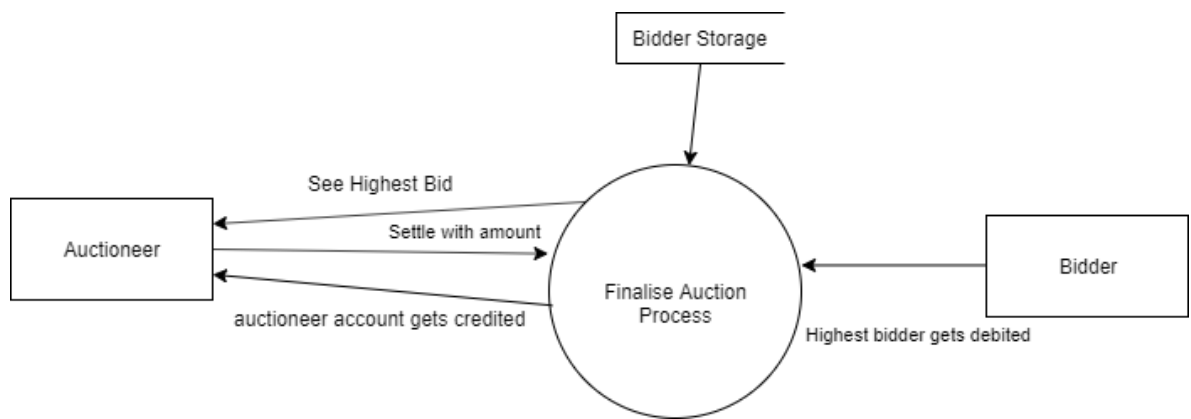


Figure 3.3: Level 1.2 Data Flow

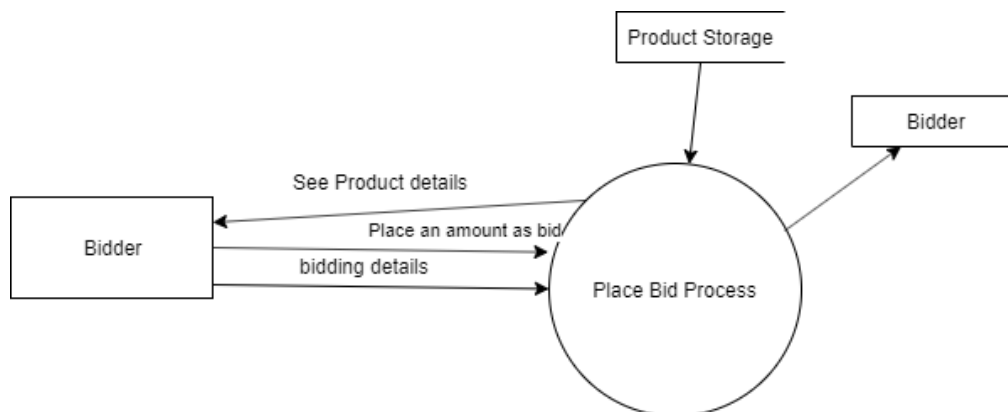


Figure 3.4: Level 1.3 Data Flow

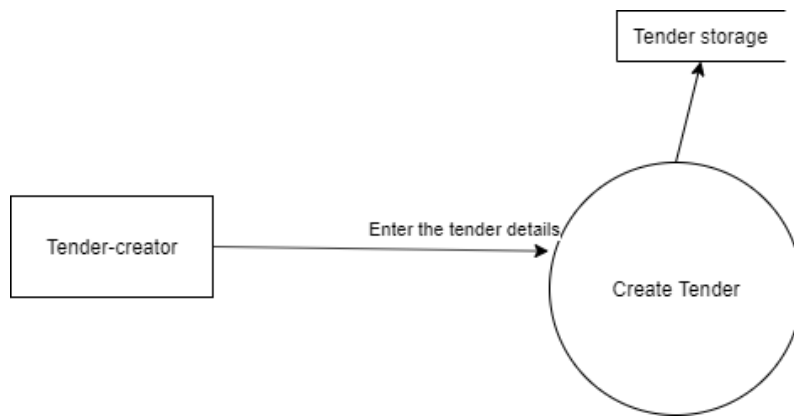


Figure 3.5: Level 1.4 Data Flow

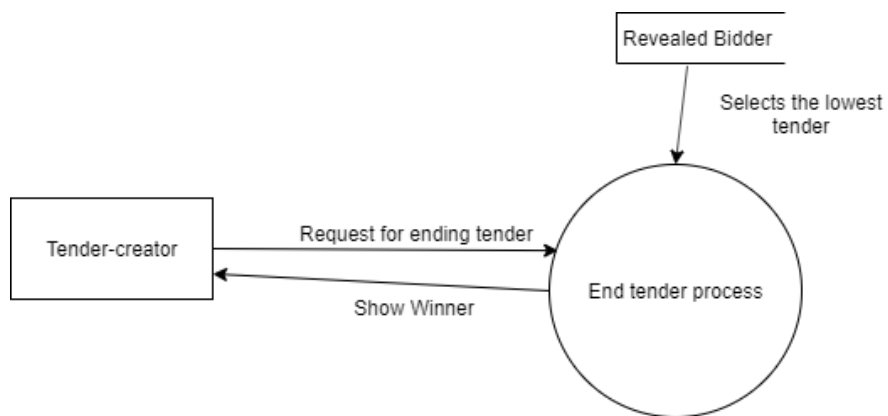


Figure 3.6: Level 1.5 Data Flow

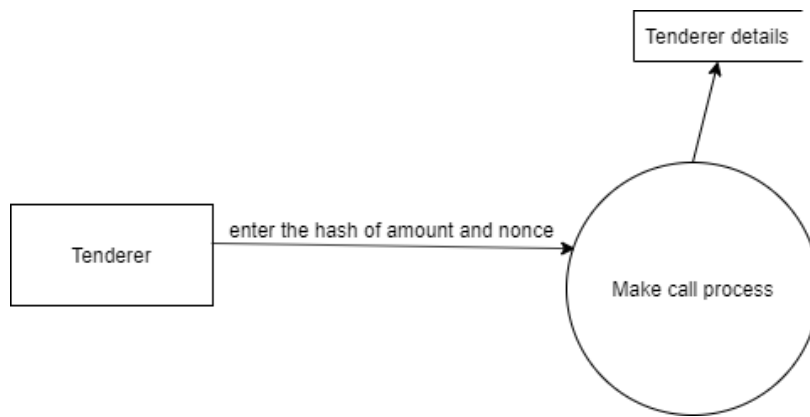


Figure 3.7: Level 1.6 Data Flow

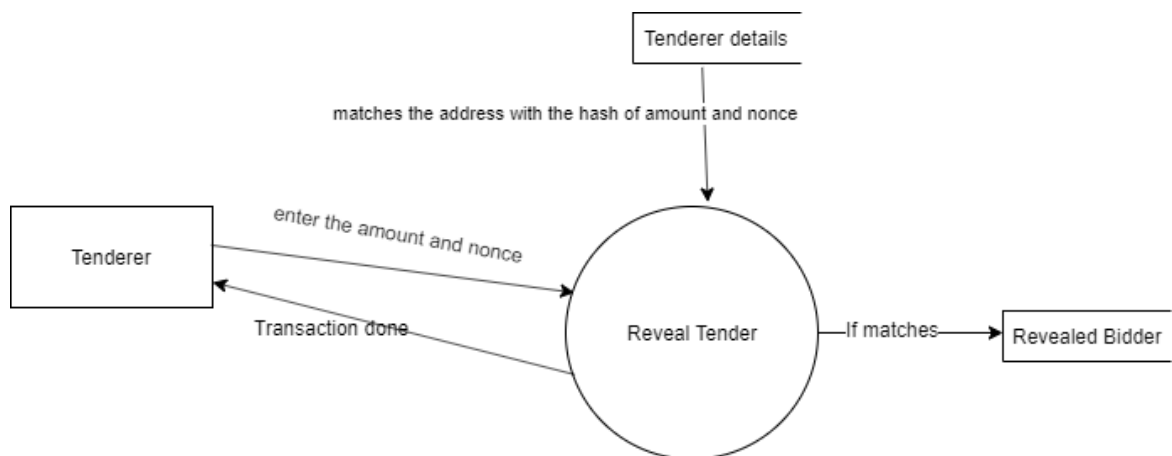


Figure 3.8: Level 1.7 Data Flow

3.4.1 Screenshots

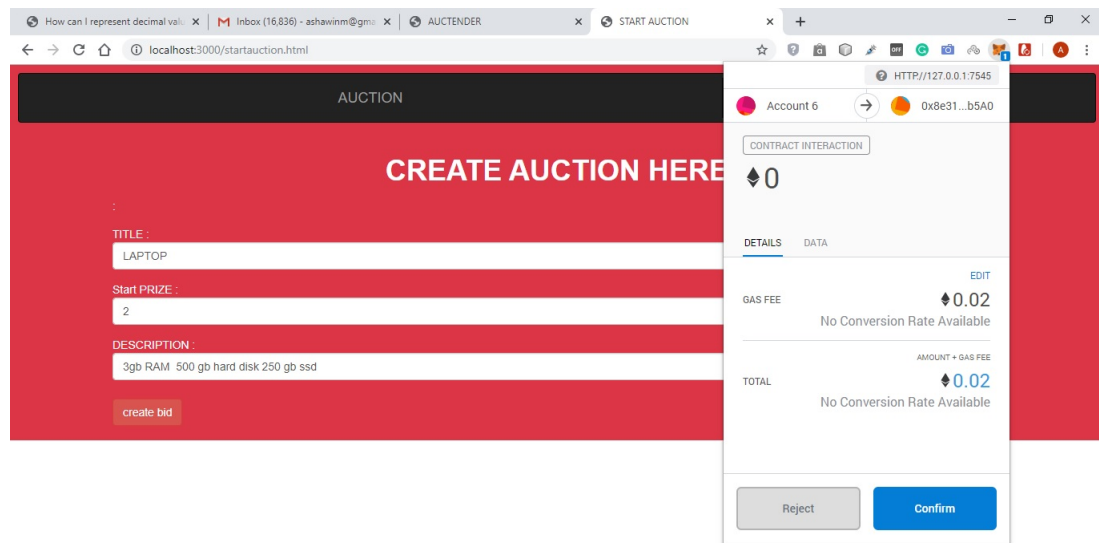


Figure 3.9: Create Auction

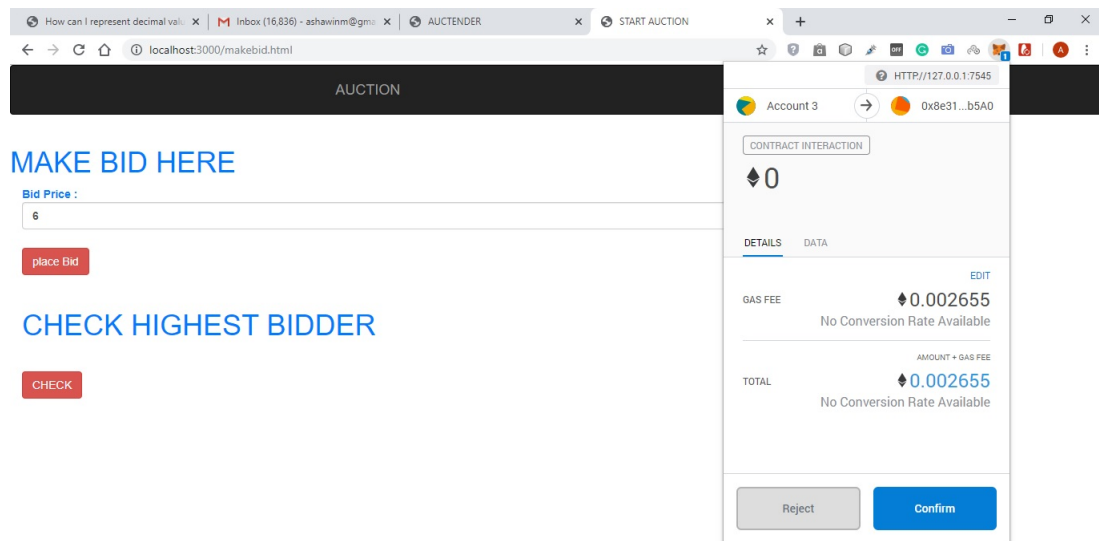


Figure 3.10: Make Bid

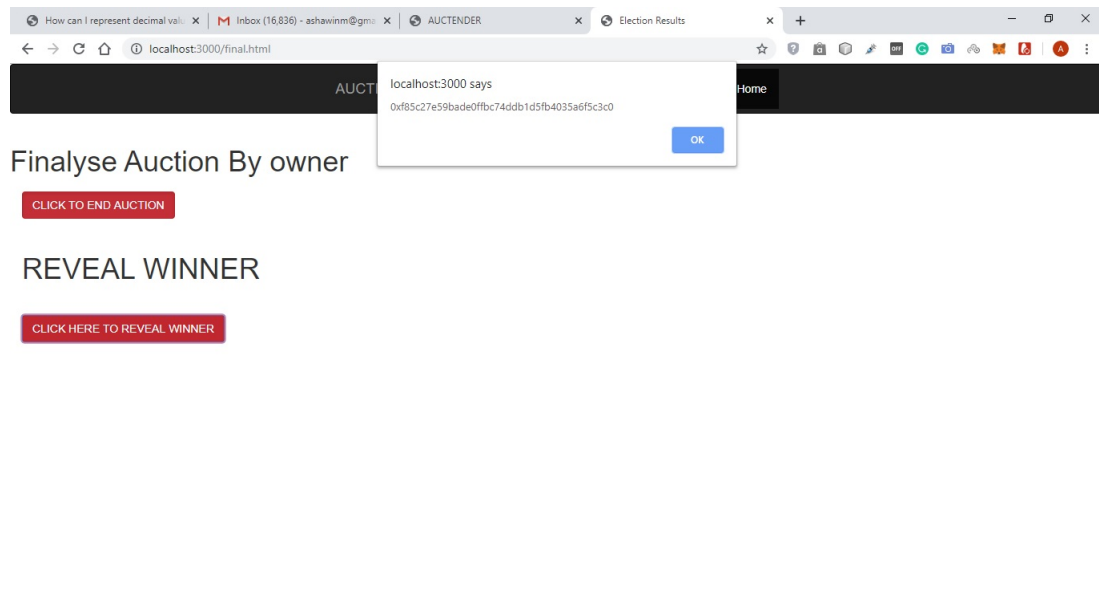


Figure 3.11: Reaveal Winner

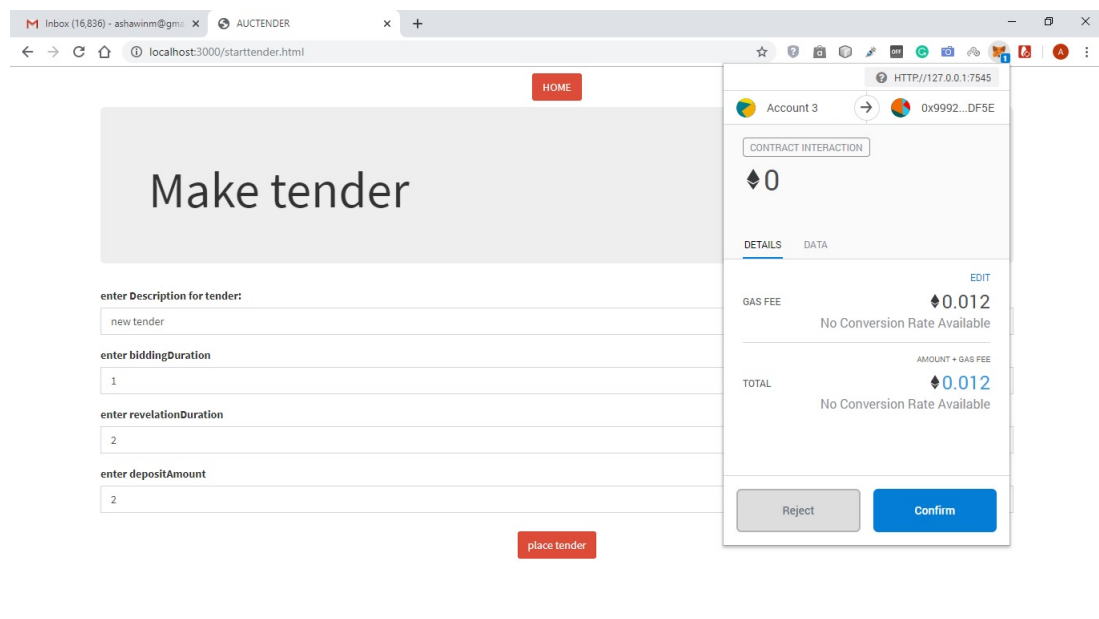


Figure 3.12: Make Tender

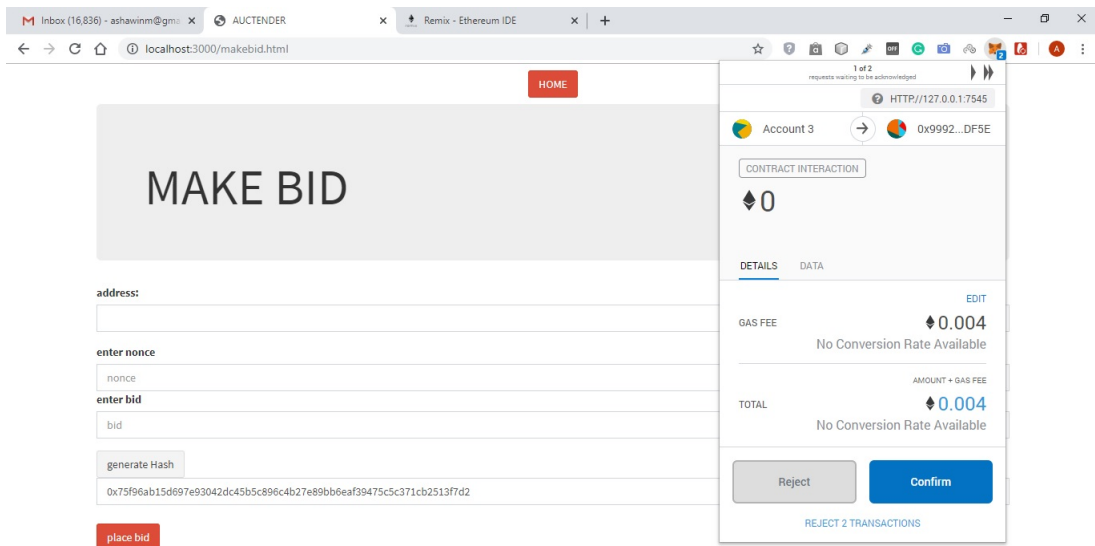


Figure 3.13: Make Bid

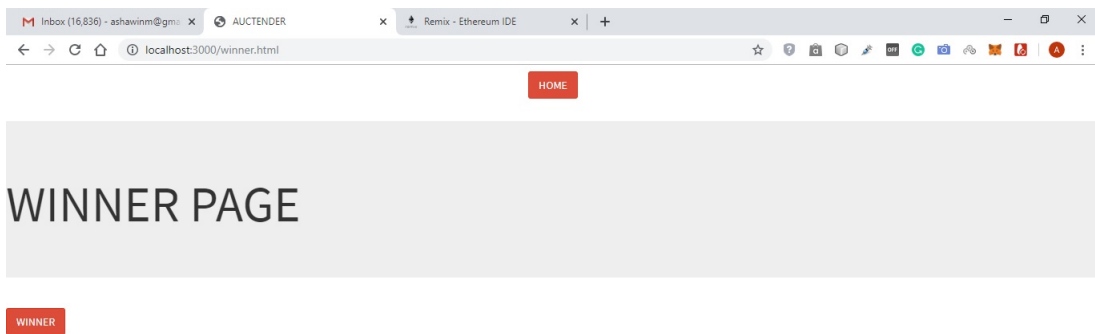


Figure 3.14: Winner Page

Chapter 4

Coding

Algorithm 1 CreateAuction

- 1: Start
 - 2: Input product details
 - 3: Store the product details in database
 - 4: Store the mapping value for each product
 - 5: Stop
-

Algorithm 2 PlaceBid

- 1: Start
 - 2: Select the product for auction.
 - 3: Place the bid value and increment accordingly.
 - 4: Store the mapping value for each hash value.
 - 5: Stop
-

Algorithm 3 FinaliseAuction

- 1: Start
 - 2: Owner of auction sees highest bid.
 - 3: If accepts auction amount,ends the auction with that price.
 - 4: The auctioneer account gets credited with ether.
 - 5: The ether from bidder gets debited.
 - 6: Stop
-

Algorithm 4 CreateTender

- 1: Start
 - 2: Input the tender details.
 - 3: Store the tender details in database
 - 4: Store the mapping value for each product
 - 5: Stop
-

Algorithm 5 CallTender

- 1: Start
 - 2: Select the product for tender.
 - 3: Get the hash for amount and nonce.
 - 4: Store the hash value for bidder.
 - 5: Stop
-

Algorithm 6 RevealTender

- 1: Start
 - 2: The bidders enters value and nonce.
 - 3: Checks whether the hash matches
 - 4: If matches set bid as valid
 - 5: Stop
-

Algorithm 7 RevealWinner

- 1: Start
 - 2: checks the smallest amount
 - 3: display winner
 - 4: Stop
-

Chapter 5

Testing and Implementation

System testing is the stage of implementation which is aimed at ensuring that the system works accurately and efficiently before live operation commences. Testing is the process of executing the program with the intent of finding errors and missing operations and also complete verification to determine whether the objective are met and the user requirements are satisfied.

The ultimate aim is quality assurance. Tests are carried and the results are compared with the expected document. In that case of erroneous results, debugging is done. Using detailed testing strategies a test plan is carried out on each module. The test plan defines the unit, integration and system testing approach. The test scope includes the following: A primary objective of testing application systems is to assure that the system meets the full functional requirements, including quality requirements(Non-functional requirements).

At the end of the project development cycle, the user should find that the project has met or exceeded all of their expectations as detailed in requirements. Any changes, additions or deletions to the requirements document, functional specification or design specification will be documented and tested at the highest level of quality allowed within the remaining time of the project and within the ability of the test team.

The secondary objective of testing the application system is to identify and expose all issues and associated risks, all known issues are addressed in an appropriate matter before release. This test approach document describes the appropriate strategies, process, workflows and methodologies used to plan, organize, execute and manage testing of software project "Solution to customer loyalty problem"

5.1 Unit Testing

| Sl No | Procedures | Expected result | Actual result | Pass or Fail |
|-------|------------------|--|------------------|--------------|
| 1 | Create Auction | create a product for auction | Same as expected | Pass |
| 2 | Place Bid | bidders can participate in auction by providing amount | Same as expected | Pass |
| 3 | Finalize Auction | end auction with a particular price | Same as expected | pass |
| 4 | Create tender | set a tender | Same as expected | Pass |
| 5 | Place Tender | set an amount for the tender | Same as expected | Pass |
| 6 | Reveal bid | match initial values | Same as expected | Pass |
| 5 | Show Winner | shows the user with minimum bid | Same as expected | Pass |

Table 5.1: Unit test cases and results

5.2 Integration Testing

| Sl No | Procedures | Expected result | Actual result | Pass or Fail |
|-------|-----------------------------------|--|------------------|--------------|
| 1 | Ganache-cli and Web3JS connection | connection establishes | Same as expected | Pass |
| 2 | Front end-Blockchain connection | connection sets up | Same as expected | Pass |
| 3 | Store and retrieve data | Stores and retrieves tenders and auction details | Same as expected | Pass |

Table 5.2: Integration test cases and results

5.3 System Testing

| Sl No | Procedures | Expected result | Actual result | Pass or Fail |
|-------|------------------|------------------|------------------|--------------|
| 1 | Run ganache-cli | Ganache-cli runs | Same as expected | Pass |
| 2 | Deploy contracts | Contract deploys | Same as expected | Pass |

Table 5.3: System test cases and results

Chapter 6

Results and Future Scope

It is observed that the system performs all the functionalities as expected. The main aim behind this venture was to solve the issues related to auction and tender using the blockchain technology. The Auctioneer can successfully place bids. When the auction is finalized by the owner, cryptocurrency ether will be debited from highest bidder's account to the owner. The tender guarantees the tender amounts are safe from being altered or known to others.

6.1 Advantages and Limitations

The proposed system features a lot of advantages over the existing system. It solves the problems of the existing system. The proposed system is way more secure than the existing system in many ways. Like any other system, this system also has its own advantages and limitations. The point is that its advantages override its limitations.

6.1.1 Advantages

- The system proposes an innovative blockchain based solution to auction and tender problem
- The authentication data of the credential which gets published to blockchain is immutable, trustful and verifiable.
- The new approach using AucTender prevents the loss of value of product in auction .
- The auctions are much more faster.
- The tender approach improves security and trust.
- nobody can change the bid amount since it matches the hash value.

6.1.2 Limitations

- Nowadays, the applications related to the blockchain technology are still in the experimental phase.
- The blockchain technology is not widely accepted by the public since most of the people trust third-party organizations.
- Cryptocurrency has not been implemented in some countries.
- User authentication needs to be done to improve the credibility of the system.

6.2 Future Extensions

The system can be generalized so that in future the online auction websites will be built in blockchain. Also if a supply chain management system using the blockchain was added along, it will be more useful for the auctioned product to reach the auctioner faster.

Also the implementation of digital signatures for tender can improve its security much better. User needs to be authenticated. Various types of cryptocurrency can improve its global reach. So in future, we are trying to build a complete auction and tender platform.

Chapter 7

Conclusion

The AucTender is a platform for both auction and Tender. In auction, the auctioneer creates auction and bidders can place their bids incrementally. Whenever the owner finalises auction, the highest bidder wins auction and the owner gets credited. The system provides a new and innovative solution for auction and tender, makes it easily accessible from anywhere and everywhere. Cryptography protection ensures that the data is tamper-proof and immutable. The cryptocurrency help us to avoid the delay in physically doing the transactions. It also removes the high platform fee charged by auction websites. Moreover, it can help us to save time. It solves some problems of auction and tender system. The implementation of this system will provide new idea of security in tender system and a notion no intermediaries between me and my money.

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