A Collective Polling Platform for Recording and Sharing People's Opinion

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Abstract - **The role of social voting has increased significantly over the past decade. Due to the increasing usage of the Internet and Internet devices the people who didn't exist before have started existing. There has been a sense of collectivism among groups with the same interests. Further, people always want their opinions to be heard. They also want to hear others' opinions about events that go around the globe. There is no place on the internet where you can drive yourself to know the views of people about some event that had taken place at some point of time in history. The availability of the data about the public, that is provided by the public on purpose, about how they see things as they happen can be a great help to an individual, an organization, the government, or any group of people in society, especially to whose work is based on the feedback.**

Index Terms - **Social networks, Graph Theory, Machine Learning, Data Visualization, Opinions, Online Polling, social media.**

1.INTRODUCTION

Whenever the poll word is mentioned, we instantly come to think of elections. Elections, especially in democratic countries, give society the power to choose what the majority of citizens think is right. Similarly, almost all businesses are concerned with the choices and expectations of the public, and they try their best to forecast their opinions before building products or services. Businesses spend a great deal of money to get to know what excites people.

To run elections and businesses, people's choices and beliefs play a critical role. These were just two major examples where getting to know the public opinion is part of how the system works. So, regardless of what the majority thinks is right or wrong, it's still vital to get that figure. In most cases, that figure is the deciding factor, or at least, contributes to decision making.

Also, the availability of the Internet continues to rise at a fast rate. From the increasing importance of social media in the lives of people to the digitalization of the services that were carried out manually before, all of it has played its part in increasing internet usage. Now, a new term known as "Netizens" has surged out in columns of various digital media sites. Netizens is an informal word meaning "citizen of the net" or "net citizen". It describes a person actively involved in online communities or the Internet in general. It's interesting to note that as far as the environment of the Internet is concerned, netizens can be used in the same manner as the word 'citizens' is used when discussing the matters of a real environment.

The Internet has proved to be a powerful environment to provide many services and has emulated many physical environments over the last two decades. Examples include commercial shopping, shipping letters, conducting meetings, and many jobs that were done only when you visited particular offices or organizations. Also, on the social media sites, which are not directly related to the term "Internet", there are billions of people that visit these sites on a monthly basis. It predicts the strength of the "netizens" in the environment of the Internet.

Like the social media sites, which aim at bringing people together, this paper discusses the idea and implementation of a platform where polling about various topics and trends can be made possible by taking the votes from the netizens. The platform can be used as a great tool for research, and also for making decisions by challenging our thinking and beliefs through seeing others' opinions.

2. LITERATURE REVIEW

Name of the author or organization	Published in Year	Learnings
T. Cerqueira, F. Bertoni and M. Pires.	2020	The increase in the number of people with access to the internet enables them to provide a great volume of data in the form of opinions through pages, forums, and various social spaces.

Ge Zhan, Ming Wang, Meiyi Zhan	2020	Netizens have a high degree of attention to social ethics, moral standards and the passion to suggest their opinion online.
Ben Salem Mayssa	2020	In the absence of information, opinion will be determined by emotion, rumor, and can be easily manipulated. Therefore, the media influence the way we think by presenting information in an orientation that aims to demonstrate something.
Lejun Zhang, Tong Wang, Zilong Jin, Nan Su, Chunhui Zhao, Yongjun He	2018	The internet becomes the hub where there is an exchange of ideological and cultural information and acts as a catalyst for public opinion.
Anwesha Chakraborty, Trina Dutta, Sushmita Mondal, Asoke Nath	2018	Social networks can be present in a graphical representation which is getting complex with the evolution of social media which allows researchers to form new algorithms to reduce that complexity by partitioning the graph.
Xiejie Hu, Chuan Lu	2018	With a high number of netizens, there is also high data of internet opinion which makes it necessary to monitor and analyze them accordingly.
Susan Condor	2016	Information is critical for citizens to perform their democratic duties.
Patricia Moy and Eike Mark Rinke	2012	Public opinion polls not only offer citizens a mechanism with which to express their sentiment on key issues of the day but also provide policymakers with information about what their constituents desire.
Rachel Macreadie	2011	Reject the idea that the polls are in pursuit of some pure, unmediated, pre-existing entity called public 10opinion and think of the polls instead as guides to what the public is likely to think about an issue given their exposure to certain sorts of information.

Mitchell Hoffman and Gianmarco Leon	2011	Informing people about other people's polling decisions does not have any affect on their poll choice.
Ajami, Noha Ramadan, Nader Mohamed, And Jameela Al-jaroodi	2011	Importance of security measures with rise of social network and tradeoff between higher security measures and the system's performance.
Graffi, K., P. Mukherjee, B. Menges, D. Hartung, A. Kovacevic, R. Steinmetz	2009	P2P approach solves the problem of high server maintenance cost of social platforms due to centralized character but comes up with its own security issues, this paper solves the security issue with its own security framework for P2P based social network.

Several research papers describe the importance of collecting opinion polls and each paper has a different method to outline it. From these papers, we get some insight into why opinions matter and what elements have the potential to change them accordingly.

Making an opinion or giving a poll to some event is making a judgment about the event as it is very generic these days for people to provide opinions, from different sources [1] and when there are some delicate events taking place in the framework it is easy to trigger public discussion [2].

Now the issue is which type of post gets the most views and replies to get the public discussion, studies show that the higher the confidence value with the negative posts, the more apparently the post was viewed and replied[2]. Users are more likely to share with others when the message has a clear negative polarity [2]. Positive posts with higher confidence values did not generate more replies but they were more probable viewed [2].

One can say that opinion and polling are the two sides of the same coin as polling for a certain event is based on the collection of several opinions so having a correct opinion for the events are very crucial in which media plays an important role as it should provide citizens reliable and diversified information to help citizens to formulate resonated judgment[3] so hosts can cast the poll very effectively because polling really makes a person comfortable with expressing himself out without isolating himself from the rest of the crowd [3].

Now as the opinions are made or create on an event, so by no means that it is always correct, the event can also go wrong so the opinions that are based on that event are also wrong or false so it's also necessary to control the dissemination of public opinion as the generation and dissemination of false information presented as public opinion can have serious impacts on society and nation [4].

In view of this research paper, our main focal point will be on internet public opinion (IPO) which is a specific form of public opinion and can be developed from online speech, so it is relevant to know how these internet public opinions are generated. There are several key elements that are responsible for generating internet public opinions that are: Subjects, Objects, Space, and Intermediary events [6] in which intermediary events play a pressing role in the advancement of the internet public opinion. With all the key elements internet public opinion operates in three stages i.e., are the occurrence and development of internet public opinion, the accumulation process of the internet public opinion, and the spreading process of internet public opinion[6].

According to[10], opinion polling can give a shape and structure to what people think and what is in their heads, where there are various opinion gathering methods, of which two of them are mentioned by [10]:

- Qualitative survey research typically involves focus group discussions, in-depth interviews, and participant observation.
- Quantitative opinion polling refers to surveys that measure the opinion of a sample of people.

A central idea revolves around people that polls predict the situation but actually they describe the situation of the moment[10]. Polls at a given time let us know the inclination of the public view towards an event [10]. Also, the role of the internet has been described in polling as people are more 'honest' towards computers than to humans, an idea challenged in a recent study that examined human-computer interaction, which found that participants were 'polite' to computers as well[10]. Opinion matter when a group of people giving them for a certain event so it can be interpreted as that opinion can change if the people know how others intend to poll but as stated in[11] There is no difference in a person's vote or opinion who is advised about how his friend or any stranger intends to vote.
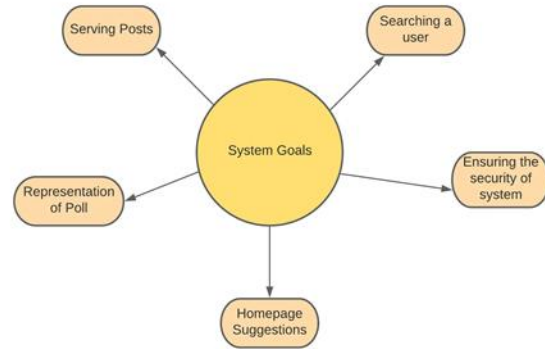
3. SYSTEM OVERVIEW

FIGURE 1. System overview representing the tasks the system is aiming to achieve i.e Serving posts, Searching for a user, etc.

The model is implemented as a web application. Where users can register themselves to engage in the polling and can personalize their profile and space.

For each user, the following features are given to systematically achieve the aim:

- Serving Opinion Charts
- Depicting the opinion poll in a graphical manner.
- Suggestions on the homepage of the user's account
- Searching users, topics, opinion charts from databases.
- Securing the system.

3.1 Serving Opinion Charts

Here, Opinion Charts is the collection of few fields. It forms the important interface of the application or system. A single Opinion Chart consists following fields:

1- A question or statement upon which polling is done.
2 - An Explanation of the question.
3 - Current state of the poll in the form of a bar chart.
4 - Further, options like comment, etc.
An API can be used to serve these Opinion Charts.

3.2 Graphical Representation

The aim of the system is to present the Opinion Charts into different forms of graphical representations. This can be done through the use of Javascript (for Node.js) libraries like Charts.js, D3.js, or Python (for Django) libraries like MatPlotlib or Plotly.

For instance, if there's a poll on how which of the following teams is going to win the Champions

League this season? Two ways to represent the views on people can be given in two forms :
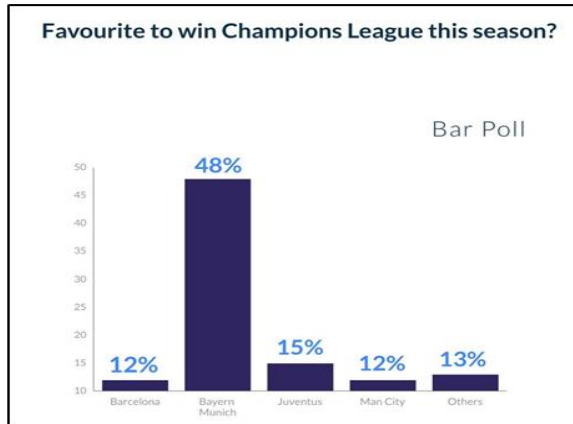
1) - Bar Poll

FIGURE 2. Example Bar Graph: Showing how votes will be distributed and displayed on the screen.
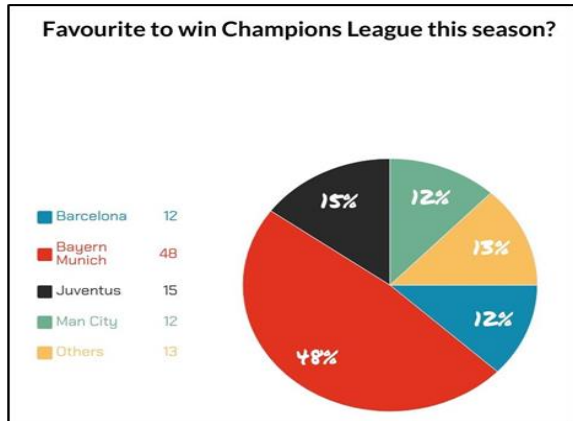
2) - Pie Chart Poll

FIGURE 3. Demo of Pie-chart, a possible different view of the same bar poll as shown in the previous figure.

Such representation of the data is the aim of this system possible through the libraries mentioned in the above section.

3.3 Suggestions on the homepage
Here, the Opinion Chart is a connotation for a particular post. The suggestions on a homepage of a particular user can be decided in the following way :
Content-based filtering means to show content that the users have liked in the past i.e. what's stored in their preferences.
User preferences can be learned and posts similar to user preferences can be served. The similarity between unvisited posts and a user can be determined based on keyword overlap i.e., by using Dice Coefficient.
Keyword overlap (e.g. using the Dice coefficient)

$$\text{sim(bi ,bj)} = \frac{(2 * |keywords(bi) \cap keywords(bj)|)}{(|keywords(bi) + |keywords(bj)|)}$$

b_i = user's preferences
b_j = keywords associated with a post.

3.4 Searching Entities
Searching Post can be done in SQL DB by making queries to the database. For e.g.
SELECT RANDOM (20) FROM AllPostsByCertainTopic
On the other hand, NoSQL DB uses an ID to search into a particular collection.
Const reqData = db.products.find({"_id": ObjectId("568c28fffc4be30d44d0398e")})

3.5 Securing the System

In this system, it's important to avoid fake accounts and identities. This can be prevented by using Reputation Mechanisms [9], As fake accounts and spoof accounts unnecessarily can contribute to the wrong results in the polls. At the same time, it's also necessary to secure the authentication of the users. It can be done using a framework that uses asymmetric cryptography. It can also be achieved through using techniques like Strong Password Policy and 2-Factor Authentication.

4. METHODOLOGY

On the basis of research, such a system has only been limited as a side feature of various websites.
This system gathers the opinions of people and then puts them into a graphical form, while maintaining the user's response completely anonymous. It acts as a medium to let people reflect on their choices. This uses some mathematical tools which are seen to be used in websites and models which deal with a huge number of users.

4.1 Graph Theory
A graph is a network of a set of objects, formally known as vertices or nodes. These nodes are interconnected with each other and the edge between them represents some relation. [5]

More mathematically, an undirected graph (which can be called a network) G = (V, E). E depicts a set of edges or links while V is a set of vertices. The cardinality in V is also called the order of G, and then it is said as G is a graph on V. [13]
Graph Theory is useful as a graph is made up of nodes, in the same manner, social media and this platform, which is a type of a social network, where each person represents a node. [5]
It is used in the nearest neighbor technique. In a given set of opinion charts, S, already voted on by the user :
1. Find the n nearest neighbors of a not-yet-seen chart in S
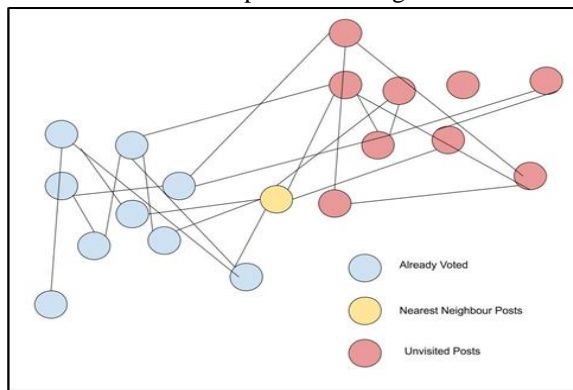2. Take these votes to predict a rating/vote for i

FIGURE 4. A visual to understand the logic behind the nearest neighbor algorithm used to calculate already nearest posts to already voted posts.

4.2 Search Algorithm
As the PageRank algorithm was developed to find the relative importance of web pages based on the links between the pages [7]. In the same manner, using Elastic library, search engines can be made to perform searching.

4.3 2FA Security
It is a future layer of security that ensures that someone attempting to realize access to their web account is the right one. It's drained in 2 steps :
1. A user can give credentials.
2. Secondly, rather than granting them access, some other information is asked.

4.4 Strong Password policy
A strong password policy is a set of rules designed to enhance computer security by encouraging users to employ strong passwords and use them properly.

4.5 The Reputation Mechanism
The Reputation Mechanism [9] lets users personalize recommendations through users they trust to follow. The major benefit of using reputation mechanisms is that it is more difficult to spoof the system by creating false identities.[12]

5. IMPLEMENTATION

Implementation is done through using the technologies that provide graph visualizations such as D3.js or Charts.js and some mathematical techniques i.e correlation and collaborative filtering which are discussed in the methodologies.
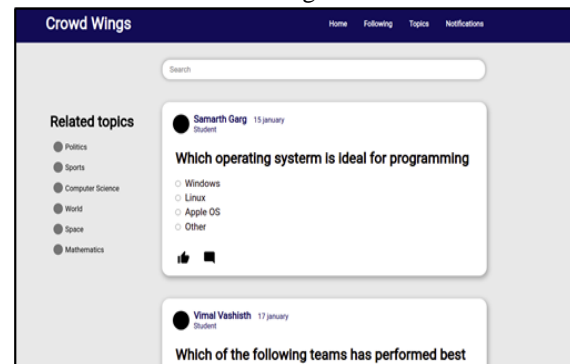

FIGURE 5. A Screenshot of the voting done on a question. A screenshot of how the UI is similar to social media websites to improve the intractability of website.
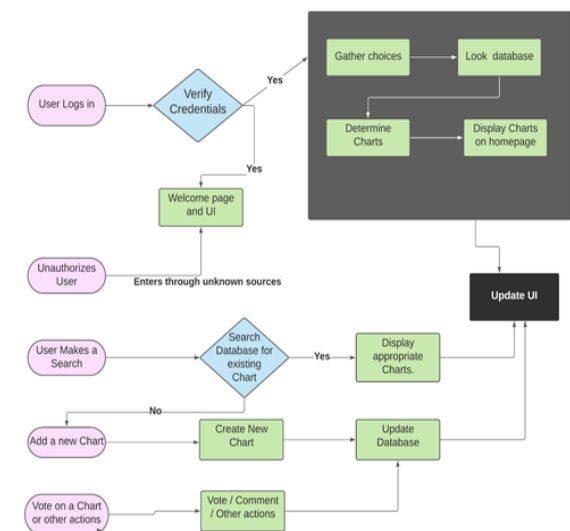
5.1 Proposed Algorithm

FIGURE 6. A flow chart of the system to understand how the system works and performs logic.

1. Authorized entities can access their accounts using login which uses Weak Password Policy and 2FA (Two-Factor Authorization) to avoid vulnerabilities.

2. If any Opinion Chart is accessed directly, then it can be viewed only. For further searching and voting, log in is necessary.

3. Starting on the homepage, the recommendations are made with the use of correlation techniques between choices made earlier and what users prefer next time.

4. Instead if a keyword is searched, the search result can be given according to the modified page rank algorithm.

5. If a user gives a response on any chart then the view of the Opinion Chart is updated in the database.

6. If a user decides to start a new Opinion Chart then it can be done given a similar Opinion Chart doesn't exist already.

7. Steps 5-6 uses data virtualization libraries to create or modify the existing opinion charts.

8. All Users have the options in terms of personalization of their profiles.

9. Deleting an Opinion Chart is not a valid feature once it's archived. After three months from the creation of a chart, it is archived.

The algorithm proposed above can be used to make the current desired system.

6. CONCLUSION

This paper discussed the implementation of a polling system that enables users (netizens) to poll and form a community of voters. The poll archives, i.e. Opinion Charts that are already archived in the past, can be used to understand public opinion about some subject during the time period of voting.

This paper also reviewed a recently developed voting system. In respect of what has already been done, this system tries to gather people all around the world in a community polling about several subject matters, so the public view and mindset can be understood.

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