

TRENDS IN FUTURE INFORMATICS AND EMERGING TECHNOLOGIES

Editors:

Deepak Kumar
Saru Dhir

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Informatics and Emerging
Technologies**

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Emerging Technologies*

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and Emerging Technologies**

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FOREWORD

Does nature compute? What is computation, after all? Computation is a process of converting the input of one form to some other desired output form using certain control actions/instructions. According to the concept of computation, the input is called an antecedent, and the output is called the consequent. A mapping function does the job of converting the input of one form to another form of desired output using certain control actions. The computing concepts are divided into two types of computing, hard computing and soft computing. These are some of the themes you will be coming across in this collection of papers and articles. I am sure you will enjoy them as much I have enjoyed them while participating!! I hope that this book leaves a mark in the field with its various research papers as a chapter for advanced computing techniques, which is applicable and useful for our modern world!.

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PREFACE

The recent advancement in computing techniques contributes majorly to the evolution and enrichment of human life and the advent of the next generation computing environment. A variety of uses and paradigms for computing techniques are growing in deployment and development for application with other emerging technologies.

Informatic computing techniques have evolved into the complex structure of heterogeneous techniques with multiple interactions with various tools and techniques. As in any other technology, research brings new developments and refinements and continuous improvement of current approaches that push the technology even further.

This issue emphasized on technical contributions of emerging computing techniques and its implementation in computer science and engineering. The objective of this issue is to provide opportunities for researchers, academicians, industry people, and students to exchange their ideas, experiments, and expertise on current computing techniques. Continuous improvements in research areas keep the readers informed with current technologies, applications.

The research papers of this issue are broadly classified into current computing techniques, information and communication technology, information science and technology, and other areas related to computing techniques and implementation.

The editor thanks all the reviewers for their excellent contributions to this issue. I sincerely hope that you will enjoy reading these papers, and we expect them to play an important role in promoting advanced computing techniques and implementation research. I hope that this issue will prove a great success with the exchange of ideas, which will foster future research collaborations.

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CHAPTER 1

Respite for Customer's Privacy Issues using Privacy Preserving Data Mining

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Abstract: Privacy preserving data mining has turned out to be progressively well known on the grounds that it permits sharing of security delicate information for study purposes. Nowadays, individuals have turned out to be progressively reluctant to share their information, over and over again people are either declining to share their information or giving erroneous information. As of late, protection safeguarding information mining has been considered broadly, in light of the wide multiplication of touchy data on the web. We examine strategy for randomization, k-anonymization, and other security safeguarding information mining strategies. Learning is matchless quality, and the more people are educated about data break-in, less inclined they will be to fall prey to the underhanded programmer sharks of data innovation. In this paper, we give a review of Privacy preserving data mining techniques.

Keywords: Condensation, Cryptography, Data mining, Perturbation, Privacy, Privacy Preserving Data Mining.

INTRODUCTION

DATA MINING

Data Mining is the method for understanding enormous informational indexes to discover designs that can disengage key factors to make prescient models which will help in taking decisions by the management [1].

One of the most basic and most used definitions of the data mining process, which focuses on its distinguishing characteristics, is given by Fayyad, Piatetsky-Shapiro, and Smyth (1996), who define it as “the nontrivial development in order to find valid, novel, potentially useful, and eventually clear patterns in statistics.”

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HOW DATA MINING IS CARRIED OUT IN RETAIL SECTOR

There exists plenitude of information accessible nowadays, whether it is disconnected or on the web. Every single part utilizes the information for reasons unknown or the other. Retail segment, for instance, utilizes the client's information to comprehend their decision inclinations, their shopping propensities, recurrence of purchasing, and so on. This, consequently, causes the organization to settle on their vital choices up to the imprint to develop the organization right away.

In order to gather the client's information, an organization may pursue any of the strategies, like at the time of checkout or through direct conversation while shopping.

IS PRIVACY OF CUSTOMER AT STAKE?

The scope of privacy can be viewed from 4 categories:

1. Information: which deals with the management of accumulation of individual information.
2. Bodily: which identifies with physical damages from intrusive techniques.
3. Interactions: which deals with any form of interactions.
4. Territory limits: which identifies with the interference of physical restrictions.

This paper will concentrate on information classification, which covers the frameworks that gather, examine, and distribute data.

After collecting the entire customer's data, one might think that whether the data stored in the database is safe in terms of privacy or not.

Here comes the mainly significant concern, not only of the customer but of company as well. Keeping the private information of a customer safe is the foremost responsibility of any organization and failing in doing so may lead them to trouble.

WHY DATA MINING IS REQUIRED IN RETAIL SECTOR

Procuring and Engaging Customer

It is harder to get novel clients than to hold current one [2]. After knowing, current customers purchasing habits, one can predict their respective activities and requirements for buying a specific product.

This sort of action encourages the retailer to hold existing clients by offering different plans [3].

Market Basket Analysis

Market basket analysis is a method in understanding what things are in high likelihood to be purchased together as indicated by association rule [4]. It gives a slight idea about client's buying behavior by showcasing relations between varieties of purchased products.

Such sort of relation analysis helps in deciding the display of items and promoting the combination of items. Customers can find each item of their interest easily, and this helps the organization in selling (a different product or service) to an existing customer.

Clients Segmentation and Target Advertising

Segmentation refers to partitioning the marketplace into various partitions on the basis of some characteristics. In order to form groups or clusters on the basis of behavior, data mining can be used [5]. With the help of these clusters, customers with similar interests can be identified, and simultaneously we can find customers for target marketing.

PRIVACY AND PRIVACY PRESERVING DATA MINING

Privacy Defined

Data protection alludes to the desire of people to be in charge of or have some control over information regarding them. Advancement in IT has hiked uncertainties about data safety and its consequences and has encouraged Information Systems specialists to look into data safety issues, including specific replies for resolving various issues [6].

Ways to maintain privacy of customer's data in retail:

It is usually not possible that you want to protect customer data and use it concurrently.

1. Start a dedicated data safekeeping role within your organization – this person's entire movement ought to revolve in the region of information safety and ensuring protection of client data. They ought to be conversant in the

Internet Gaming Disorder: Symptoms, Neurological Issues, and Effective Assessment Modalities

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Abstract: Gaming over the internet is one of the major interests in children and adolescents. Nowadays, a wide range of games are available on the internet ranging from casual browser games, multiplayer games, and simulator-based games, *etc.* This advanced gaming technology allowed players to connect with each other virtually through their social connection. However, excessive internet gaming leads to functional and structural changes in the brain areas. Thus behavioural changes are noticed commonly in the new generation. They are moving from real-life social relations to online social sites, and when this movement is uncontrolled by self-restriction or not limited by supervision gradually turns into online addiction. The World Health Organization (WHO) has recognized Internet Gaming disorder (IGD) as a diagnosable condition and decided to include it in the “International Classification of Diseases (ICD)” 11th edition in the year 2018. Such online gaming addiction study is gaining interest in clinicians and researchers, making it an active area of research. The study of its symptoms and its assessment methods for detecting and analyzing internet gaming addiction is the need of the hour. In this paper, an extensive study about Internet Gaming Disorder and its assessment methods was presented. Examination of IGD in participants using different modalities ranging from self-reported psychological questionnaires-based assessment to pathological neuroimaging methods to multimodal biosignal analysis is discussed and analysed. Comparative analysis of modalities has also been performed in order to summarize findings in terms of efficiency, mobility, and availability. The analysis presented in this paper will be useful for the researchers for developing an effective computational method for IGD analysis.

Keywords: EEG, fMRI, Gaming Addiction, Gaming Craving, Gaming Disorder, IGD, Multimodal.

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INTRODUCTION

Playing games is part of human nature and has been present since human history. Nowadays, playing video games on the internet is one of the popular pastimes among adolescents and adults around the world [1, 2]. Thus, the gaming industry market, especially internet gaming, is now a booming market. According to the report [3], 2.3 billion gamers across the globe spent \$137.9 billion on games in 2018. In India only, the online gaming market has recorded rapid growth in the last decade and is currently around \$1 billion industry [4]". With the advancement in technology, games have also transformed a lot. Gamers are from the physical world to the virtual world. A wide range of games with different offers are nowadays available on the internet, ranging from Casual Browser Games to Multiplayer games (like MMORPGs) and Games with Simulation. A major percentage of players are attracted by the MMORPGs in which players are connected virtually, mostly through their social connection from different remote locations [5, 6]. Accessibility of these games and the number of people willing to play them has increased with the easy availability of the internet.

As the internet has broadened the playground for internet gaming, playing games online provides feelings of pleasure and reward virtually to users. It leads to skipping routine activity done by an individual in daily life and enjoying something distinct from their routine. Excessive playing of such games impacts the gamer virtually, and it is assumed by the gamer as a way of relaxation (physical and mental). Thus, resulting in addiction among them. A fifteen-year longitudinal study data [7] reveal an increase in cognition of gamers who were playing action video games excessively. If these action video games are played in a controlled fashion, they can help train the human mind to become more attentive, learn to adapt to different conditions and environments, *etc.* A positive effect is only cultivated when playing time of such games is distributed over a period of weeks to months rather than a single sitting with a large gaming space.

The design of internet games involves immortal character design, a sci-fi combat system, virtual gambling points, *etc.*, to attract adolescent people [8]. These games have an adverse effect on the human body due to various issues like long exposure in a short span, continuous electromagnetic radiation from the screen, wrong body posture, brain dysfunctions, low working memory, cue and urge to play games again and again. This inhibits the players from maintaining the required space between the subsequent games, elevating negative impacts, *viz.* lack of social interaction as players are more inclined to make the virtual connection. It leads to an unhealthy lifestyle due to continuous and long duration of playing, leading to addiction. Addiction is one of the human behaviour which is the result of a neurological response that stimulates the feeling of pleasure,

excitement, and reward to the extreme. In scientific terms, behavioral addiction is a chronic relapsing disorder.

When one's behavior is eliciting a compulsive need for a habit-forming substance or activity, it is characterized as behavioral addiction [9]. All common addictions cause brain changes, which include sensitization, desensitization, dysfunctional prefrontal circuits, and dysfunctional stress circuits. Studies have reported [10] that adolescents and young adults who have a less mature brain and give more space to the internet than any other age groups easily fall into the cultivating habit of repetitive use of the internet. This slowly turns into an addiction and can be seen as relapsing nature and, in some cases, led to problematic internet use or IGD.

IGD is a very young field of research under the umbrella of behavioral addiction, which had been through the methodological limitations of research shown very limited understanding and generalization of research findings [11, 12]. Such online gaming addiction-related study is gaining interest among clinicians and researchers. Hence, the key motivation of this chapter is to introduce the readers to this new neurological disorder, *i.e.*, "Internet Gaming Disorder", its symptoms and neurological issues, and its assessment modalities and methods. The paper begins with the general and detailed focus on IGD, its neurological connection, symptoms, and social impact. It further narrows its focus on different existing assessment methods of IGD. In addition, the recent work done in the field of correlating IGD with other disorders is also presented along with the comparative analysis of different IGD assessment methods.

INTERNET GAMING DISORDER (IGD)

Internet Gaming Disorder, *i.e.*, IGD, is related to playing video games over the internet in an excessive amount that interferes daily life of a person and causing relapsing and the cultivation of addictive behavior. The behavior of gaming addicts is to get feelings of pleasure and reward in the virtual world. They willingly forget sleep, food, and real human social contact. World Health Organization (WHO) and American Psychiatry Association have considered Internet Addiction in their previous list of diseases. The new term coined as Internet Gaming Disorder (IGD) has replaced video game addiction and Internet addiction, which were earlier considered by researchers. The WHO has recognized gaming disorder as a diagnosable condition and decided to include it in the International Classification of Diseases (ICD) 11th edition in the year 2018 due to symptoms like withdrawal symptoms, tolerance, not able to control playing time, unsuccessful quitting attempts, giving up other activities, continuing to play despite problems, playing more to relieve negative moods, risk having

CHAPTER 3

A Machine Learning APP for Prediction of Pandemic such as COVID-19**Smriti Jojo¹, Saru Dhir^{1*} and Madhurima¹**¹ *Amity University Uttar Pradesh, Noida, India*

Abstract: COVID-19 PANDEMIC is the current pandemic infection caused by a new strain of coronavirus. It is contagious, and there is no vaccine developed to date. There have been a lot of measures, such as lockdown, taken by the Indian government to tackle the pandemic. Though 4 phases of the strict lockdown period haven't made much progress in decreasing the COVID-19 spreading curve, the government finally had to unlock/lockdown for containment zones in the Country. Here, in this paper, the author has developed a flutter based Mobile Application that uses Machine learning to predict COVID-19 outbreak for the upcoming week based on the past time-series data. The application is named "COVID_19 India" as it gives the nationwide COVID-19 information and forecast for India. This project opens a plethora of opportunities in the field of research, data science, development, AI and machine learning implementations, and integration of information technology in the field of healthcare.

Keywords: COVID_19, Facebook Prophet, Flutter, JUPYTER NOTEBOOK, Machine Learning.

INTRODUCTION

According to World Health Organisation, coronaviruses are the extended family of viruses that give rise to several diseases in humans as well as animals. Respiratory disorders varying from the common cold to acute diseases such as MERS and SARS are caused by coronaviruses. COVID-19 or 2019 novel coronavirus disease, originated from the Hubei province, Wuhan, China, was declared an International public health emergency concern by WHO on Jan 30, 2020 [1]. SARS-CoV is identified as the most pathogenic human coronavirus identified far 16-18, and it is most likely to live in animal reservoirs, causing disease through Zoonotic transmission. The COVID-19 cases have been confirmed in a huge number of countries, due to which the World Health Organ-

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isation (WHO) on 11th March 2020 has characterized COVID-19 as pandemic [2]. India reported the first Confirmed case of COVID-19 on 30 January 2020 in Kerala [3]. The infected person had a travel history to Wuhan, China.

The most frequent symptoms of COVID-19 are dry cough, fever, and fatigue. Around 1 in every 5 people developing COVID-19 becomes seriously ill. Still, anybody can get infected with COVID-19 and can get critically sick. COVID-19 is an infectious disease that could spread *via* tiny droplets expelled from the nose or mouth when an infected person coughs, sneezes, or speaks. That's why wearing of masks, washing hands with soap/alcohol-based products, social distancing, and self-isolation is a mandatory measurement imposed by the government [4].

India recorded 4 phases of strict lockdown starting from 25th March-31st May 2020 [5]. Therefore, the lockdown decelerated the growth rate of pandemic from the rate of doubling every six days to the rate of doubling every eight days observed for the duration of 12 days. A lot of conspiring theories came against China for using coronavirus as a bioweapon. However, the theories were made unsubstantiated. The identification of a new coronavirus as the cause of SARS (severe acute respiratory syndrome) was not surprising for Coronavirus investigators. But the capacity of coronaviruses to mutate and cause disease gave an indication of its establishment in the laboratory. India with Confirmed=511478, Active=198734, Recovered =297013, Deaths=15731 cases on 27th June 2020 [6]. Strict policies have to be made and implemented in India to save the post and current crisis. The COVID-19_INDIA mobile application gives a prediction of the COVID cases in India. It predicts the behaviour of COVID-19 for the given time period and also provides the most probable day for the maximum spreading of the virus. Since no vaccine is still developed, only prevention is the cure for the time being. This project opens a plethora of opportunities in the field of research, data science, development, AI, and machine learning implementations and integration of information technology in the field of healthcare.

LITERATURE REVIEW

Coronaviruses are the genus of the Coronaviridae family. They have enveloped viruses with a large plus-strand RNA genome. Its genomic RNA is 27–32 kb in size, polyadenylated and capped [7]. The newly found coronavirus causes COVID-19 [8]. 'CO'=corona, 'VI' =virus, and 'D' = disease. This pandemic infection was cited as '2019-nCoV' or '2019 novel coronavirus' [9]. The incubation period of the virus is from 2-14 days, whereas the case fatality rate ranges from 2-3% [10]. HCoV-229E, HCoV-OC43, and SARS-CoV are the three human coronaviruses studied in depth. HCoV-229E and HCoV-OC43 were

identified (synonym) in the mid-1960s and cause common cold [7-15]. SARS-CoV has been identified as the most pathogenic human coronavirus causing life-threatening pneumonia [16-18] [11]. SARS-CoV is proposed to be the first member of the fourth group of coronaviruses or an exception of group II coronavirus. They are likely to inhabit an animal host, and zoonotic transmission is responsible for initiating epidemic in humans [10]. As MHV (Mouse Hepatitis Virus) belongs to group II coronaviruses, they are believed to possess similar organisations, protein sizes to SCoV. SCoV encodes a more complex and larger gene array than MHV or other coronaviruses, which reflects its evolution in an animal host. The deletion of one of the accessory genes in human isolates of SCoV indicates that this gene could be involved in host range, adaptation, replication, and transmission in humans [10]. The discovery of coronavirus is not new, and the first occurrence was in 2002-2003 when a new coronavirus of beta genera was noted. This coronavirus had an origin with bats crossed over to humans *via* an intervening host of palm civet cats in the Guangdong province of China [8]. The identification of a new coronavirus as the cause of SARS (severe acute respiratory syndrome) was not surprising for Coronavirus investigators. However, the capacity of coronaviruses to mutate host range, pathogenesis, transmission, and disease gave an indication of its establishment in the laboratory using Cell adaptation and Virus passage [9]. Developing attenuated and stabilized strains of SCoV which could resist reversion and recombination would provide additional safeguards and powerful genetic tools for the study of SCoV treatment, prevention, disease, and emergence [10]. The most frequent symptoms of COVID-19 are dry cough, fever, and fatigue. Other symptoms such as aches, pains, sore throat, nasal congestion, conjunctivitis, diarrhea, headache, loss of taste and smell, skin rashes, and fingers/toes discoloration are less common. Some people infected with COVID-19 only develop mild symptoms [10]. Virus confirmation in respiratory discharge is done by molecular tests. Low or normal white blood cell count with elevated C-reactive protein (CRP) and abnormal tomographic chest scan with mild or no symptoms are the common laboratory observations [8]. 80% of people recover from the disease without the needed hospital treatment. Around 1 in every 5 people developing COVID-19 becomes seriously ill. Older people with medical conditions like heart, hypertension, respiratory disorders, cancer, diabetes have a higher probability of developing serious sickness. Still, anybody can get infected with COVID-19 and can get critically sick. Anyone suffering from cough/fever associated with difficulty in breathing, chest pain, loss of speech/movement must seek a medical check-up immediately. It is suggested to call the doctors or medical facility first so that the patient can be directed to the right clinic [9].

Japan was the Second Country after China which was heavily affected with 2019-nCoV. 161 people from a cruise ship were quarantined in Yokohama, Japan, on

CHAPTER 4

Different Authorization Mechanism for Software System**Sudhir Kumar Gupta¹, Deepak Kumar^{1,*}, Munesh Chandra Trivedi² and Kamal Nayan Agarwal³**¹ *AIT, Amity University, 125-Noida 201303, India*² *Department of Computer Science & Engineering, NIT, Agartala Tripura, India*³ *Department of Information Systems & SCM, Howard University, USA*

Abstract: Software Quality is a major concern when we develop any application. Data privacy, customer trust, and any long-term goal depend on how well and secure our application and business success also depend upon it. It involves many factors, starting from the design phase and can go to the implementation phase. A major part of software quality is software security. Software security ensures that our software work continuously and correctly in a malicious attack environment. Authorization is the backbone of any application and plays an important role in application security. When a user login into a system, the system should identify how many access rights he has related to each functionality. It is then the responsibility of implemented authorization policy to restrict him or her based upon that. We have some existing authorization techniques, and this paper focuses on the review of authorization techniques with the pros and cons of the existing approach. Comparison between different authorization techniques has also been discussed.

Keyword: Authentication, Authorization, Data, Privacy, Security, Software Quality.

INTRODUCTION

When we talk about software security, software security follows some basic attributes authentication, authorization, auditing, least privilege, separation of duties, fail-safe, and defense of depth. Authentication ensures that you are the correct person to login into the system. You need to pass an identity user id, and password and the system will verify. We can pass credentials or user identity by using different ways, such as username and password, smart card and tokens,

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or biometric information. We have two types of authentication: single factor and multifactor. In single-factor authentication, we authenticate with one credential, whereas in multifactor, we use two or more of the credentials. For example, when we log into a bank website, we sometimes need to enter credentials and passwords, and then the bank asks mobile OTP to verify identity.

Authorization is a process to identify how many access rights a user has once he or she login into the system. This process ensures that a user cannot edit or delete if he has only read-only access. Once a system proceeds with authentication, the next step is an authorization as in Fig. (1) given on [1].

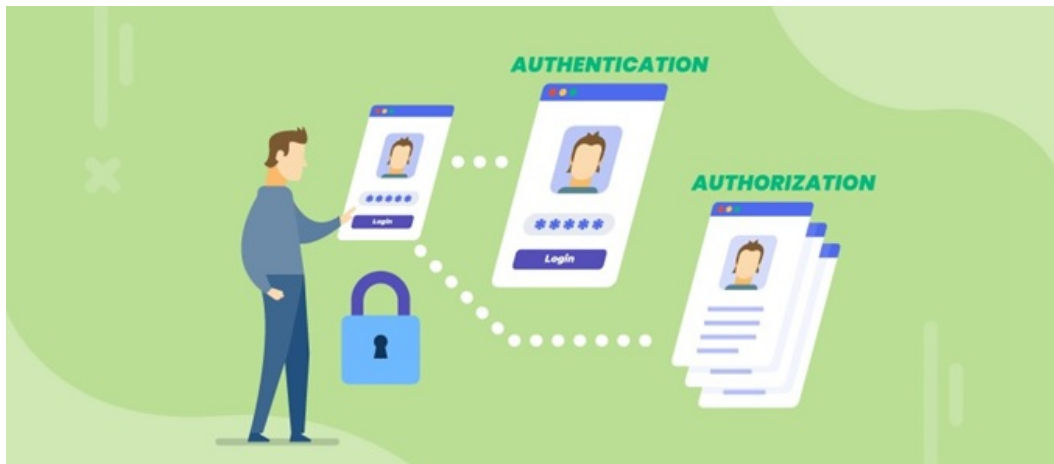


Fig. (1). Authentication and Authorization [1].

Auditing is a security concept which is used for logging crucial information for future purpose. When we perform any financial or transactional information, it is very necessary to log important info for history purposes, which can be used once needed. Sometimes, we need to audit to identify who performs this operation and what time.

The least privilege means we should provide the minimum access to a person and for minimum time to complete any task to avoid unwanted operations to perform.

Separation of duties is another key concept in software security. Access to any sensitive information should depend upon multiple factor satisfaction.

Fail-Safe means if a system is failed it should fail in a condition that our data is not lost. The system should not commit any partial transaction, and it should either be fully committed or roll back completely.

Defense of depth means we should have multiple layers of protection, and if one fails, somehow other should handle the flow. It is like multiple locks in a single door, so an unwanted person cannot enter the house until he did not open all the locks, which is difficult.

This review paper will focus on authorization techniques that already exist and try to conclude which is good and future scopes.

LITERATURE SURVEY

Mandatory Access Control (MAC) and Discretionary Access Control (DAC) [2]: When an application is used by multiple users, we need to apply some rule where we can ensure that users can perform only those operations which they need. MAC and DAC are two models which we used in the very early stage of software security systems.

In MAC, administrators create a set of levels, and every user assigns a specific level. Under a MAC enforcement environment, access to all resources is controlled by the administrator, and the user cannot change access control of any resource. In this type of environment, every resource has security labeling. It contains two types of information with each label [User Category, Severity], User Category means what is the management level of user (Top, Middle, Low), and Severity means what is the complexity level of information (Top secret, secret, *etc.*) Every user also has the same two properties, and the system needs to match both in case of desired access rights. User can access all the resource less than his or her level but not which is more, for example, if admin creates level 1 to 10 based upon complexity and user A have level 4 access, he can access all levels starting from 1 to 4 but not more than 4. MAC is good when we have many users. A good example of MAC is the level of windows users like admin, normal user, and guests.

In DAC security systems, every resource has a list of users who can access it. DAC is directly associated with the user, not by the access level, so in DAC, we need to know about each user's resources who can access it. DAC is a more flexible option as you just need to add a user with the resource when needed. However, it might be unmanageable when you have a long user list associated with the resource. In DAC, every user can set access permission for a resource that he already owns, which means user A cannot set or change the access control of a file that is owned by user B. For more clarity on MAC and DAC see Fig. (2) from [3].

A Swift Approach for Malware Detection

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Abstract: Malware Detection is imperative in cybersecurity. With the increasing rate of cyber crime incidents, it has now become the priority in the cyber security domain. Different machine learning concepts are implemented for detecting malware, hence dealing with a large number of datasets. This gives researchers a reason to focus on reducing parameters in the datasets that have little or no impact on detection accuracy and improve detection time. This paper attempts to implement one such technique to optimize data sets for quick results.

Keywords: Decision tree classification, Machine learning, Malware detection, Random forest classification.

INTRODUCTION

Malware is one of the significant menaces in the cyber domain. They are capable of exploiting the vulnerabilities that exist within the hardware and software of the computing systems. They can steal sensitive information, provide a backdoor to a system for later access, harm the existing system by making it unfit to work [2]. Over the years, malware is responsible for the disruption of many internet-based services, stealing sensitive information, etc. This leads to many cybersecurity firms developing methods to prohibit them from working. One such technique for malware detection is based on machine learning, in which features from malware are extracted in a dataset and further used for forensics [1]. The most important things to consider in malware detection through machine learning techniques are time and accuracy. Detection of malware should be as fast as possible for real-time detection. As far as the detection accuracy is concerned, cybersecurity experts and researchers should stay updated about 0 day (Zero day) malware signatures. We have used a static approach that uses a supervised machine learning technique in which parameters extracted from the Portable Executable (PE) header are used

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to check for the possibility of malware [3]. This implementation is modified further by refraining from the use of specific parameters from the PE header file in the dataset that would rarely affect the detection accuracy but will help in the quick detection of malware.

MACHINE LEARNING

Machine learning is a branch of algorithms that permits software applications to predict more accurate results without being explicitly programmed. Malware Detection using machine learning is the process of finding anomalies or outliers from the datasets. Antivirus software uses these techniques to detect malware in the computer system. They keep on updating their database and detection techniques to discover new kinds of malware families with more accuracy [4]. In this paper, we have used random forest, and decision tree-based supervised machine learning techniques for classification in which features extracted from binaries (PE header parameters) in the python environment, which are then compared against different executables to check for the possibility of malware.

Classification Algorithms

We have used three classification algorithms in our implementation, namely, Extra Trees, Decision Tree, and Random Forest.

1. **Extra Trees Classifier:** Extra Trees classifier applies a meta estimator which matches several randomized decision trees (also known as extratrees) on the data set's many sub-samples and enhancing the accuracy of the prediction and managing to overfit. Unlike a random forest, at every step, the whole sample is used, and decision boundaries are chosen at random rather than the most effective one. Overall, Extra Trees are less costly from a computational point of view in training, but they are inclined to grow huge. Extra Trees can frequently generalize much effectively than Random Forest, but it is not easy to guess without implementing both first (and tuning the n estimators, maximum features, and minimum samples split by cross-validated grid search). Extra Trees classifier continually assesses random splits over a viable portion of features (Unlike RandomForest, which determines every possible split over a sustainable portion of features). The primary purpose of using this classifier is its computational efficiency [5].
2. **Random Forest Algorithm:** Random Forest is a supervised machine learning algorithm. As it is clear from its name, it constructs a forest and then makes it random. The constructed forest is a group of Decision Trees, which generally is

trained with the bagging method. The main logic behind using the bagging method is that it enhances the overall output through the merging of learning models. A significant advantage of the Random Forest technique is its usage in case of both classification and regression problems, which constitutes most of the present machine learning models [6].

3. **Decision Tree Algorithm:** Decision Trees are non-parametric supervised learning algorithms applied in regression and classification problems. The algorithm learns the decision rules inferring from the dataset parameters and helps to predict target variable value based on it. Decision Tree Classifier can carry out multi-class classification on datasets. Decision Tree Classifier inputs two arrays: an array X, of size (n samples and n features), which holds the samples for training, and Array Y consisting of integer values, of size (n samples), which contains the class labels for the samples of training. The model can be used for the prediction of the class of the samples once it is fitted. Alternatively, the probability of each class can also be predicted, which is the fraction of training samples of the same class in a leaf [7].

METHODOLOGY

We have used the python 3 environments for implementing machine learning algorithms. Malware detection is divided into two phases, *i.e.*, the learning phase and the checking phase, respectively. In learning phase, we will be splitting the dataset into training and test sets, which is a subset for training a model and a subset for testing the trained model, respectively, and selecting the most relevant features that will be the deciding factors of whether the file that we are testing is legitimate or not [8]. In the checking phase, the executable file to be checked for malware is checked against the features collected from the learning phase.

Dataset Description

The Portable Executable (PE) file format delineates Microsoft's operating systems executable file format (EXE). The dataset includes parameters from the header, which contains Common Objects File Format (COFF), which holds information such as the type of machine, file's nature (DLL, EXE, OBJ), number of sections, *etc.* The optional header includes the subsystem version, operating system version, the size of the code, the size of data, the linker version, checksum, the size of header, the address of the entry point, *etc.* [9].

Learning Phase

In Learning phase, we input a dataset containing 138048 files, each of which includes 56 features (pe parameters) as shown in Fig. (1) for selection of relevant

Measuring Academics' Intentions to use a Project Management System (PMS): A Case Study of the College of Computing and Information Technology, Shaqra University

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Abstract: Traditional mechanisms for managing information have become outmoded as the information is increasing in quantity, and more resources are utilized for its management. This paper proposes an application that will help to manage complete datasets in their required formats in an academic domain. Unlike in the corporate sphere, there is an acute need for such management systems in academia. A system was deployed at Shaqra University, College of Computing and IT. The dataset took into consideration a quality assurance project currently being undertaken at the University. This paper blends the DOI model with the TAM Model to measure academics' intentions to use the Project Management System. The results reveal a positive relationship between the perceived ease of use, perceived usefulness, attitudes toward using, Trialability, Compatibility, Observability, and academics' Intentions to Use the Project Management System. The paper presents a final observation set that shows the association between various parameters and academic intentions regarding their use of the project management system.

Keywords: Adaptability, Business Process Management, PMS, System, System Design, TAM, Usability, User Acceptance.

INTRODUCTION

Information has now become an integral part of day-to-day life. A digital transformation is occurring in every sector worldwide. In accordance with the objectives stated under the Saudi Vision 2030 for the increased adoption of electronic services and digitization, this study was established to recommend a project management system for the digitization of the Saudi Arabian vision. With the changing face of technology, sophisticated software applications such as man-

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ufacturing execution systems, enterprise resource management systems, and a product life cycle management system are essential [1]. Suppose we try to formulate between the manager and business processes and the technical business process Systems. In that case, there will be a huge difference and a variety of processes involved inside the system. In addition, the orientation will not be the same for all the systems [2]. The traditional system for the manager business processes that were taken care of at any workplace was not that similar as it was supposed to be with the technical aspect [3]. Various modeling techniques, including programming and a high degree of abstraction between various processes or the control mechanism, are an integral part of the complete technical process [4]. There is a very strong managerial and technical link between any system and its operable sections, which is reflected in [5]. However, what was most significant was that the critical disciplines that are a part of the business process management success were related to various non-technical issues such as the change in the attitude of the workers and the assumptions regarding the building of a new frame of reference every time there is a change in the system [6].

However, it can be identified that managing the business processes is the role of management and the behavioral side of the information comes from the operational management. There has to be a connecting parameter between the two entities. The integration of information technology with the business process will require some kind of mining and adaptive design [7]. The cross-linkage of the managerial and the technical perspective for the solution of a problem under the business process involved at any stage can provide various benefits. Processing of the information and the processing of managerial issues that are involved must be clearly visible and should be reflected as a part of the existing tool that is used for the modeling of the process [8].

The Project Management System (PMS) is the system used by organizations to manage the various activities of a particular project. The activities need to be reported and noted with respect to various timelines; the management of the files is a very important task that comes under this umbrella [9]. The application of the PMS in the academic domain is one of the most important features considered in this particular research [10]. This business process needs to be mapped against all the processes that are involved in the management of a particular task at the project level [11]. Furthermore, in accordance with the 2030 vision of the Saudi Arabian kingdom, the digitization of all the processes is an integral step towards the technical transformation of data.

Various tasks are handled with the help of technology [12]. A large number of people are involved in the implementation of a particular system [13]. The

identification of appropriate technology can be most effectively studied based on the parameters of the TAM model in conjunction with the Diffusion of Innovation Theory model (DOI) [14]. The TAM model, proposed by Davis in 1989, had various effects and consequences [15]. However, the model as proposed by Davis required further improvement and updates [16]. Therefore, an extended version of the model was proposed in this research by combining the TAM model with the DOI model to measure the academics' Intentions to use the Project Management System (PMS). In [21], the integration of various systems into a particular unit can be done with the centralized repository system. In the same way, the project management system can be integrated with the existing centralized system of the University as a plug-in and can be used to achieve organizational success. It can be further notified that the client/server architecture could be best used in such type of integration of plug-ins with the existing web-based applications. The enterprise integration can be done with the help of the information technology unit at the University site. The web service can be applicable for a group of people who are an integral part of the organization only, which will result in a more secure connection for the critical data of the organization.

The unit of Quality Assurance at the College of Computing and IT is integrated with the PM system to perform various tasks as a combined collective activity. The members of the computer science department are assigned various tasks based on the PM System. This system is a client/server-based architecture, which will be deployed on the server of the datacenter. The server will be responsible for handling all the requests from the client that are coming from the various staff members. Business processes will be uploaded by the manager-level staff member or the senior administration. They are responsible for providing a very strong timeline architecture, which is available inside the system. The front-end will be a web-based application that will be running on Ruby on rails. However, the back end shall be a database that will support PostgreSQL. The web server will be comprising of Apache and can be deployed on either Windows or Linux-based hosting. A real look and feel of the system are allocated to the members. The attitude of the academic member is a very important factor towards the entire system and its applicability. Therefore, the main consideration is identifying the factors that will affect the intention of the academic members to utilize the PM system. In this study, there are two research questions:

1. What are the salient factors that will affect academics' intentions to use the PM system at CCIT in Shaqra University?
2. Do the academic members have positive attitudes towards using the PM system?

Document Sentiment Analysis using Python

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Abstract: Sentiment Analysis is a part of artificial intelligence that uses natural language processing (NLP) to analyze the raw data and further extract the user's sentiment. The sentiment analysis can be achieved at three levels: at the document level, sentence level, and aspect level. In this chapter, we will be covering Document Sentiment Analysis, in which we analyze the contents of the document. This chapter gives a practical overview of the field of document sentiment analysis using the rule-based method. The main idea is to show the working of document sentiment analysis. The analysis can be done using the python language. Python language is a high-level language that is used in artificial intelligence and various related fields. Two different libraries have been used to do the analysis. The NLTK library is a free and open-source library used for tokenization, stop words, and lemmatization whereas, the spacy library is used for its displacy visualizer module, which shows the illustrations of the sentences and named entity recognition, highlighting the entities present in the document. The experiment is conducted using the pre-processing methods, and a conclusion is derived with the aid of the result.

Keywords: Dependency parser, Document sentiment analysis, Named entity recognition, Opinion mining, Rule-based method, Sentiment analysis, Tokenization.

INTRODUCTION

In this chapter, we have briefly discussed the steps used in document sentiment analysis. Document sentiment analysis approaches like automatic method and hybrid method are quite complex to understand and implement. This chapter will be a quick guide on how to conduct document sentiment analysis in a few simple

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steps using the rule-based method. We have in-depth covered the pre-processing steps of document sentiment analysis. A brief explanation about these steps with practical implementation will clear the concepts related to document sentiment analysis.

The term ‘sentiment’ means ‘specific view about something’ or ‘opinion based on a feeling’. The term ‘analysis’ means ‘a detailed examination of something’. So, overall sentiment analysis is a method of extracting the user's opinions, emotions, or sentiment by analyzing the content present. Therefore, sentiment analysis is also referred to as ‘opinion mining’.

As we know, the world runs on the sentiments/opinions of people. We always give a thought about what is the opinion of people about a particular thing. Whenever it comes to deciding, we always consider others' opinions, which gives us assurance about our decision. The widespread use of the internet has enabled us to survey many people with ease, which is called a review. A collection of reviews is called a dataset. There are various types of datasets available for research.

Recently, sentiment analysis was used to analyze an organization's announcements to check the management's emotions and how it is changing [1]. When it comes to an organization, customer reviews play an important role in improving a product and meeting up to customer needs. If the company fails to stand up to the customer's needs, the company can collapse. This is where sentiment analysis plays a significant role in extracting the user's emotion.

Sentiment analysis can be examined at three different levels: document level, sentence level, aspect level. In this chapter, we will be covering the document-level sentiment analysis.

LITERATURE REVIEW

In this paper, the author collected the tweets from the Twitter API and pre-processed them. After the pre-processing of the data, they developed the semantic classifier with the help of sci-kit-learn. Scikit-Learn consists included various tools like clustering, classification, regression, and visualization. They used the Stanford dataset, *i.e.*, 4 million tweets categorized as positive and negative. They studied that the cleaner the data, the more accurate results can be obtained [11].

Positive tweets were not added for extracting information in the paper. Only useful tweets were used as a dataset [12]. In another paper, their feature space consisted of unigrams, bigrams, and POS. They concluded that SVM

outperformed other models and that unigrams were more effective as features [13].

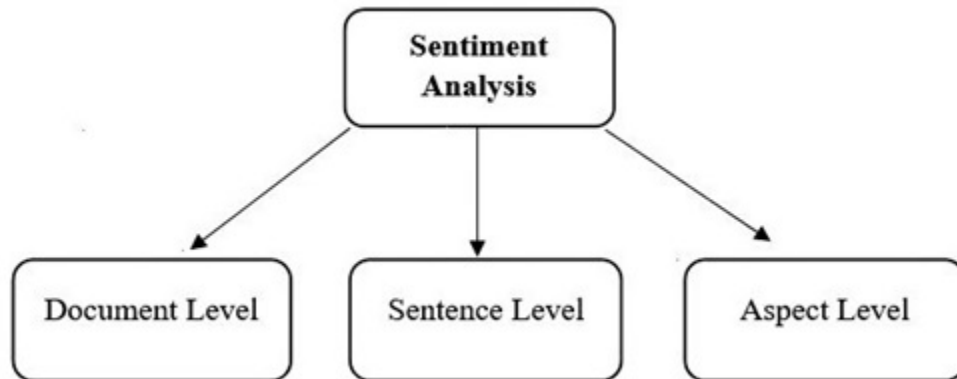


Fig. (1). Levels of Sentiment Analysis.

Document-Level Sentiment Analysis

The term ‘document’ refers to any written piece of information. In document sentiment analysis, the document is analyzed, and the user's sentiment is depicted as positive, negative, or neutral [2] (Fig. 1). However, advanced polarity can be used to show different types of emotions such as sad, happy, disappointed, *etc.* A survey was conducted on Twitter using sentiment analysis, and it was concluded that the usage of happy emojis has declined during the coronavirus outbreak [3].

During the process of analysing the document, one tends to face many challenges [4], *i.e.*:

1. Multiple meanings of the same word.
2. People tend to ask product-related questions in product reviews which are not really review. *e.g.*, “This dress is good?”
3. Sarcastic sentences, *i.e.* a statement with the totally opposite meaning. Such statements tend to give the wrong reviews about the product. *e.g.*, “Such a good product that it stopped working an hour later”.
4. Sentences with no sentiment words still can express sentiments. *e.g.*, “The tube light uses a lot of electricity”.
5. People tend to use short forms in reviews. *e.g.*, “Der is good space 4 two people in dis car”.

CHAPTER 8

Comparison of SDLC Models Based on Software Estimation Techniques**Saru Dhir^{1,*}, Manish Asthana¹, Kapil Dev Gupta¹ and Abhishek Jain¹**¹ Amity University Uttar Pradesh, Noida, India

Abstract: Software estimation has a key role in software project planning due to its huge impact on the software development life cycle. Thus, precise estimation of effort and cost along with the duration of project helps in software project delivery in stipulated time within budget. The agile model helps the team to improve any process over traditional models, and it applies to the estimation process as well. Irrespective of the Software development life cycle (SDLC) model used, it still remains a challenge to accurately estimate the size and effort required for developing the software system.

Keywords: Agile methods, Cost estimation, Effort estimation, Planning, Software estimate.

INTRODUCTION

In the early years of software development, companies used to develop software in an ad hoc fashion and didn't have well-defined process to be followed to minimize the risk for the project. With the technological advancement in computers and easy accessibility of better computational devices, the size of software projects started increasing, and thus software development process and its management has gone through significant changes. Software project planning and estimation become an essential activity in the software development life cycle process and, if performed properly, leads to successful software project delivery [1 - 4]. A software project, which is not estimated properly, exceeds the budget, is delivered late, and does not meet the customer's requirement, thus leads to project failure.

Software estimation is a process to find the most accurate size for the cost of software development in terms of resources, time, and money. This includes effort related to different project life cycles or stages like actual development, testing, maintenance, and operations, *etc.* [5, 6]. Software estimation is important as it

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impacts the budget of the project and translates to money at the end [7]. Software resource estimation is much more difficult compared to other industries, as typically, this involves developing new products or solutions as opposed to fabricating the same product over and over again [8, 9]. This paper presents a comprehensive comparison of the software estimation process in general software projects and agile-based software development process.

SOFTWARE ESTIMATION

Why Estimate?

Project planning is based on several parameters, which include all information needed by the project to perform activities, *e.g.*, taking necessary technical decisions, organizing staffing, coordinating, reporting and budgeting. Estimates of planning parameters should be based on strong inputs or historical data in order to provide confidence to the management or client that any plans based on these estimates are capable of supporting and achieving project objectives [10, 11].

What to Estimate?

Like any project in other industries as well, the resources required for software development projects are limited. Program managers in software development projects always remain under pressure to complete the project in a given timeline and managing the limited resources available. Resource managers in software development projects don't always have the feasibility to deploy more resources to reduce the calendar time. Program managers have to marshal the resources suitably and use them diligently to meet the objectives of the project. According to software engineering, any software project development is required resources categorized in one of these: time, skills required (technology), infrastructure, and money [12 - 14].

1) Time: For any manager, calculating the man-hours required to complete the software development project is the most daunting task. Prospects clients receive a rough estimate in man-hours from their service provider, predominantly based on their prior experience with similar projects and historical data. Software project attributes like size and complexity have a large impact on the schedule of the project. In most cases, the size and complexity of software projects cannot be compared quantifiably. Due to the basic nature of software projects, these estimates may go wrong, and projects are either delayed or cost much higher than projected earlier.

2) Skills (Human resources): Information regarding the knowledge and skills required for the execution of the software development project is important for the delivery of the project. The resource manager must assess currently available knowledge and skills in the team and identify the gaps in the skill set. Planning involves both training the concerned team and acquiring knowledge from external sources. Software estimation must take into account the resource planning, as information about the availability of key resources will ensure the estimates are realistic in nature.

3) Hardware (Computer resources): Nowadays, almost every software project requires an infrastructure setup, which itself requires a lot of planning and effort from the team. From earlier days, when software's development required just computers, software's development practices have evolved to a great extent, and any team these days require many tools for the different life cycle of the project. Considerable effort and cost are required to fulfil these dependencies for the software development.

4) Money: Cost estimation is the most crucial activity for any project as is the case with other industry projects. In software projects, other three estimation parameters also affect the cost of software project indirectly.

Cost prediction is most important for the higher management compared to other estimates. Budget prediction for the software development project is to be done in the planning phase of any iteration of software project.

How to Estimate?

Estimation is a complex process and vary based on the software development life cycle model used in the project. Each team can customize the process depending on project structure and team formation. Broadly the process of estimation has following steps:

1) Divide the objective in sub tasks: Divide the whole project of top level functional delivery into smaller tasks. Depending on the size of the project, this could be two level division to get tasks, which could be assigned to individual persons. Work Breakdown Structure technique is the most widely used method for the breakdown of given piece of work.

2) Assign the sub tasks to individuals: Tasks at most granular level are assigned to the members of the team based on their availability.

3) Effort estimation: Project manager and stakeholders estimates the size and calculate the duration, how much time is required to finish the task, for each of

Internet Privacy Concerns and Social Awareness

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Abstract: Internet Privacy is a matter of grave concern as there is an exponential growth in our digital footprints. Most internet users are not aware of what internet privacy is, and some are not concerned at all. With the growth of cybercrime, internet users must know what internet privacy is and why they should be aware of it. Genuine information or credentials shared online between an internet user and an internet-based service might be intercepted by hackers maliciously or even government bodies legally, can be used for any malicious intent. Some of the recent cases of data breaches support this, making it one of the most critical reasons for internet users hesitant in trusting any internet-based service. The paper gives an idea that the more an internet user is aware of what internet privacy is, chances are the more he/she will be able to trust any internet-based service since the internet is the new platform for social as well as professional trading.

Keywords: Cybercrime, Data breach, Index terms, Internet privacy, Internet privacy Awareness.

INTRODUCTION

Internet or Online privacy amounts to an individual's autonomy over his/her personal information or data publicized *via* the internet. It comprises various factors such as technologies and techniques to secure sensitive data and communication [1]. Online privacy is crucial to users, especially with the growing e-transactions [2]. Privacy infringement is one of the essential things to be considered for a website under development [3]. Online privacy is vital for individuals who shop online, visit a social networking site, engage in online gaming, *etc.* People need to be aware of how important their personal information is that they share with an internet-based service [4]. Doing so will establish proper trust, which will help remove any hesitancy an individual has in any internet-based activity. On the off chance, if an individual's credentials are compromised,

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his/her identity may be in Jeopardy. The recent cases of Whatsapp's privacy changes in January 2021 show how the data of individuals can be used for personal, monetary, and social gains.

INTERNET PRIVACY

Privacy can be exploited as a tool to practice control over us by the government and private sector companies (mainly e-commerce) [5]. It is the key to freedom of thought. An organization monitoring everything we do online eventually prohibits us from delving into ideas outside of the mainstream. It is the cap on the power of the government and private sector companies.

An Individual's data affects vital decisions in his/her life.

This data can affect an individual's reputation, decisions making capabilities, and shaping his/her behaviour. An individual's information is influential in many choices, from getting a loan, insurance, or even a job.

This data can be used by the government for various reasons [6] or by any internet-based service such as a website to show a kind of advertisement and content he/she might view online [7]. Without having the slightest idea about the utilization of our data, we are virtually helpless in today's world. Additionally, what capacity do individuals have to object to the utilization of their information? What are the legal issues if the use of that information harms them [17]? One of the advantages of having freedom is autonomy in our lives, and freedom cannot be achieved if crucial decisions are made in a classified manner behind our backs.

Privacy is about respecting one's individuality. Most individuals don't want others inquiring every little detail about them, hence the phrase "none of your business." If an individual wants privacy, it is not respectful to disregard an individual's desire without a convincing reason. Knowing one's private insights doesn't give more precise judgment about them. Privacy enables individuals to shield themselves from these troublesome judgments. Privacy also helps to minimize the social tensions in our life.

In our day-to-day life, we build relationships with people, both personal and professional; trust is a crucial factor that bonds the relationship. A Breach of confidentiality breaks that trust. In our relationships, such as with physicians and legal advisers, trust is a vital component for keeping honesty in that relationship. When trust breaks in one relationship, that experience makes one resistive to trust someone else in a relationship again. Trust is a crucial component between internet-based services and users. A survey has shown that social awareness and Internet literacy are related to both Internet privacy and intention to transact [8].

INTERNET PRIVACY AWARENESS

In today's world, where mobile applications and digital gadgets are dependent on our data, awakening people about internet privacy is more important than ever. In today's world of online activities (banking, healthcare, social), we encounter various organizations, both public and private, seeking access to information that people consider private [9]. Giant tech companies like Apple, Facebook, Google are collaborating with Governments around the world for analyzing our information [10]. This information can be used legitimately by the organizations to improve their system or can be used illegitimately for personal gains.

People who post their day-to-day life events online should be concerned about their privacy, children, especially [23]. People who are a sufferer of domestic violence, public speakers, and different sensitive groups of people need privacy to ensure their safety and their families [11]. Recent events in the past decade have made us worry about the situation of cybersecurity all around the globe, since technology giants like Facebook, Apple, Microsoft Snapchat, *etc.* faced major data breaches [12], Google accessing user locations, Global surveillance scheme, ISP Spying are to name a few. That's why internet privacy awareness should be mandatory, and it should be our collective obligation to ensure it.

Why Should Internet Users be Aware of Online Privacy?

Online security affects everyone who interacts online. Invasion of privacy implies gaining personal insights that offer admittance to one's life. The data privacy issues exist because numerous information is available on the internet from a wide variety of sources, such as medical records, legal and judicial records, financial records and banking transactions, genetic data, residential and geographical records, user activity through cookies [13].

Online Users should be aware of the importance of their data they share on the internet, also they should be mindful of the policies of the government on privacy & data protection of their respective countries and the countries where their information is stored since different countries have different laws on data protection [14]. Also, it is a good part on the user end if he/she reads a service agreement when agreeing to use any web service, rather than clicking " I Accept " blindly. Being aware of these policies is advantageous for users from different parts of the globe to be more transparent in terms of business, social networking, *etc.*

Beat the Virus

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Abstract: Coronaviruses (CoV) are a very large group of viruses that causes sickness going from the regular virus to progressively extreme maladies. An epic coronavirus (nCoV) is a different strain that has not been recently found in people. Point by point, the investigation found that SARS¹-CoV was a transfer from people to people and MERS-CoV from dromedary camels ²to people. A few known coronaviruses are getting in creatures that have not yet contaminated normal people. Normal indications of virus incorporate respiratory side impacts³. In increasingly extreme cases, the disease can cause pneumonia, severe intense respiratory disorder, kidney disappointment, and even demise. In view of the rising epidemic of ‘COVID-19’; “BEAT THE VIRUS” is a side scroller⁴ entertaining game established to make people realize the importance of hygiene and sanitization in beating the epidemic⁵ of this virus. Side scrollers expect clients to move one consistent way (generally to one side). By means of a fun game, people will know the importance of ‘Masks’, ‘Gloves’ and ‘Hand Sanitizer’ in fighting the virus.

Keywords: Corona Virus, CoV, Covid-19, Epidemic, Virus.

INTRODUCTION

Coronaviruses (CoV) are a very large group of virus that causes sickness going from the regular virus to progressively extreme maladies, for example, Middle East Respiration Syndrome (MERS-CoV) and Severe Acute Respiration Syndrome (SARS-CoV). An epic coronavirus (nCoV) is a different strain that has not been recently found in people [1]. In view of the rising epidemic of ‘COVID-19’; “BEAT THE VIRUS” is a side scroller entertaining game established to make people realize the importance of hygiene and sanitization in beating the epidemic of this virus. By means of a fun game, people will know the importance of ‘Masks’, ‘Gloves’ and ‘Hand Sanitizer’ in fighting the virus. The genre side-scrolling game is one where a side-see camera edge is utilized for activity seeing. Side scrollers, for the most part, are used in 2-D view with game characters that move from the left to the correct side of a screen. Some side scrollers expect

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clients to move one consistent way (*generally to one side*). Be that as it may, many side scrollers permit backtracking, just as up, down, left, and right developments. Side scroller games were well known during the brilliant period of arcade computer games and third-era technology. Beat the virus is a side-scrolling entertainment game in which the character, 'Bob' is on a hunt for the Covid-19 vaccine.

On the way to find the vaccine, he faces many challenges and hurdles. The game is embedded with immense features of collecting things which helps one in fighting the virus. Throughout the path toward a vaccine, Bob has to save himself from the enemy, *i.e.*, coronavirus, as Bob's life is reduced when he comes in contact with the virus. To prevent the virus, Bob has to pick up sanitary *collectibles* like 'sanitary mask', 'hand sanitizers' and 'gloves'. The rules for playing the game and user-provided instructions for actions done by Bob are very simple. The main aim of the game is to spread awareness among all age groups without having the boundaries of age range. As we all know, doctors, nurses, police, and other social workers have left no stones unturned to ensure proper awareness and safety to us by risking their own life. So the game 'Beat the Virus' shows respect and appreciation to our real-life heroes.

The game, 'BEAT THE VIRUS,' is loaded with immense action, graphics, particles, and vibing sound effects. A touch screen is used for the stimulated control of the platform. With particle effects for death and destruction, the game is a great source of entertainment with life-saving awareness.

COVID 19

Coronavirus illness 2019 (COVID-19) is an infectious disease caused by severe intense respiratory condition coronavirus 2 (SARS-CoV-2). It was first recognized in December 2019 in Wuhan, China, and has since spread all around, coming about as *progressing pandemic*. As of 27 May 2020, more than 5.61 million cases have been accounted for across 188 nations and regions, coming about in more than 350,000 passings. More than 2.3 million individuals have recovered [2, 3].

Normal indications include fever, cough, fatigue, shortness of breath, and loss of smell and taste. While most of the cases bring about mellow side effects, some advancement to acute respiratory pain syndrome (ARDS) is likely encouraged by a cytokine storm, multi-organ failure, septic stun, and blood clots. The time from introduction to the beginning of symptoms is commonly around five days yet may extend from two to fourteen days.

The infection is primarily spread between individuals during close contact:

- [a] Most regularly *via* small droplets produced by coughing,
- [b] Sneezing and talking.

The beads, for the most part, tumble to the ground or onto surfaces rather than traveling through air over long distances. Less usually, individuals may get tainted by contacting a defiled surface and afterward contacting their face. It is generally infectious during the initial three days after the beginning of indications, albeit spread is conceivable before manifestations show up and from individuals who don't show symptoms. The standard strategy of diagnosis is *by real-time invert translation polymerase chain reaction* (rRT-PCR) from a nasopharyngeal swab. Chest CT imaging may likewise be useful for analysis in people where there is a high doubt of disease dependent on side effects and hazard factors. As it may, rules don't suggest utilizing CT imaging for routine screening.

Prevention

To prevent contamination and to slow transmission of COVID-19, do the accompanying [4]:

- Use proper soap to wash your hands.
- Practice social distancing. Don't touch face with fingers.
- Spread your mouth and nose when hacking or sniffing.
- Avoid going out of the home.
- Do regular home exercise.
- Avoid public gatherings.

COVID-19 affect a different individual differently. Most befool people will create gentle to direct disease and recuperate without hospitalization [5].

Most regular side impacts are:

- fever.
- dry cough.
- tiredness.

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