Design And Implementation Of A Web-Based Information System For Combating The Spread Of Computer Virus: A Viral Marketing Approach

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Abstract: Today, the effects of computer virus cannot be undermined as it has become a major threat to both computer professionals and users alike. Undoubtedly, rapid development in information technology has also aided the advent of computer virus through huge clusters of computer networks and communication links. Over the years, anti-virus softwares have been on the fore-front in the fight against the spread of computer viruses which have proved to be effective. However, The researchers believe that prevention remains the best measure for protection. A descriptive survey design was used for the study to analyze the existing system which concentrates more on curative measures other than preventive measures. Several techniques were adopted such as careful observation of the existing system on fighting computer viruses, collection of relevant information from the internet. Agile development methodology was employed in developing a design process for the proposed system. Visual ASP DOT NET programming language 2008 Express Edition was chosen as the language of development with MY SQL database as the back end. The expected result is a web-based information system that will adopt a viral marketing approach in spreading preventive measures regarding best operational practices, safe internet browsing and other educative measures that will reduce vulnerability of computer users to its minimum.

Keywords: Computer, Computer virus, viral marketing,...

Introduction

Today, the effects of computer virus cannot be undermined as it has become a major threat to both computer professionals and users alike. Undoubtedly, rapid development in information technology has also aided the advent of computer virus through huge clusters of computer networks and communication links. Computer virus share lots of similarities with their biological counterparts. Both append themselves as parasites to a host for propagation through self-replication.

According to Wing W; (2006), viruses may carry out damaging activities on the host machine such as corrupting or erasing files, overwriting the whole hard disk, or crashing the computer. Some viruses may print text on the screen or simply do nothing. These viruses remain harmless but keep reproducing themselves. In any case, viruses are undesirable for computer users.

Presently, computer viruses are causing undesirable effects on programs, infecting personal computers (PCs) and servers. Some cause mere annoyance, others cause real damage: delete and modify files, steal and run unwanted applications, some even send messages via emails and cripple the operations of the operating system, all of which are encountered by individuals, organizations and institutions alike. Observations show that existing techniques in the fight against computer viruses are relevant, they supply only partial solutions; perfect and universal measures against all possible virus scenarios do not exist. However, that is not to say that we are powerless to combat viruses, contain their effects, or limit their capability to do damage.

John D; (1987) as cited in Oyelere; (2015) provides that "you cannot write a program that can with 100% certainty look at a file and decide whether it is a virus… He also found out that a virus on a computer system travelled further and faster than anyone had imagined. More so, there are other worrisome trends that tend to turn the tide in favour of computer viruses ranging from: the rate at which more viruses are created to continued increase in inter-connectivity among computers through computer networks and the internet.

Matt B; (2018), in his work states that "computers are the bane of modern computing. An estimated 50,000 computer viruses provide a variety of effects ranging from the merely unpleasant to the catastrophic. They attack all platforms and are written in all popular computer languages".

According to Kevin J; (2014), "Computers and computer users are under assault by hackers like never before, but computer viruses are almost as old as electronic computers themselves. Most people use the term "computer virus" to refer to all malicious software, which we call malware. Computer Viruses are actually just one type of malware, a self-replicating program designed to spread itself from computer to computer. A virus is, in fact, the earliest known malware invented".

Although a lot have been done in combating the menace of computer virus through anti-virus software which require regular update to ensure continuous effectiveness, there is need to do more in prevention as in most cases in life; prevention in the case of computer virus seem to be the best option for protection. The researchers believe that in addition to the use of antivirus software, computer users can be made less vulnerable to virus infection if kept abreast on how to stay safe through educational tips on current trend regarding virus spread and infection, best operational practices for prevention purposes. Thus, computer virus infection can be prevented more by adopting a viral approach in spreading preventive measures among computer users.

The Concept of Viral Marketing

Wikipedia defined viral marketing as "a marketing technique that seeks to exploit pre-existing social networks to produce exponential increase in brand awareness through viral processes like the spread of an epidemic". It is word of mouth delivered and enhanced online. It harnesses the network effect of the internet and can be useful in reaching large number of people in a short while.

According to MarketingSchool; (2012), "viral marketing is a business strategy that uses existing social network to promote a product or awareness. It refers to how information about a product is spread with other people in the social network. However, modern technology has allowed the viral effect to include many internet-based platforms as well." Originally, viral marketing campaigns have been catalyzed by email systems. However, the advent of online communities, social networks and online forums have proven to be a more effective way of disseminating information exponentially faster than ever. Thus, an effective viral marketing campaign can be likened to an epidemic outbreak of a virus that can only be limited by the relevance of the message.

Unlike biological and computer viruses, many people welcome viral marketing because it gives them raw information, a chance of feeling socially accepted, being in the know, and following the latest fashion. "It flexibly supplies needed information" (Jeffrey; 2001).

Common Viral Marketing Techniques

To ensure a successful viral marketing campaign, some techniques must be employed in its messaging as identified by most authors: Mindcomet; and Tara; (2017) in their works identified most common viral marketing messaging as follows:

a) **Free Products or Services:** Introducing giveaways in form of product and services can spark up interest. People naturally will talk about what they got free and tell others how to get it too.
b) **Compelling Content:** Good content and concept can often make or break a viral campaign. Quality content can often be more expensive but offers better result. Using a video for instance can offer a viewer the chance to engage a given product or service, it can also be fun and entertaining.
c) **Exclusivity:** This tells about a message designed to appeal to our natural tendency to desire things we can't normally have. It might be invitation to join V.I.P clubs, having access to products prior to their release to the public. However, Mindcomet highlights that this tactics can lose its appeal if spread too widely.
d) **Social Media:** Schofield maintained that it's almost impossible to engage a broad-scale viral marketing without using social networks like Facebook, Twitter, YouTube, or other sources. She further stated that these media allow people to easily share your message and greatly increase the likelihood that it will go viral.
e) **Use of Rewards:** Using rewards and financial incentives can play a role in viral referral campaigns. Users can be incented to pass long a message or link in exchange for some kind of reward or compensation, this can be inform of points, special offers, free SMS units and in some cases cash.

Based on the foregoing facts, this work intends to create an internet based information system that will adopt a viral marketing approach in spreading preventive measures among computer users in the fight against the spread of computer viruses.

Statement of the Problem

In today's highly computer dependent environment, computer security is a major concern which is routinely threatened by malicious programs such as computer viruses, Trojan horses, worms and the like. "People accumulate data from many sources using various available electronic devices to store data on their computers, most of whom are not fully computer literate and unaware of computer virus threats. Theses computer viruses spread when users share data from computer to computer, an internal network or the internet.

Once this happens, the data stored in it becomes insecure and the system becomes a source of infection to other systems during data transfer" (Imran K; 2014).

The problem at hand is the spread of computer virus which poses serious threat to computer users. Oyelere; (2015) posits that computer virus still seem to be in the infancy stage in developing African countries though some measures have been taken on the control of viruses by introducing anti-viruses.

More so;

a) The spread of computer viruses is on the increase as newer versions are released,

b) Increase in networks among computers in the world designed to benefit users are likely to boost the spread of these viruses as well.

c) Observations show that more have been done in virus detection, removal and analysis. This is made possible through activity monitors, scanners and disinfectors that try to dictate viral infection on a given computer system and to restore infected programs and files to their uninfected state if possible.

Objectives of the study.
The main objective of this study is to create an internet based platform that will adopt a viral approach in spreading conscious preventive measures in the fight against the spread of computer virus. In order to achieve this aim, the study would perform the following specific objectives:

a) Analyze the existing system for combating the spread of computer virus with respect to its short-falls.
b) Develop a design for the proposed system. This will comprise of:
   ▪ An algorithm of the proposed system.
   ▪ Models of the proposed system such as the dataflow diagram, system flowchart as well as a sequence diagram of the proposed system.
c) Employ a suitable language and database system for coding the new system.
d) Test and implement the new system.

Methodology
Methodologies are often the process backbone of significant web development projects. For the benefit of delivering the proposed system, the researcher adopted the Agile Methodology owing to the following reasons:
a) Agile advocates developing in iterations in order to deliver value to the users, and for the efficiency of the system. Research shows this to be faster and more efficient than hierarchical flow of control.
b) Agile methodology eliminates waste by selecting only the truly valuable features for a system, prioritizing those selected, and delivering them in small batches.
c) It emphasizes the speed and efficiency of development workflow, and relies on rapid and reliable feedback between programmers and users.
d) Agile uses the idea of work product being pulled via customer request.
e) It concentrates on concurrent work and the fewest possible intra-team workflow dependencies. It also strongly recommends that automated unit tests be written at the same time the code is written.

Agile methodology describes a set of principles and values for software development where requirements and solutions evolve through adaptive planning, evolutionary development, early delivery, continuous implementation as well as rapid and flexible response to change. The Agile method came to light by the Agile Manifesto in 2011 as an umbrella term describing methodologies. It laid emphasis on:
   ▪ Individuals and interactions over processes and tools.
   ▪ Working software over comprehensive documentation.
   ▪ Customer collaboration over contract negotiation.
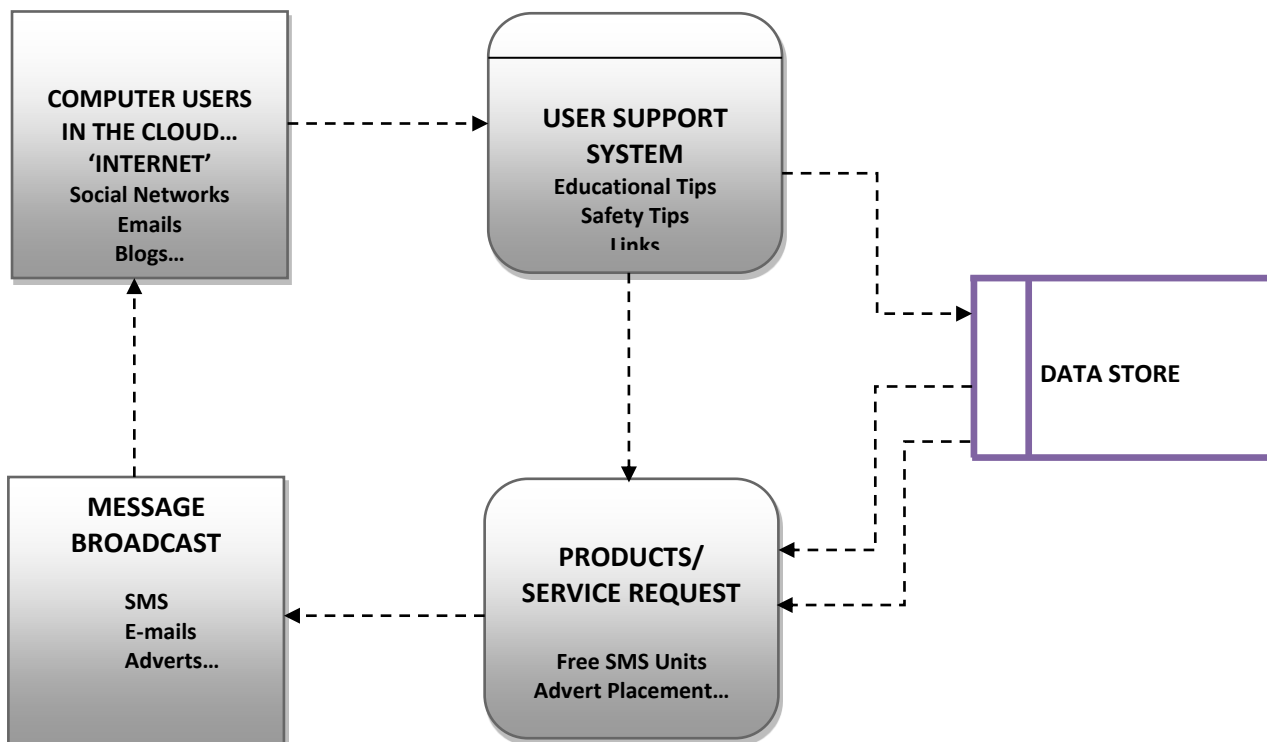   ▪ Responding to change over following a plan.

The Proposed System
The proposed system is a web based platform that will adopt a viral marketing approach in the fight against the spread of computer virus. This is not an attempt to create any antivirus software rather leveraging on the internet to spread educative cum preventive

measures that will promote best operational practices while minimizing vulnerability among computer users. Specifically, the proposed system is expected to promote:

a) Educational tips on computer virus infection.

b) Alerts on outbreak of new virus and possible preventive measures via emails.

c) Provide links to free up-to-date antivirus software as well as news feeds

d) As a viral marketing campaign, the system is expected to offer free SMS units and placement of adverts with the condition of creating an account and adding up a certain number of friend's email addresses. Once done, mails will be sent automatically to those addresses with attached link to the website. Secondly, the system will also append a link to the site inviting all recipients of SMS via the online platform. This cycle will ensure easy and wider spread of the campaign while reaching out to numerous computer users.

HIGH LEVEL MODEL OF THE PROPOSED SYSTEM...DFD

COMPUTER USERS IN THE CLOUD... 'INTERNET'
Social Networks
Emails
Blogs...

USER SUPPORT SYSTEM
Educational Tips
Safety Tips
Links

DATA STORE

MESSAGE BROADCAST
SMS
E-mails
Adverts...

PRODUCTS/ SERVICE REQUEST
Free SMS Units
Advert Placement...
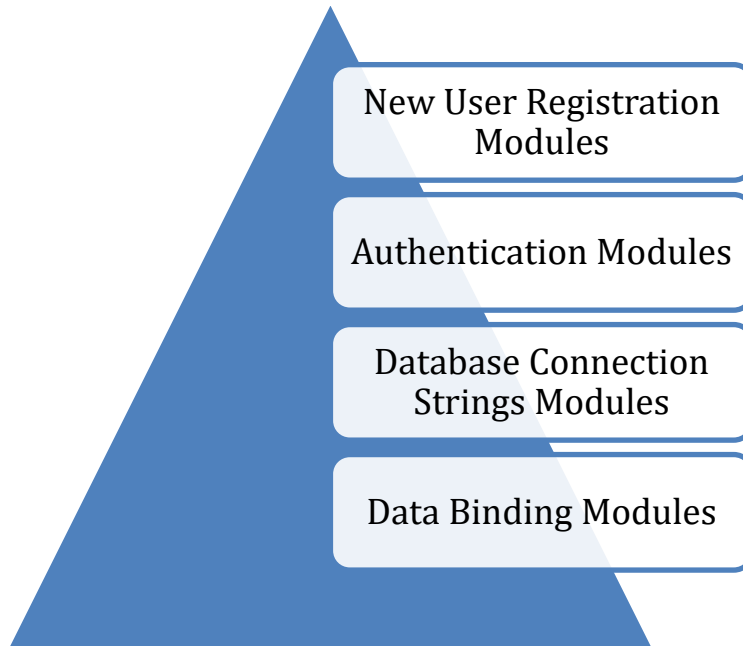
The diagram below shows the program modules used:

Fig.10: Program modules

Descriptions:

a) **New User Registration Modules:** This ensures that any unregistered user who wishes to register is enrolled. The registration details are saved to the database. However, there is provision for a user to recover forgotten password.

b) **Authentication Modules:** Authorized username and password is entered in order to gain access to the program. Unauthorized users without the required username and password will not be granted access.

c) **Database Connection Strings Modules:** These modules ensure that the required database name and tables are used. There is a data adapter specified where necessary.

d) **Data Binding Modules** Data binding connects data from a custom element (the host element) to a property or attribute of an element in its local DOM (the child or target element). The host element data can be a property or sub-property represented by a data path, or data generated based on one or more paths.

Program Output Design

SAY NO TO VIRUSES

HOME   **SHARE YOUR EXPERIENCE**

smee   LOGOUT

By sharing your experiences with Viruses, Malwares and Hackers, other users are made aware of the dangers ahead.

Saturday, March 16, 2019

Post your Experience

Subject

Subject

Comment

Upload Picture (Optional)

Browse...   No file selected.

SUBMIT

RECENT POSTS

Posted by: *smee*
Date: *Saturday, March*
Subject:
I think I was Hacked!
Comment:

There was an incident yesterday night when I tried accessing the internet, and suddenly my system became very slow, Could it be that I was hacked?

Posted by: *Smee*
Date: *Friday, March 1*
Subject:
Solution to Virus Infection
Comment:
If you suspect your Computer already has a Virus : 1. Start your computer in safe mode and run an anti-virus scan of your entire computer. 2. Refer to your computer software supplier's customer support team to see if they offer any tools or resources to extract the virus from your computer. 3. Be sure to delete all of your temporary files in safe mode. 4. Use Malware

software to scan for additional threats to your computer and security.

Conclusions

A web based viral marketing application has been successfully designed and created to combat the ignorance of numerous computer users. This new system, unlike the existing one has features that make it unique, effective and more reliable. The features include:

i) It is web based which makes it accessible to clients all over the world.

ii) It is also user friendly and simple to use. It has tool tips where necessary.

iii) It contains a knowledge base which contains information relating to viruses which have been encountered by other users.

iv) The high level of operating efficiency, which has been incorporated into the new system, has helped immensely to enhance quick decision-making by computer users when visiting unsafe web pages. Thus, there is improved confidence among computer users

Contributions to Body of Knowledge

This research work has contributed immensely to its body of knowledge which is the Information and Communication Technology ICT. The pros are as follows:

1. This work will help in creating awareness and reawakening the consciousness of computer users on the need for adopting efficient antivirus or firewall to secure their systems on the web.
2. The relationship between computing and user safety can be clearly seen from this research work.
3. Software development and maintenance is an important process in safe computing all around the world.

Recommendations

One primary interest in safe computing is the use of a feedback mechanism. The researcher recommends that this viral marketing application be adopted by institutions and every internet user for optimum performance and feedback measurements on the web. This will help to provide end-users all around the world with effective support, improved issue resolution and user satisfaction.

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