

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

Smart Appointment Reservation System

S. Sri Gowthem¹, K.P. Kaliyamurthie²

¹Assistant Professor, Department of CSE, Bharath University, Chennai, India

²Professor & Head, Department of CSE, Bharath University, Chennai, India

ABSTRACT: The smart appointment reservation system is an electronic paper less application designed with high flexibility and ease of usage for patients to book their appointment within the scheduled appointment slots according to their preference. This system serves in managing appointments and provides patient to cancel or reschedule appointment by integrating distributed clinical systems into a set of consistent and convenient services accessible via a web browser. The administrator checks the patient's requests, manages the appointment schedule, and maintains the patient's information. The patients will receive the scheduled updates regarding confirmation of appointments, delay in appointment schedules and unavailability of doctor. This smart appointment reservation system gives patient a chance to provide feedback about the system to enhance the services. The design of the proposed system provides easy way for the patient to reserve their appointment with their preferences. The implementation of this proposed system is done by developing web forms applications using .NET Framework 4.0 tools and technologies in visual studio 2010. And the SQL Server 2008 to obtain the building of the system.

KEYWORDS: Web based, Appointment, Dynamically, Scheduling, SMS.

I. INTRODUCTION

A health care system consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities. Examples of health workers are doctors, nurses, midwives, dieticians, paramedics, dentists, medical laboratory technologists, therapists, psychologists, pharmacists, chiropractors, optometrists, community health workers, traditional medicine practitioners, and others.

Currently, many healthcare providers are emerging in primary health care use computerized information systems to a certain extent. The design and implementation of integrated health information system is challenging due to the heterogeneity and autonomy of different clinical specialties and differences in ownership of clinical practice and resulting differences in information systems that they use. The emergence of the Web Services Technologies brings the opportunity to addressing the above challenges by using new set of technological solutions.

Appointment scheduling systems lie at the intersection of efficiency and timely access to health services. Timely access is important for realizing good medical outcomes. It is also an important determinant of patient satisfaction. The ability to provide timely access is determined by a variety of factors. Patients' satisfaction with an appointment system when they attempt to book a nonurgent appointment is affected by their ability to book with a doctor of choice and to book an appointment at a convenient time of day.

Patient registration system in most health care institutions is carried out using paper or is not carried out at all, and arrival of patients to health care institutions without reservation system results in live queues at consulting rooms. When reservation is made in paper form, it is not possible to combine information flows from different health care institutions in practice patients are not able to choose the most suitable physician and visit time among different institutions. Paper registration allows work for one operator only and in single workplace. This restricts efficiency of work and results in queues at reception desks and blockages of telephone lines. Expediency of such system is low and fails meeting needs of both users of health care services (the patients) and suppliers of these services (physicians, reception desk personnel and administration staff). Most elements of the reservation system are ineffective, and therefore too much time of human resources, patients and employees is consumed for usual operations, and material costs are too high as well.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

Smart appointment reservation system deals with problems related to patient visit reservation in health care institutions are

- Much personal time spent when registering for a visit and while waiting at consulting rooms
- Limited selection possibilities for patients
- Inefficient use of human resources in health care institutions
- Inefficient management of health care institutions due to inadequate flows of information.

The objective of the project is to improve the appointment booking system with patients' preferences and updates about the patient appointments will be intimated through SMS alerts dynamically. It also provides a platform for patient to cancel or reschedule their booked appointments.

II. RELATED WORKS

[1] Patient Appointment Reservation System (PARS) has been created to improve the quality of health care services increasing the availability, expedition and the effectiveness of the information of physicians' visits time using modern information technologies.[1]

[2]The Dentist Online Reservation System Design and Implementation Web Based Application, This system implements a database system which the transactions can be done in web base application[2].

[3]Dynamic Scheduling of Outpatient Appointments Under Patient No-Shows and Cancellation. This system describes about the design framework to propose heuristic dynamic policies for scheduling patient appointments, taking into account the fact that patients may cancel or not show up for their appointments.

[4]Appointment Systems with Patient Preferences

The author designs a framework for the appointment systems that dynamically update patients preferences to improve booking decisions.

[5]Optimal outpatient appointment scheduling. This paper explains a local search procedure is derived that converges to the optimal schedule with a weighted average of expected waiting times of patients, idle time of the doctor and tardiness (lateness) as objective.

[6]Appointment scheduling in health care:Challenges and opportunities.This project reduces time to find a suitable match among the available time slots of providers in the clinic,provider prescribed restrictions on how available slots may be filled and patients' preferences for day/time of week as well as for a particular service provider.

III. PROPOSED SYSTEM

Scheduled consultation times of physicians are entered into the Patient Appointment Reservation System by admin. There is an opportunity for specialists to enter their planned consultation times themselves if they sign into the system.

Patient can view the hospital details, doctor's profile including the visiting time of the doctor. For booking an appointment the patients' details are entered into Patient Appointment Reservation System by registering themselves through web browser.[3] After registration the patients' can login and book their appointment with their preferences.

Patient can also cancel or reschedule their appointment at their convenience. The appointment updates includes booking, cancelling or rescheduling of appointments will be intimated through SMS. Also the patient receives text messages reminding about upcoming visit time, informing about time or the availability changes of the visit. [4]

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

OVERVIEW :

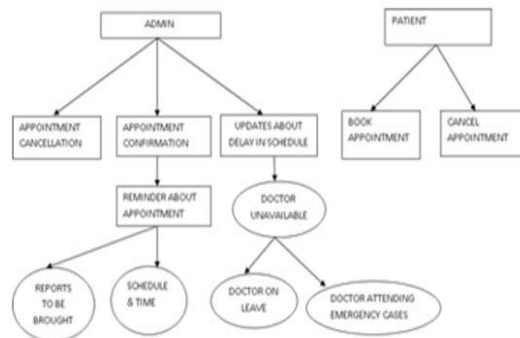


Figure 3.1 General Overview

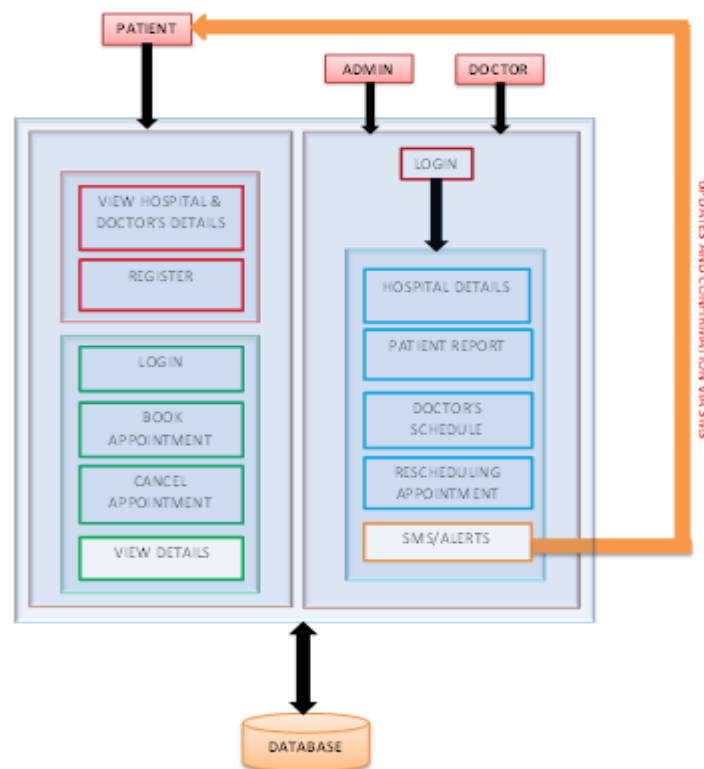


Figure 3.2 Architecture Diagram

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

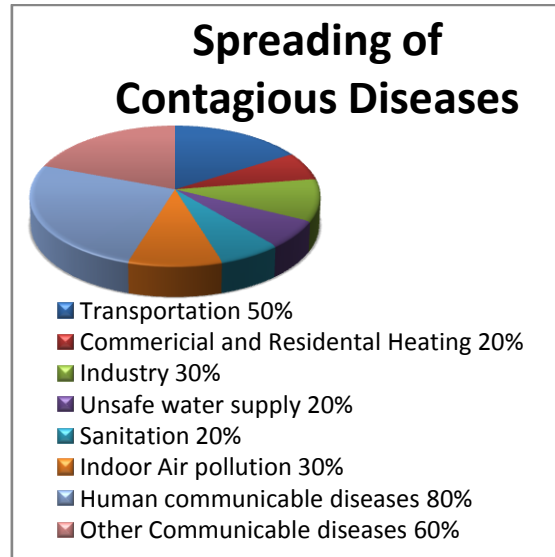


Figure 3.3

The diagram depicts the spreading of contagious diseases.[5]

Our project reduces the waiting time for patients at the hospital. It's convenient for patient to come to hospital according to their appointment time. So that they need not wait at the hospital for long time this prevents patients especially kids getting affected by contagious diseases.[6]

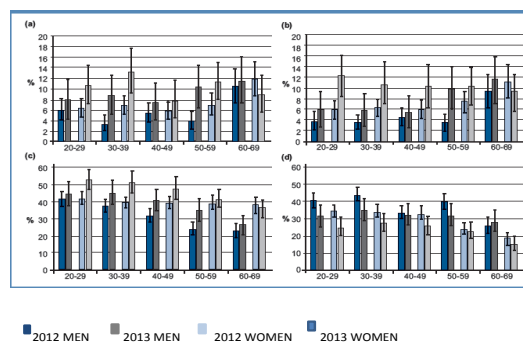


Figure 3.4

This Graph Depicts the Comparison Between the Men and Women Getting Affected By Pollution in the Year 2012 and 2013

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

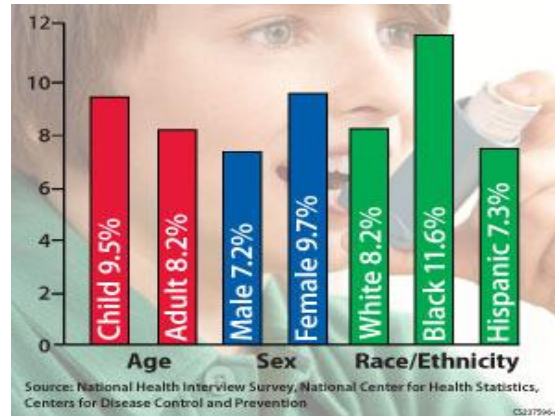


Figure 3.5

This Graph depicts the Current Percentage of People Getting Affected By Spreading Of Diseases – Age, Sex, Race/Ethnicity

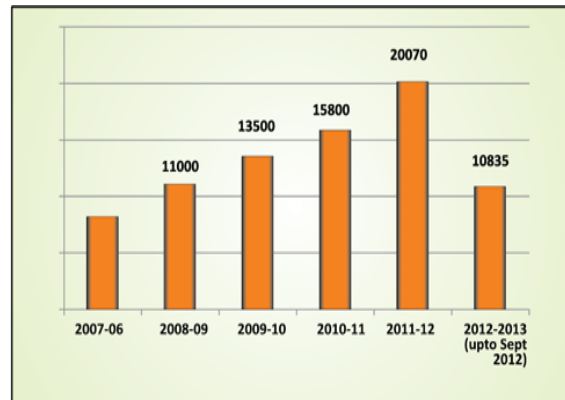


Figure 3.6

This Graph(Figure 3.6) shows the people getting affected by Pollution over the year 2007-2013

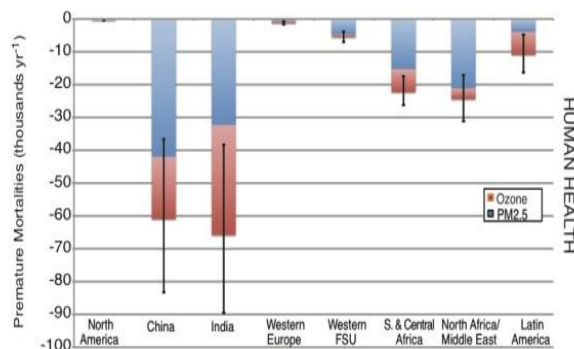


Figure 3.7

This Graph shows the comparison of Premature Mortalities among Various countries

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

IV. IMPLEMENTATION

To implement the web based application for the proposed system, we start with developing Web Forms applications using .NET Framework 4.0 tools and technologies in visual studio 2010 and the SQL Server (2008) to obtain the building of the system. The processes include on coding activities that enhance the performance and scalability of the Web site application. The .NET Framework provides an extensible architecture for customizing the behaviour and display of components and controls in design mode.[7]

Home page (Figure 4.1) of the Smart appointment reservation system allows the patient to select the options provided in the site. Once a patient has successfully logged in, the appointment selection web page (Figure 4.7) will be displayed.

The patient can select their preferred appointment date, time ,doctor and book their appointment. If the initial preference cannot be met, an alternative choice will be presented automatically, including the available time, date and doctors in the medical centre.[8] Once the patient clicks Submit button, the appointment information will be stored into the clinical database. Then the system will generate a confirmation SMS to the patient's contact number and also mail will be sent to their respective email address.

Admin manages the appointment schedules and also maintains patients' health record.[9] If there is any change in schedule of the doctor or if the doctor's arrival will be delayed it will be intimated to patient through SMS.

The outlook of the proposed system will be

HOME PAGE



Figure 4.1 Home Page

Figure 4.1 shows the home page of the proposed system.[10] From this page the admin/doctor/patient can navigate to other pages through the tabs provided.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

LOGIN FORM

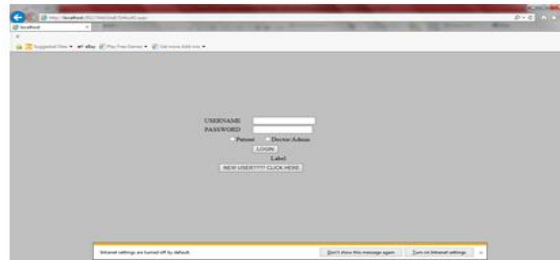


Figure 4.2 Login Page

Figure 4.2 shows that the patient /admin can login to this system by giving their username and password.[11]

ADMIN LOGIN



Figure 4.3 Admin Page

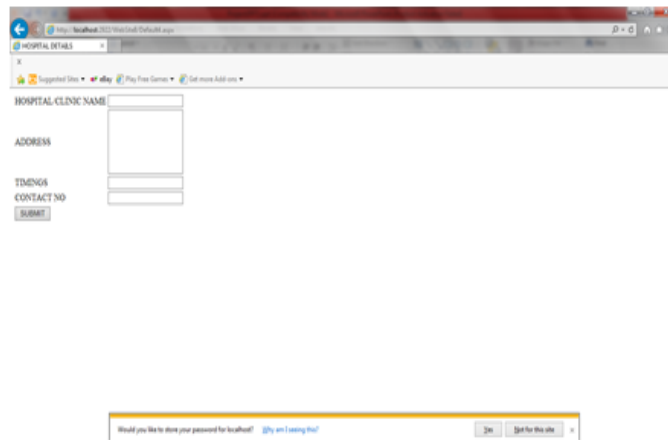
International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

Figure 4.3 shows that the admin can view, edit or add hospital and doctor details.

ADDING HOSPITAL DETAILS



The screenshot shows a web browser window with the title 'HOSPITAL DETAILS'. The form contains the following fields: 'HOSPITAL CLINIC NAME' (text input), 'ADDRESS' (text area), 'TIMINGS' (text input), and 'CONTACT NO' (text input). A 'SUBMIT' button is located at the bottom left of the form. Below the form, a security warning asks: 'Would you like to store your password for localhost? (You are leaving this)'. The warning has 'Yes' and 'Get for this site' buttons.

Figure 4.4 Hospital Detail

Figure 4.4 provides the admin to add the hospital details mentioning the hospital name, address, overall hospital timings and Contact number.[12]

ADDING DOCTOR'S DETAILS



The screenshot shows a web browser window with the title 'HOSPITAL DETAILS'. The form contains the following fields: 'HOSPITAL CLINIC NAME' (text input), 'DOCTOR'S NAME' (text input), 'DESIGNATION' (text input), 'SPECIALIST IS' (dropdown menu), 'VISITING TIMINGS' (text input), and 'NO OF APPOINTMENTS' (text input). A 'SUBMIT' button is located at the bottom left of the form. Below the form, a security warning asks: 'Would you like to store your password for localhost? (You are leaving this)'. The warning has 'Yes' and 'Get for this site' buttons.

Figure 4.5 Doctor Detail

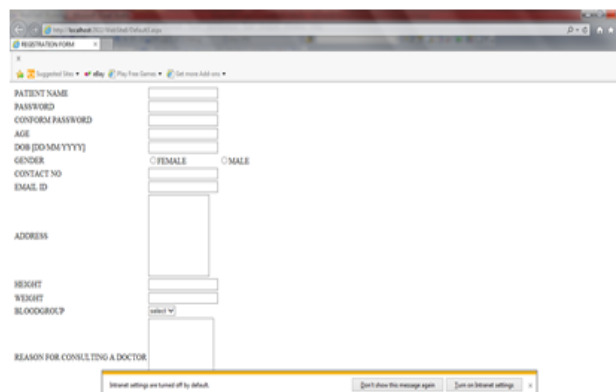
International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

Figure 4.5 provides the admin to add the doctor details to the corresponding hospital name.[13] The doctor details includes the Doctor name, designation, specialisation, their visiting timings and the number of appointments the doctor can visit.

PATIENT REGISTRATION

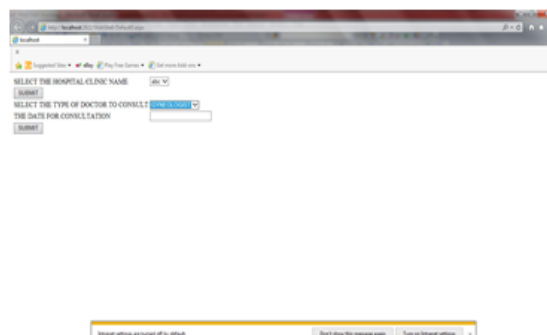


The screenshot shows a web browser window with the title 'PATIENT REGISTRATION FORM'. The form contains the following fields: PATIENT NAME, PASSWORD, CONFIRM PASSWORD, AGE, DOB (DDMMYYYY), GENDER (with radio buttons for FEMALE and MALE), CONTACT NO, EMAIL ID, ADDRESS, HEIGHT, WEIGHT, BLOODGROUP (with a dropdown menu), and REASON FOR CONSULTING A DOCTOR. At the bottom of the form, there is a status bar that reads 'Internet settings are turned off by default' and two buttons: 'Don't show this message again' and 'Get on Internet settings'.

Figure 4.6 Patient Registration Form

Patient can register (Figure 4.6) by providing their details to book their appointments (Figure 4.7) by selecting the hospital name, specialist at the hospital and the date of consultation.

BOOK APPOINTMENT



The screenshot shows a web browser window with the title 'BOOK APPOINTMENT'. The form contains the following fields: 'SELECT THE HOSPITAL/CLINIC NAME' with a dropdown menu and a 'SUBMIT' button, 'SELECT THE TYPE OF DOCTOR TO CONSULT' with a dropdown menu and a 'SUBMIT' button, and 'THE DATE FOR CONSULTATION' with a text input field and a 'SUBMIT' button. At the bottom of the form, there is a status bar that reads 'Internet settings are turned off by default' and two buttons: 'Don't show this message again' and 'Get on Internet settings'.

Figure 4.7 Appointment Booking Page

With this page the patient can proceed by booking their appointments with their preferences and also they can cancel or reschedule their appointments and confirmation will be sent through SMS.[14]

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2015

V. CONCLUSION AND FUTURE WORK

This paper proposed an Smart appointment reservation system for patient can be completely automated through an online scheduling software program which integrates hospital details and patient's health care information onto a single site and provides patient an easy way of booking appointment according to their preference and can access their health care information in a convenient way.

The benefits of implementing this technology touch everyone involved in the scheduling process, as administrators and staff can conduct their tasks more efficiently and accurately, while customers and clients have the ability to book their appointments and reservations quickly and more conveniently

The future work will be focusing on specifying the vaccine information for kids and details of future visiting schedule for pregnant women.

Also provides patient to consult the doctor through the video conferencing, so that the patient will be secured from spreading of diseases and getting affected from pollution.

REFERENCES

1. Patient Appointment Reservation System (PARS)- Vilnius (2008)
2. Vijayaragavan S.P., Karthik B., Kiran T.V.U., Sundar Raj M., "Robotic surveillance for patient care in hospitals", Middle - East Journal of Scientific Research, ISSN : 1990-9233, 16(12) (2013) pp. 1820-1824
3. ChutisantKerdvibulvech, Nwe Ni Win
- The Dentist Online Reservation System Design and Implementation Web Based Application and Database Management System (2012)
4. Vijayaragavan, S.P., Karthik, B., Kiran Kumar, T.V.U., Sundar Raj, M."Analysis of chaotic DC-DC converter using wavelet transform", Middle - East Journal of Scientific Research, ISSN : B27, 16(12) (2013) pp.1813-1819.
5. Nan Liu, Serhan Ziya, Vidyadhar G. Kulkarni- Dynamic Scheduling of Outpatient Appointments Under Patient No-Shows and Cancellation(2010) Manufacturing & Service Oper. Management 12(2) 347-364
6. Vijayaraghavan K., Nalini S.P.K., Prakash N.U., Madhankumar D., "Biomimetic synthesis of silver nanoparticles by aqueous extract of *Syzygium aromaticum*", Materials Letters, ISSN : 0167-577X, 75() (2012) pp. 33-35.
7. Wen-Ya Wang, Diwakar Gupta-Adaptive Appointment Systems with Patient Preferences (2011)
8. Kaandorp, G. C., G. Koole. 2007. Optimal outpatient appointment scheduling. Health Care Management Sci. 10(3) 217-229
9. Gupta, D., B. Denton. 2008. Appointment scheduling in health care:Challenges and opportunities. IIE Trans. 40(9) 800-819
10. Savin, S. 2006. Managing patient appointments in primary care.S. Hillier, F. R. W. Hall, eds. Patient Flow: Reducing Delay in Healthcare Delivery, International Series in Operations Research & Management Science, Vol. 91. Springer, New York, 123-150.
11. Vijayaraghavan, K., Nalini, S.P.K., Prakash, N.U., Madhankumar, D., "One step green synthesis of silver nano/microparticles using extracts of *Trachyspermum ammi* and *Papaver somniferum*", Colloids and Surfaces B: Biointerfaces, ISSN : 0927-7765, 94() (2012) pp. 114-117.
12. Robinson, L. W., R. R. Chen 2003 Scheduling doctor's appointments:Optimal and empirically-based heuristic policies. IIE Trans. 35(3) 295-307.
13. Kulanthaivel L., Srinivasan P., Shanmugam V., Periyasamy B.M., "Therapeutic efficacy of kaempferol against AFB1 induced experimental hepatocarcinogenesis with reference to lipid peroxidation, antioxidants and biotransformation enzymes", Biomedicine and Preventive Nutrition, ISSN : 2210-5239, 2(4) (2012) pp.252-259.
14. Murray, M., D. M. Berwick. 2003. Advanced access: Reducing waiting and delays in primary care. J. Amer. Medical Assoc. 289(8)1035-1040.
15. Dr.A.Muthu Kumaravel, KNOWLEDGE BASED WEB SERVICE, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 5881-5888, Vol. 2, Issue 9, September 2014
16. Dr.A.Muthu Kumaravel, Data Representation in web portals, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 5693-5699, Vol. 2, Issue 9, September 2014
17. Dr.Kathir.Viswalingam, Mr.G.Ayyappan,A Victimization Optical Back Propagation Technique in Content Based Mostly Spam Filtering ,International Journal of Innovative Research in Computer and Communication Engineering ,ISSN(Online): 2320-9801 , pp 7279-7283, Vol. 2, Issue 12, December 2014
18. KannanSubramanian,FACE ECOGNITION USINGEIGENFACE AND SUPPORT ECTORMACHINE,International Journal of Innovative Research in Computer and Communication Engineering,ISSN(Online): 2320-9801,pp 4974-4980, Vol. 2, Issue 7, July 2014.
19. .Vinothlakshmi.S,To Provide Security & Integrity for StorageServices in Cloud Computing ,International Journal of Innovative Research in Computer and Communication Engineering ,ISSN(Online): 2320-9801 , pp 2381-2385 ,Volume 1, Issue 10, December 2013