

Transformative and Innovative E-municipality for the Next Generation using Cloud

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ABSTRACT - In most developed countries there is no direct communication between people government. Lack of communication between people and government create a way for bribery. Still if unethical ways are followed there is no grantee that the desired work can be finished or not within given time. It is very costly thing to sacrifice a leave to lodge a complaint in person to the municipal corporation. Here we mainly focus on E-municipality sanitation and development of Municipal Corporation. To make it possible, the people who belong to the municipal corporation are provided with an opportunity of raising a complaint regarding any issue that take place in their locality. The issues are garbage management, water supply, electricity management, road repairs or layering of roads and threatening of animals. To raise the complaints through Twitter for Municipal Corporation regarding the above categories, a simplified solution is designed where the different type of complaints made by people are integrated.

Key Words: Communication, Twitter for Municipal Corporation, E-municipality, Garbage management

1. INTRODUCTION

E-municipality is the function of information and communication technologies to swap over information between government and the citizens, government and production organizations and between government organizations. Cloud computing is a new way of accepting and providing services over internet. Cloud based e-municipality system provides many remuneration to Government like reduced cost, dispersed storage of data, ease of use of resources at lower cost, manages security, scalability, accountability and modifiability. In earlier existing systems, one must visit the office and complaints given through written statement. Based on the priority, the complaint can be submitted in drop box or directly to the commissioner or the concerned department, which may take physical effort and time consuming task. In this existing system, one cannot get any acknowledgement that the complaint has been received. Guarantee for problem solution is given through verbal communication. Hence, it is not meant for problem solution. The main objective is to

make easy the process of dealing all municipal activities in a very simplified and effective way. For every submission of opinions, the user gets opinion acknowledgement. All these type of acknowledgement are generated by the computer, the solution of time may differ from the type of the category. To make any opinion, it is made mandatory for the user to mention his contact details, so that it does not receive any anonymous complaint details. Here we make easy the process of dealing all municipal activities in a very simplified and effective way. For every submission of opinions, the user gets opinion acknowledgement. All these type of acknowledgement are generated by the computer, the solution of time may differ from the type of the category. To make any opinion, it is made mandatory for the user to mention his contact details, so that it does not receive any anonymous complaint details.

2. LITERATURE SURVEY

2.1 Integrating Planning and Tax imbursement

Dr. Stephan Bartke in "Turning brownfields into safe, attractive and lively urban districts by means of integrated planning" quoted that Cleaning up and redeveloping brownfields. Inefficient management of various demands and needs of people involved. The problem with cleaning up and redeveloping brownfield sites is not so much the availability of appropriate technologies as the inefficient management of the various demands and needs of the people involved. The German founders of DE-US.net are among the few land and urban developers worldwide who are able to properly clean up brownfield sites, including their soil and groundwater, at low cost and transform them into attractive and sustainable urban business and residential areas. Their reliability and success is based on targeted cooperation between experts from research, SMEs and local government as well as property owners, investors and the local population. They have carried out several hundred commercially successful projects in Germany and converted industrial wastelands and other derelict sites for sustainable use in tomorrow's cities. DE-US. Net's secret of success in brownfield redevelopment consists in exchanging ideas and knowledge with experts at home and

abroad, involving all the stakeholders in local authorities, businesses and the scientific community as well as the local population, prospective occupants and investors right from the outset, and also calculating risks and systematically minimizing costs through integrated planning. In this way it is possible to develop reliable and sustainable urban solutions which benefit everyone. The aim is to protect health, safeguard the environment, save costs and energy, and meet the functional and aesthetic requirements of future users. Experts from DE-US.net will be available on 5-7 December at the 2017 National Brownfields Training Conference in Pittsburgh, PA to share experience and present their projects. Make use of this opportunity and register here for more information about the network and workshop or to arrange a personal appointment.

Daniel shoangcody and Tuttle Stan veuga in "Rules versus home rule local government responses to negative revenue shocks" quoted that gradual disappearance of brick and mortar retail stores raises concerns about the financing of wide range of services provided by local government which often rely heavily on sales tax income. Local governments rely heavily on sales tax revenue. They use national bankruptcies of big-box retail chains to study sudden, plausibly exogenous revenue shortfalls. Treated localities respond by reducing spending on law enforcement and administrative services. They further study how cities with different degrees of autonomy vary in their response. Cities in home rule states react more swiftly by raising taxes or issuing bonds. A regression discontinuity in Illinois reinforces the causal evidence in support of this impact of local autonomy. Home rule cities do not appear to abuse their discretion: their bond ratings are more likely to be strong than non-home rule municipalities.

2.2 Information sharing and implementation

Ajay Dutta, M. Syamala and Manish Arorain in "Online census based information sharing for delivery of e-government services" described that Census is the citizen's socio-economic data collection process for the preparation of the citizen database stored in National Population Register (NPR). NPR preparation in India has been facing various barriers like high human resources requirement, time consuming process and limited availability of the citizen database for e-Governance services. An Online Census System (OCS) themselves permits the enumerator to enter the census data using Information and Communications Technology (ICT). The 12 digit Unique Identification (UID) number issued by Unique Identification Authority of India (UIDAI) is an individual identification number specific to each citizen. In this they design of UID based online Census System (UIDOCS) is

proposed. Census information sharing service is an open standard based web application that interacts with other web applications for the purpose of sharing citizen data. This will help in using uniform and reliable census data across various e-Governance applications. It presents a census data integration mechanism based on the Service Oriented Architecture (SOA) with various e-Governance applications. The proposed architecture of information sharing consists of three layers; Web Service Provider, Service Broker and Web Service Consumers. Web Service providers publish services to a service broker. Web Service Consumers find required services using a service broker and bind to them. A prototype of the framework is implemented and validated with e-Governance applications for issuing Caste Certificate and Rural Area Certificate as pilot based. It is concluded that census web service can be effective and efficient in all types of e-Governance applications as it can provide accurate and timely information within reasonable amount of time.

Meltem oztwan and Serkan alacam in "A citizen centric integrated information system roadmap for municipalities" quoted that the purpose of the study is to analyse e-government implementation and effectiveness at the municipal level in the vision of information system (IS) integration and to propose a roadmap for an integrated information system (IIS) for municipalities from the citizens' perspective. Integration models proposed in the literature are reviewed and merged into a more comprehensive model. Based on the proposed model, integration process occurs under four domains: strategic, organizational, logical and physical. Related approaches of hierarchy, structure, direction and extent are analysed and evaluated for each domain. Then, IS practices for seven different municipalities are examined and compared to each other so as to evaluate the current situation. At the final stage, a practical structural framework is developed and presented. As a result of the longitudinal interviews with Saryer Municipality, the general framework and a roadmap for municipalities are put forward. While this roadmap can be extended further by other researchers, it can also act as a base for practitioners to develop integrated information systems (IIS) for citizen services offered local governments.

2.3 Digitalizing the municipality

Ikram Dastan in "Digitalizing the municipality and factor affecting the acceptance of e-municipality an empirical analysis" described that over the years, rapid developments in information and communications technologies have brought about an increase in the amount of time users spend online. Users who consistently interact online also resort to receiving goods and services that are supplied via these networks. This type of user

behaviour has also expedited the supply of services delivered by municipalities. In this regard, the purpose of the current study is to determine the factors affecting the adaptation of e-municipality services and their extent, by exclusively observing the leading e-municipality service provider. In order to achieve the purpose of the study, field research was conducted among 302 participants in the city of Yalova using the convenience-sampling technique. The findings indicate that competence in the use of technology, perceived ease of use, perceived awareness and information quality positively influence the acceptance of e-municipality services whereas factors such as perceived trust and usability of resources have no significant impact.

T.M.Vinod Kumar in "E-governance for smart cities" quoted that Emerging e-governance for smart city on urban development, planning climate change, carbon accounting, water governance, energy governance. It highlights the electronic governance in a smart city through case studies of cities located in many countries. "E-Government" refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits are less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions. The book is divided into three parts E-Governance State of the Art Studies of many cities, E-Governance Domains Studies and E-Governance Tools and Issues.

2.4 Mechanism in monitoring and management

R Alguliyev Farhad yusifav in "Effective mechanism in monitoring and management of e-government" quoted that the formation and management of e-government are analysed Web analytics application issue is investigated as the possibility to increase the effectiveness of e-government management indicators. Web analytics is analysed as effective feedback mechanism in monitoring and management of e-government. Some recommendations on how to design e-government programs were made.

Simuna Kavovic in "E-democracy and E-participation in Slovenian local self-government" suggested that the usage of e-participation tools in Slovenian municipalities. It originates from the theory of e-democracy in connection with information and communication technology (ICT). ICT allows citizen

participation and inclusiveness in the processes of decision-making by use of various e-participation tools (e-contact, e-forum, e-survey, e-petition, etc.) An emphasis was placed on local democracy and its various forms, i.e. representative, market, network and participative democracy, one of the increasing elements of which is also e-participation. We analysed official web pages of all 211 Slovenian municipalities and found that while all municipalities offer e-access and various forms of e-consultations to its citizens, other e-participation tools can only rarely be found. In addition, a comparative analysis of the survey results from 2006 and 2009 shows that the number of municipalities which offer diverse tools of e-participation is slowly decreasing.

2.5 Smart Grid functionality

M. Harshmi, S.Hannien Kurimaki in "Development smart grid concepts architectures and technological demonstration worldwide" described that recently developed various smart grid concepts architectures and demonstration. It describes various smart grid concepts, architectures, and details of associated technological demonstrations implemented worldwide. The survey is based on initiatives taken by EU and IEA (e.g. ETP, EEGI, EERA and IEA DSM) and description of projects conducted in Europe and US (e.g. FENIX, ADDRESS, EU-DEEP, ADINE, Grid Wise and SEESGEN-ICT). The report presents drivers, visions and roadmaps to develop smart grids worldwide including China and India. The survey encompasses various smart grid concepts, i.e. development of virtual power plant, active demand in consumer networks, DER aggregation business, active distribution network, and ICT applications to develop intelligent future grids. The comparison is carried out on the basis of commercial, technological, and regulatory aspects. In addition, the existing features of smart grid technology and challenges faced to implement it in Finish environment are addressed. As a matter of fact, the implementation of smart grid is consisting of more than any one technology, therefore, this transition will not be so easy. In the end, a fully realized smart grid will be beneficial to all the stakeholders. Smart grid will be an outcome of an evolutionary development of the existing electricity networks towards an optimized and sustainable energy system.

David Arduini and Mario Denni in "The role of technology organization and context factors in the development of e-government services: An empirical analysis on Italian local public administration" defined how technology, organizational and contextual factors are correlated to the development of e-government, as a case of new technology. Using data drawn from the 2007 and 2009 Istat ICT-PA surveys on 4471 Italian municipalities, they identify the technological, organizational, and

contextual factors associated with the development of e-Government services in local administrations. They find that both outsourcing and internal accumulation of ICT competencies are strongly correlated to the provision of these services. Moreover we observe that in-house ICT activities have twice as high an impact on e-Government development as compared to ICT outsourcing. The enactment of advanced e-services is less likely in the case of small municipalities, in sparsely populated areas, and in the presence of higher rates of growth of the elder component of population. By contrast it is more likely in areas characterized by more intense patenting activities, which in turn favour a dynamic and sophisticated demand for new services. Though broadly consistent with Fountain's "technology enactment framework", our findings suggest that more emphasis should be given to the internal competencies of public administrations, and to context specific factors reflecting the characteristics of end users.

3. E-MUNICIPALITY PROCESS

E-municipality process consolidates user and admin interaction. The interaction consists of four processes. User and Admin registration, Billing and payment, complaint registration and acknowledgement process. The user and admin should have to register first to get the user name and password. User have to submit the needed details, an acknowledgement will be received by the user after the viewing of admin about the needed details of user. All the user details will get stored in the admin server.

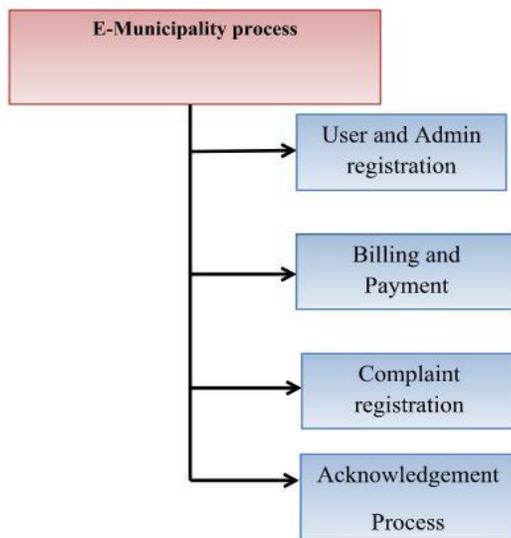


Fig-1: Representation of E-municipality

E-municipality process contains four elements. They are User and Admin Registration, Billing and Payment, Complaint Registration, Acknowledgement process. First process describes about how the user and admin register the necessary details .Billing and payment process designates the different methods for paying the bills. Complaint registration process carried out with water supply problem, Garbage management problems, Threatening animals and Road repairs. Final progression is acknowledgement process describes about sending and receiving the acknowledgement from admin to user.

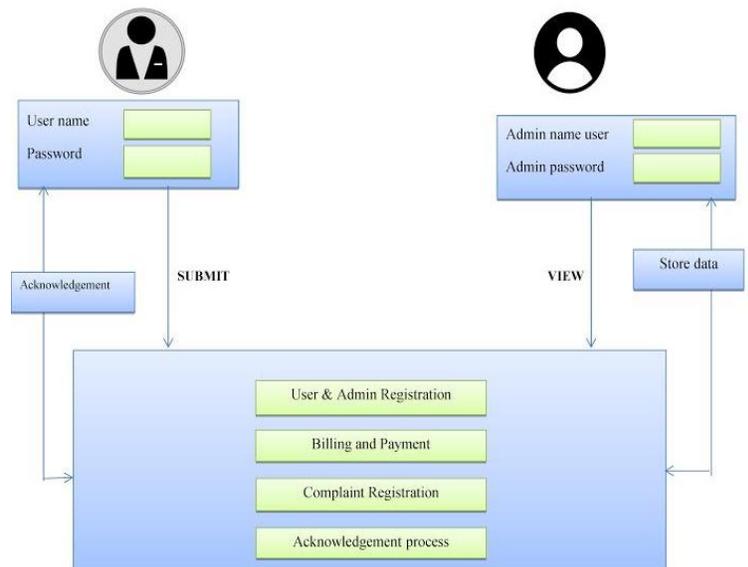


Fig-2: Process Functionality of E-municipality

3.1 USER AND ADMIN REGISTERING

In this user can add their personal details like full name, name, and gender, and password, mobile, email and user can add their area and location according to admin registered area and location only, Can't be add their personal wish. User Registration consolidates certain functionalities such as Login, Forgot Password, User Profile, Update Profile, Share post and View Post.

Login: User can login with registered name and password if user entered wrong name and password man's login session won't work

Forget Password: User can change password with help of JAVA OBJECT API. User should enter registered mobile number and he/she will get Reset code for changing their Password. If user enter wrong code error message display in that page.

Profile: User can see their personal details meanwhile they can update their personal details.

Share Post: There are tweet box, photo uploading option Category, area, location and so user can text municipal related problem in that tweet box and corresponding photo, area and location so user can share their post in this page. This post will share to the concern area peoples.

View Post: It have user posts with information. User can rating for posts if rate score above 3 mails will forward for corresponding authorities with help of JavaMail API



The form contains the following fields and options:

- Name: Text input field
- Address: Text input field
- Gender: Radio buttons for Male and Female
- Age: Text input field
- Aadhar card no: Text input field
- Phone number: Text input field with a '+91' prefix
- Telephone number: Text input field
- Mail ID: Text input field
- City: Text input field
- Locality: Text input field

Fig-3: User Registration

3.2 ADMIN REGISTRATION

In this, admin should register their details and they take the responsibilities to incorporate the fields which in need to be in function to user. The fields provided by the admin are View Register User Details, Add category, Add Area, Add authority. Admin login consist of admin name and password will stored in database. If admin entered incorrect name and password error message will display in that page. In View Register User Detail, Admin can view all the Registered User details. Admin can add category like Irrigation Water supply department and, sewage water control Board, etc. admin can add Area details and also can add authorities for corresponding categories.

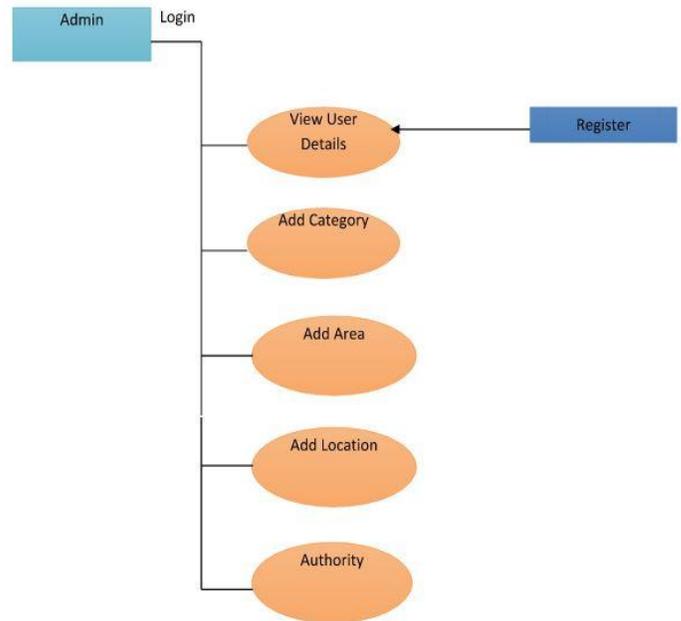
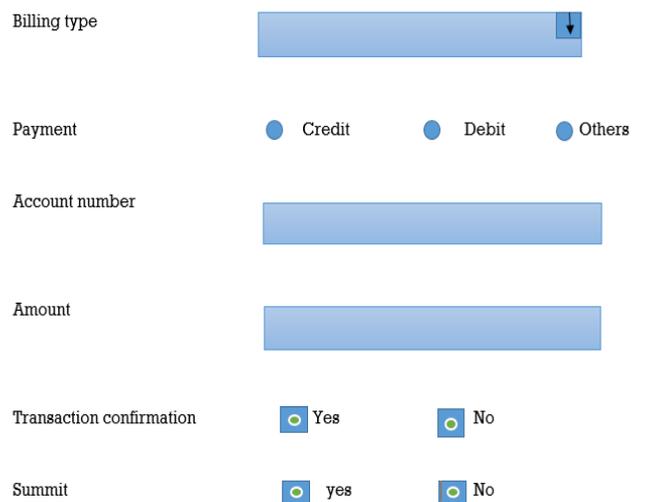


Fig-4: Admin Registration

3.3 BILLING AND PAYMENT

Billing and payment is a process where there are opportunities for paying the municipality bills such as water tax, property tax, vacant land tax etc. in online. Billing and payment segment ask for billing type, payment method such as credit or debit. By entering the account number and amount it will ask for weather the transaction is confirmed or not, after that submission quires will also be asked.



The form contains the following fields and options:

- Billing type: Dropdown menu
- Payment: Radio buttons for Credit, Debit, and Others
- Account number: Text input field
- Amount: Text input field
- Transaction confirmation: Radio buttons for Yes and No
- Summit: Radio buttons for yes and No

Fig-5: Billing and Payment

We use Authorized payment gateway process to carry put the payment such as Authorize.Net, PayPal, Secure pay.com, 2 check out.com, First data cooperation, Blue pay processing LLC, Pay simple, Fast charge.com, Pay nova, Choropay, etc.,

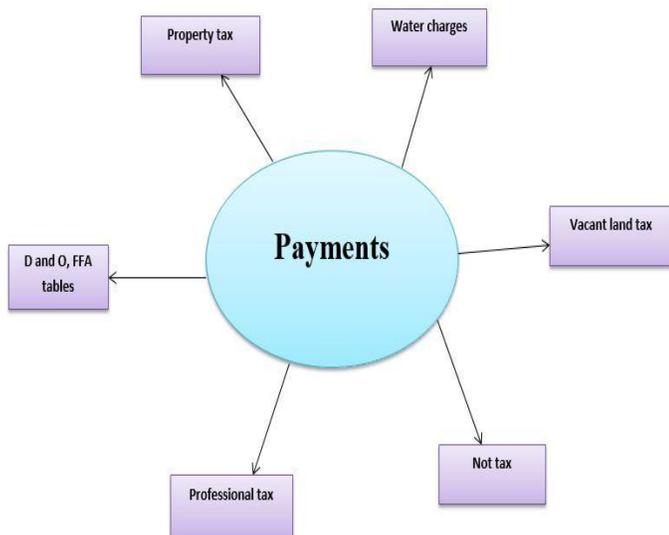


Fig-6: Payment Segments

Payment segment consolidates different types of payments in municipalities such as property tax, water charges, vacant land tax, professional tax, no tax, D and O, FFA tables.

3.4 COMPLAINT PROCESS

User can elevate with an opportunity of registering the complaints which is occurred in their municipality. The registered information's will reach to the higher authorities of municipalities. The higher authorities will be the Admin. In the process user has to register their name, address, mobile number. After this they should give the details about the complaints such as complaint type, incident photo, explanation of the complaint, incident location. There are two categories for submission Emergency complaint, Normal complaint. If the user has selected emergency submit then the municipality has to take the actions immediately. In case of normal submit the municipality can take action only within two or three days. After all these process the system will produce a complaint_number for the particular complaint. If there is no acknowledgement received by the user, he can resubmit the complaint using his complaint number.

Name	<input type="text"/>
Address	<input type="text"/>
Mobile No	<input type="text"/>
Complaint Type	<input type="text"/>
Incident photo	<input type="text"/> <input type="button" value="UPLOAD"/>
Incident location	<input type="text"/>
Explanation of the complaint	<input type="text"/>
Submit	<input type="radio"/> Emergency submit <input type="radio"/> Normal submit

Fig-7: Complaint Process

3.5 ACKNOWLEDGEMENT PROCESS

In the acknowledgement process the user has to submit the problem statement to the Admin. When the admin has viewed the user's details, the user will receive an acknowledgement

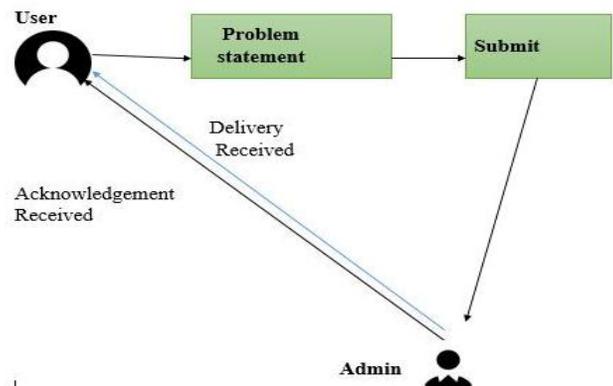


Fig-8: Acknowledgement practice

4. ADVANTAGES

The opinion reporting is very simplified and effective way. It is a best solution for incoming bulk opinions. It is user friendly online application. It works well in emergency situations and also small localities. It is convenient by getting easy access to most current information available without having to spend time in

municipal office. The main objective of this project is to make easy the process of complaint reporting with very simplified and effective way. This project involves major problem solving modules where these acts as best solution for incoming bulk complaints. For every submission of complaint, the user gets complaint acknowledgement. All these type of acknowledgement is generated by the computer; the solution of time may differ from the type of the complaint and category. To make any complaint, it is made mandatory for the user to mention his contact details, so that it does not receive any anonymous complaint details.

5. CONCLUSION

It handles various issues and shortens the communication gap between citizens and government. Using this online application each and every person in the municipality could able to function properly with the help of cloud framework. Effectual Twitter analysis is done to identify the process in minute level. Finally it's a step towards the smart cities.

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REFERENCES

1. Calabrese, F., Colonna, M., Lovisolo, P., Parata, D., & Ratti, C. (2011). E. Baralis, L. Cagliero, T. Cerquitelli, P. Garza, and M. Marchetti, "Cas-mine: providing personalized services in context-aware applications by means of generalized rules", *Knowledge and information systems*, vol. 28, no. 2, pp. 283-310, 2011. Real-time urban monitor using cell phones: A case study in Rome. *Intelligent Transportation Systems* 12(1), 141-151.
2. S. Pandey, W. Voorsluys, S. Niu, A. Khandoker, and R. Buyya, "An autonomic cloud environment for hosting ecg data analysis services", *Future Generation Computer Systems*, vol. 28, no. 1, pp. 147-154, 2012.
3. Laursen, K., & Salter, A. J. (2014). A. Ibaida, D. Al-Shammary, and I. Khalil, "Cloud enabled fractal based ecg compression in wireless body sensor networks", *Future Generation Computer Systems*, vol. 35, pp. 91-101, 2014.
4. Dameri, R.P.: Comparing smart and digital city: initiatives and strategies in Amsterdam and Genoa. Are they digital and/or smart? In: Dameri, R.P., Rosenthal-Sabroux, C. (eds.) *SmartCity. How to Create Public and Economic Value with High Technology in Urban Space*, pp. 45-88. Springer, Heidelberg (2014).
5. Sankaranarayanan S. Balamurugan, Dr. P. Visalakshi, V. M. Prabhakaran, S. Charanya Strategies for Solving the NP-Hard Workflow Scheduling Problems in Cloud Computing Environments. *Australian Journal of Basic and Applied Sciences* (2014).
6. V.M. Prabhakaran, Prof S. Balamurugan, A. Brindha, S. Gayathri, Dr. Gokul Kruba Shanker, Duruvakumar V.S NGCC: Certain Investigations on Next Generation 2020 Cloud Computing-Issues, Challenges and Open Problems *Australian Journal of Basic and Applied Sciences* (2015)
7. V.M. Prabhakaran and Dr. Gokul Kruba Shanker S. Balamurugan, R.P. Shermey Internet of Ambience: An IoT Based Context Aware Monitoring Strategy for Ambient Assisted Living. *International Research Journal Of Engineering and Technology* (2016)
8. Bencardino, M., Greco, I.: Smart communities. Social innovation at the service of the smart cities. *TeMA. J. Land Use Mob. Environ.* (2014)
9. Alexopoulos, C., Zuiderwijk, A., Charapabidis, Y., Loukis, E., & Janssen, M. (2014). P. Neirotti; A. De Marco; A.C. Cagliano; G. Mangano; F. Scorrano (2014). Current trends in Smart City initiatives Designing a second generation of open data platforms: integrating open data and social media. *Electronic Government* (pp. 230-241). Berlin Heidelberg: Springer.
10. Mariotti, I., Beria, P., Laurino, A.: Car sharing peer to peer: un'analisi empirica sulla città di Milano. *Rivista di Economia e Politica dei Trasporti* 3, 1-16 (2013) Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of Urban Technology*, 18(2), 65-822.

11. Sciallo, A., Occelli, S.: Collecting distributed knowledge for community's smart changes. TeMA. J. Land Use Mob. Environ. 6(3), 293-309 (2013).

12. Arena, M., Cheli, F., Zaninelli, D., Capasso, A., Lamedica, R., Piccolo, A.: Smart mobility for sustainability. In: AEIT Annual Conference 2013: Innovation and Scientific and Technical Culture for Development, AEIT (2013).

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