

SUCHITRa (System for Urban, Clean, Healthy India Transformation through Rating) – A Cleanliness Rating Tool for Cities to Empower Citizens

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Abstract : *Most of the cities of today's world are facing issues of cleanliness on its streets, footpaths, public places etc. In spite of efforts from civic authorities / local administration, cities are getting dirty day by day. Citizens who pay heavy taxes for cleanliness and hygiene largely remain unsatisfied for most of the time with the authorities. Today, most of the governments in developed countries have taken one or other initiative to empower the citizens through extensive utilization of Information Technology. The proposed system "SUCHITRa" is conceptualized to empower citizens to rate the cleanliness at public places in India, make aware the responsible local authorities of places requiring immediate attention for cleaning. It will also assist the local authorities in resources optimization and rank their own administrative areas to identify un-cleaned spots and assess the success of their own cleanliness initiatives. Third party is added to have an unbiased rating of the cleanliness. SUCHITRa is a proto-type multi-lingual rating, location based monitoring and management system using cloud architecture to assess the cleanliness activities for enhancement of human habitat. In future, the system can be implemented in developing countries to provide a clean, hygienic environment to its citizens.*

Keywords: *Cleanliness, Cloud, Citizens, Rating system,*

I. Introduction

Cities of today's world are facing major issue of waste generation and its disposal, also, the local authorities and administration are facing the biggest challenge in terms of maintaining cleanliness at public places. The bare fact remains that waste generation is a consistent process and the main problem for local authorities is how to vigil the waste spreaders and maintain the cleanliness at public places. With limited manpower and machinery in hand, the local authorities find it very difficult to identify and maintain the cleanliness in urban areas. Also, local citizens who pay taxes to local authorities to maintain their city, have no say in the administrative process, resulting in a big communication gap between local authorities and the citizens. Most of the times, in such scenario, citizen's health is also compromised in terms of vector borne diseases such as malaria, dengue etc., dust allergy, breathing problems for infants and elderly people. Unlike many other countries, Govt. of India has initiated "Swachh Bharat Abhiyan" (Clean India Mission) by 2019 through its citizens creating awareness among masses to maintain cleanliness.

In this era of ICT, most of the governments have taken one or other initiative to empower the citizens through extensive utilization of Information Technology. There are many Cleanliness rating systems available in developed countries, but in developing / emerging countries, still there is no mechanism to rate the cleanliness at public places.

The proposed system "SUCHITRa" is conceptualized to empower citizens to rate the cleanliness at public places, make aware the responsible local authorities of places requiring immediate attention for cleaning. The main objective of the proposed system is maintaining the cleanliness within the city by the means of rating mechanism. Major emphasis is to ensure a comparative framework to receive public marks within which littered areas of the corporations/urban areas and statutory towns can set out details for providing cleaning services and assessing 'technical' cleanliness. The system would be put in place to evaluate and control the quality of cleaning services via online application tool/crowd sourcing which in turn allows the municipals, responsible for the service to evaluate the status of the cleaning of their cities in real time.

The proposed solution is required for enabling citizen's at large, municipal corporations, private institutions, social activists and other relevant public to easily and quickly find pertinent state information in the

areas of sanitation and cleanliness around their habitat. It will also enable various departments to boost transparency, improving supervision, at all stages of implementation of program

II. Background

The lack of basic cleanliness in public places at present is glaring, and also a paramount concern for all agencies and for public in India. There is an urgent and effective intervention needed at various levels to keep places frequently clean by conducting regular audits or assessments at such places could be the results to showcase and encourage best performers, and provide practical guidance to others making improvements. In order to do this, here is a state-of-the-art solution to implement a system to assess the cleanliness activities for System for Urban Clean Healthy India Transformation through Rating (SUCHITRa).

The guiding principle of the proposed system "SUCHITRa" is, "if cleanliness can be measured, then cleanliness can be managed". Based on GIS and Cloud technology, the SUCHITRa System is subject to constant auditing and continual improvement. However looking to the prior experience and Indian environment mobilizing both citizens, local authorities, NGO's, civic bodies and all involved stakeholders to participate in the rating process and extend their hand for Cleanliness program is always a challenge.

The different areas would have different categorization of cleanliness problem. Such as the area X would have higher levels of pedestrian litter than the average, Area Y would have higher levels of stray dog fouling and Area Z would have higher levels of business, domestic and construction. So categorizing and prioritizing the activity with coordination to local authority and fixing the higher rank would be a research constraint.

"SUCHITRa" will assist the local authorities as well as local citizens to accept cleanliness as best practice and the provision of advice on the compilation of Cleanliness management activities. Also, it will help to develop and provide guidance on a methodology by which local authorities can survey and rank their own administrative areas in order to allow them to identify un-cleaned spots and assess the success of their own cleanliness initiatives, and better direct their resources and personnel.

III. Need Analysis

Rating system is needed to measure cleanliness, for effective management and to extend hand for Cleanliness program. Cleanliness is no doubt connected to the tourism and global interests of the country as a whole. India is already a known hub in the world tourist map. The system would help stakeholders associated with Tourism, environmental, health and hygienic in local as well as national level. Government launched "Clean India Mission" in an aim to mobilize masses and seeks to create a clean India. The plans and policies framed to maintain cleanliness and management of waste generated, while educating the local authorities as well as local citizens to accept cleanliness as best practice with the provision on the compilation of cleanliness management activities. It's about keeping the country clean; it's about keeping our society clean and healthy. Keeping city clean is not the responsibility of the government; cleanliness is a collective action to be taken by citizens, civic bodies, local authorities and NGO's.

IV. Limitations Of Existing System

- No standard prioritization cleanliness indexing activity is available with respect to location & time in India
- No system available providing support to stakeholders
- No system providing information on how users' in-time cleanliness-rating activity affects their socio-economic backgrounds.

V. Methodology

The overall scope of this proposed project is to design, develop and implement a proto-type multi-lingual and location based monitoring, rating and management system using cloud architecture to assess the cleanliness activities for enhancement of human habitat. Following are the salient features of the software:

- "SUCHITRa" android app - Rating Index System
- Profile management (Admin, citizen, Employee and Auditor) with local language support
- Uploading, downloading and indexing of multimedia files on Cloud
- Alert system through email and SMS
- Geo Tagging and human resource monitoring through the application
- Chat engine with multilingual support
- Multimedia Based Awareness Module.

VI. Suchitra

SUCHITRa is a rating mechanism for auditing the cleanliness within the society through systematic rating calculation system to rate cleanliness through feedback from citizens & to measure waste at public places.

This rating system will have feedback from the common citizens, the cleaning staff and a third party for auditing the ratings (**Fig. I**). Auditing party is added to have an unbiased rating of the cleanliness. All the inputs will be provided to the rating system with the help of a mobile app, which all the interested citizens can install on their smart phone (**Fig. II**).

VII. How The System Will Work

Since the system is designed for Indian Cities, the standard structuring of most of the municipal corporations is as follows:

- Each Corporation will be divided into Zones and each zone will be divided into subzones.
- System provides facility to citizens to give their feedback on the cleanliness quality of a particular area.
- Citizen will capture the image of an area indicating the cleanliness status of the specified area and will provide feedback as per the decided template.
- Corporation employee will capture the image of an area indicating the cleanliness status of the specified area and will provide feedback as per the decided template.
- Third party / Audit Party will also give its feedback the same way.
- The data along with the geotagging (process of adding geographical identification metadata to various media such as a geotagged photograph) will get stored into the centralized database.
- System will extract the information and based on this geotagged data provided with the feedback, it will identify the Sub-Zone to which the feedback belongs to.
- All the feedbacks against the particular sub-zone will clubbed together, which will further be utilized by Sub-Zone Rating Calculator for providing Sub-Zone rating.
- The same way rating will be received for all the Sub-Zones of City.
- The Zone Rating Calculator will take all the Sub-Zone Ratings (SZR) and calculate the Zonal Rating (ZR).
- The Corporation Rating Calculator will take the Zonal ratings and calculate the Corporation Rating (R). (Fig. III)

VIII. Benefits Of Proposed System

Stakeholders of the proposed system will be common citizens, Local authorities and NGO's.

Following are the benefits of the proposed system "SUCHITRa" –

- Municipal Corporations will be able to access rating of each Sub-Zone, Zone or Complete Corporation at any point of time.
- Keep track of field teams and get alerts for assigned area using "Geofencing" (a location-based service that sends messages to smart phone users who enter a defined geographic area) rules
- Job allocation and tracking the total time spent
- Resource optimization - Manpower & Machinery
- All the critical data can customize into alerts, reports and can be visualized under a single dashboard. This in turn can help with rapid, informed decision making.
- Proliferation of good practices from corporations to corporations

Future Benefits of the proposed system may be -

- Pan India level integrated system to rate the cleanliness.
- Base on Analysis, Future development plan can be created for Smart cities.
- Image processing for surveillance & fine enforcement for spreading garbage.
- Incorporate Navigation system for public utilities (Garbage bins, public toilets, etc.).
- Implementation in all official Indian languages.

IX. Figures

Fig I showing the Rating SUCHITRa System

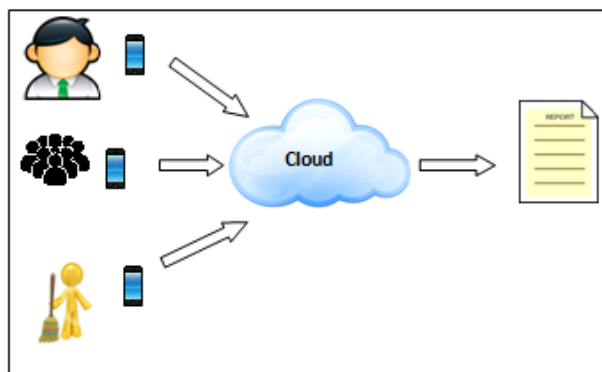
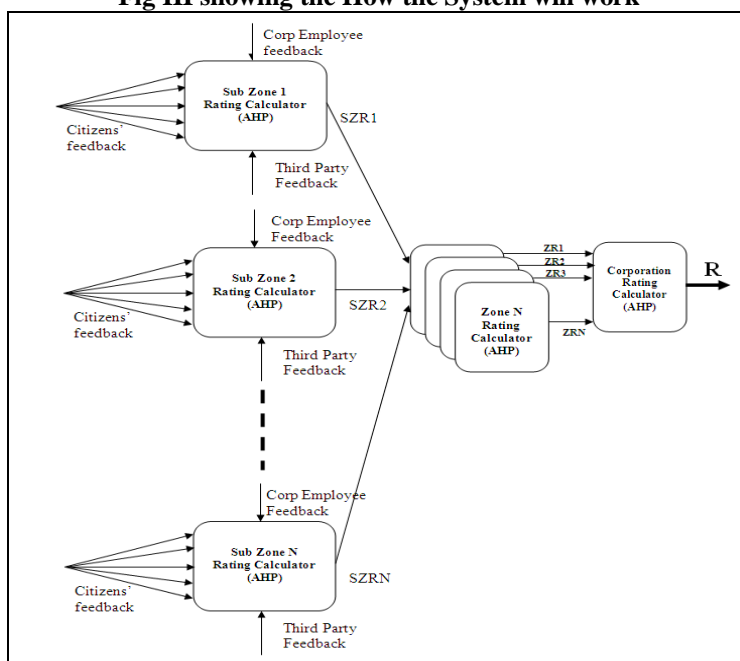


Fig II showing rating grades for Cleanliness in “SUCHITRA” App

Proposed Parameters x Ratings	Ratings				
	Extremely Dissatisfied	Dissatisfied	Neutral	Satisfied	Extremely Satisfied
Biomedical Waste	X	X	X	X	✓
Business Waste	X	X	X	X	✓
Domestic Waste	X	X	X	✓	✓
Construction Waste	X	X	✓	✓	✓
E-Waste	X	✓	✓	✓	✓
Other	X	✓	✓	✓	✓

Fig III showing the How the System will work



X. Conclusion

The proposed study describes the importance of rating system for a clean and healthy environment. A model for rating the cleanliness in the surrounding was established using Analytical Hierarchy Process. Cloud based services are discussed for web hosting and data storage along with multilingual interface for all types of users. Such solution is required for enabling citizen's at large, municipal corporations, private institutions, social activists and other relevant public to easily and quickly find pertinent State information in the areas of sanitation and cleanliness around their habitat. It will also enable various departments to boost transparency, improving supervision, at all stages of implementation of program

Acknowledgements

We would like to acknowledge and sincerely express our gratitude to **Dr. Hemant Darbari, Executive Director, C-DAC, Pune** for providing competitive environment to carry out this research.

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