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Government-Citizen Interaction Platform

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ABSTRACT

To transform a city into a smart city it is important to focus on civic issues faced by the inhabitants. Civic complaints incorporate problems related to street condition, traffic, noise, water etc. Their analysis can contribute to proactive decisions to be taken by the city authority. Urban Computing is applied in many areas like transportation, environment, and security etc. but there is a need to explore more on urban planning from the perspective to analyze root cause of civic issues and reducing their concentration. In the present work, segregation of different urban areas is done and issues critical in a region are determined. Primarily, two phase clustering has been performed. In first phase, a dynamic grid based clustering is done on the basis of spatial attribute to analyze complaints that may have strong interdependency. In second phase, the location based clusters are further clustered based on complaint category which helps in determining regions of city imitating similar complaint behavior. The analysis is done on real world data acquired for two cities New York (USA) and Bangalore (India). Experimental results are visualized to show better interpretation. The results will help in planning strategies to improve inhabitant's satisfaction rate and consequently improving their quality of life.

Keywords: Urban computing; Civic Complaints; Data Mining; Dynamic Grid based Clustering; Bounding box.

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0INTRODUCTION

With advanced human lifestyle in cities many big challenges like Street conditions, Garbage collection, Damaged Light post, traffic congestion, tremendous air pollution, incalculable energy consumption, overpowering noise pollution etc. are originating which needs to be tackled. Cities will be smarter if general requirements like water, electricity, gas and clean air are efficiently managed. Urban Computing is administrating these key issues by employing certain computing strategies like data collection, pre-processing of data, interpretation of data and services provisioning.

Governments have as one of their objectives to deliver public services to their citizens for their general interest. To realize these services, public bodies typically use several cross-organizational business processes, transactions and resources that operate on an Information and Communication Technology (ICT) platform. Nevertheless, interactions with public service organizations are characterized by deep dissatisfaction. Service Oriented Computing (SOC) is the computing paradigm [Pa03] that leverages the technical value of solutions in the area of public services. Current trends in improving the relationship between governments and citizens aim at exploiting the development of tools and collaborative platforms for supporting formal analysis, conceptualisation, modelling, implementation, publishing, and further on provision of e-services. The COCKPIT1 project aims at providing a systematic methodology while empowering the role of citizen in the service design and delivery process. It comprises the definition of a governance model to the design, construction and operation of public services based on co-production approach to shape public service offerings around the citizen's experiences; and a formal representation (meta model) to express the structural and

behavioural characteristics of public services while keeping in mind the delicate balance that should be achieved between government and citizens.

I. LITERATURE SURVEY

Urban Computing, being at a commencement stage, has been explored in different domains to resolve various challenges, existing in urban areas such as to provide a personalized environment to a driver which will adapt to weather conditions, real time traffic conditions and get accustomed to driving habits. An intelligent system entitled as T-Drive is proposed in [2] to help the driver to find the fastest route to reach the destination by analyzing the historical trajectories. Moreover, to improve the taxi services by reducing the customer's waiting time spent to find the taxi, a time saving strategy is proposed [3] to select the most optimal cab for a request made by user and performs real time taxi sharing function. Diminishing of the natural resources and rising pollution is a major concern. Analysis is performed on GPS trajectories fetched from taxicabs to record the amount of gas consumed and evolved in an urban area. The average travel speed of road segments and traffic volume is inferred in [4] to calculate gas emission. Similar work is done to identify preferable locations to install new gas station by analyzing the refueling events in [5], including estimating the time spent at gas station in an event to infer the amount of fuel consumption. Noise situations are inferred for different regions of New York and analyzed by modeling them in a three dimensional tensor [6].

[7] A Citizen-centered Methodology for Public Services Design and Delivery Public service design and delivery process is the activity of planning people, infrastructure, communication, and materials components of a service in order to improve its quality, the interaction between the service provider and citizens, and the citizen's experiences. Such a process is critical since it allows government organizations to translate their political and strategic plans into the operational level and that the efficiency of operations strategy is contingent upon making the right design choices.

[8] The COCKPIT Governance Model The COCKPIT Governance Model [Ko11][Ko12] spans four different layers (or stages) which are based on the logical flow of the lifecycle of a service - from its conceptualisation to its post-operational evaluation – from which public bodies may have direct feedback in fine tuning or revamping their services: i) Service Conceptualisation and Implementation: opinion mining is proposed as a direct way to collect citizens' opinions on the services that are under consideration; ii) Service Modelling: citizens opinions, selections and preferences get translated to service requirements and features, meanwhile being presented with a visual representation of their decisions' outcomes; iii) Service Deployment: highly sophisticated profiling mechanisms for services are provided to automatically adjust themselves to citizens' preferences; and iv) Service Delivery Evaluation: opinion mining is once again used, in order to directly assess the opinions of citizens and for receiving feedback.

III. PROBLEM STATEMENT

To transform a city into a smart city it is important to focus on civic issues faced by the citizens. Civic complaints incorporate problems related to street condition, garbage collection, electricity, traffic, noise, water etc. Their analysis can contribute to proactive decisions to be taken by the city authority like municipal corporations. Urban Computing is applied in many areas like transportation, environment, and security etc.

IV. PROPOSED SYSTEM

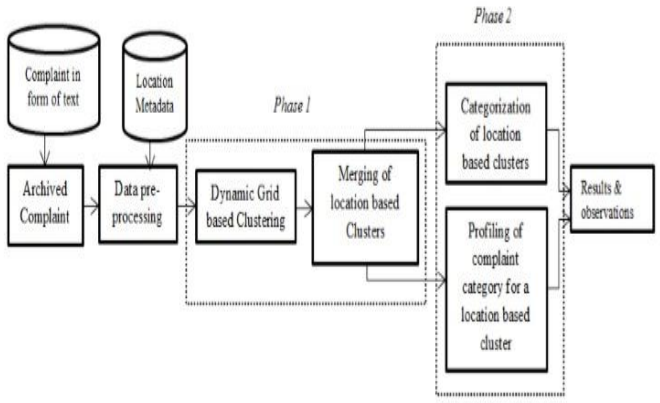

Fig. 1. Framework of proposed model

Data Pre-Processing:
The data pre-processing block, records user generated civic complaints.

Dynamic Grid based Clustering:
It was required to group complaints with spatial proximity, as it was observed that category of complaints might be similar for spatially closer regions.

Public sector organizations have the possibility to spread information and deliver services to a large number of citizens electronically, and citizens can access to these data and services independent from location and time. Governmental websites provide up-to-date information and citizens can contact public employees easily via mail.

V. APPLICATION

The analysis will help the city planners to take actions in regions where certain complaints are measured as critical by analyzing the internal reason behind it. It can even help in prediction of city dynamics related to civic complaints. It will be helpful in suggesting the users about the major issues faced by the neighborhood areas and areas are prone to similar adverse conditions. The study will also be helpful for deciding the priorities, deploying the resources to the most critical areas.

VI. CONCLUSION

This exploratory research shows the use of spatial and temporal nature of civic complaints to visualize their

integrated view over different regions. The proposed grid based clustering grouped the complaints with spatial proximity; the standard clustering algorithm would have given sparse results. The nature of complaints is observed to be entirely different in both the regions analyzed. It was also inferred that cosine similarity gave more accurate results than Euclidean measure. Correlation of the complaints acted as a significant factor in criticality score computation. In the future, prediction strategies can be incorporated to predict the complaint occurrence over a region. It can be explored more to optimize the criticality score computation.

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