

# Mobile Based Complaints and Suggestions System with Geospatial Data

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**Abstract** — The public organization plans to improve the quality of service and citizen satisfaction and keep citizens safe and secure for the wellness of the community. To hear the real voice of the customers, the service providers are open to process suggestions and complaints of customers. Providing any suggestions and lodging complaints is not an easy process for the customers. They have to follow a long procedure and formalities to report such problems like roads in bad conditions, environment cleaning, potholes, rule violations, electric related problems, water wastage, etc. The purpose of this study is to investigate the problem, collect data from citizens and service providers, analyze the data, design a framework based on acquired information to solve identified problems, develop and evaluate a prototype. The framework, we developed lets citizens report problems in their city to the relevant authority and track the status of their complaints or suggestions. So, whenever people come across any issues in service provision, transportation, environment cleanliness, electricity, water, etc..., they can inform the concerned public body and track issue status through mobile devices. The complaints are registered into the system through the mobile application. The Global Positioning System (GPS) sensor is a feature of smart mobile devices which used to determine the exact location of the problem and camera can be used to take the picture or video of visual problem. Customers can compose complaints or suggestions by recording their voices. The system shows the entire public service delivery points near the current position of the user in the order of distance. The customer needs to choose the concerned authority from the list. If they do not know the concerned authority, they can get help from the mobile application. Then concerned authorities can get the provided customer complaints and suggestions of their own via a web application. The framework is evaluated considering different evaluation metrics like software quality attributes and ISO standards. The framework could eliminate the problems of citizens which are difficult to register complaints or suggestions and can enhance citizen participation in service improvement. The prototype is evaluated by sample users by preparing an evaluation criterion.

**Keywords** — Global Positioning System, Mobile Complaints and Suggestions, Global System for Mobile Communication.

## 1 INTRODUCTION

Customer Complaints and suggestions are valuable input to improve quality of service, monitor the public infrastructures, environments, and redress civic problems. The citizens may have complaints concerning their day to day activities. Building a smooth infrastructure to handle customer complaints and suggestions encourage customers to express what they think, and what they feel. Complaint handling process that needs long procedure like going to the office and standing there for hours, wasting their valuable time and efforts discourage citizens from lodging complaints and providing suggestions in short limit citizen participation. Cities need to make better use of resources and become more efficient. Policies, regulation, citizen participation, and standards are all major components needed to build a viable Smart City [1]. Improved public service delivery and greater government openness are important benefits arising from the application of ICT as highlighted in the eGovernment Vision for 2020 [2]. Ethiopian ICT envisioned developing, deploy, and use information and communication technologies to improve the livelihood of every Ethiopian and optimize its contribution to the development of the country [2]. Currently, Ethiopia has 40 million mobile subscribers and 10 million internet subscribers. Ethiopia aspires to raise its mobile subscribers to 64 million and internet subscribers to 46 million in the GTP II period [2].

The wireless technology advancements in our country motivate us to conduct research to solve big issues on governmental organizations and citizens. Information and Communications Technologies present a large spectrum of tools that the current generation makes his/her life easy. Governments can easily communicate with citizens to improve the way of service delivery, to keep customer satisfaction, and gather an idea from citizens. This study is proposed to achieve the objective to improve the complaints and suggestions handling practices that can be applied in any government organization. The researcher designed a framework to handle suggestions and complaints through a mobile phone. The public body manages customer complaints via a web application. Service providers can learn to recover from mistakes. Good feedback can turn angry, frustrated customers into satisfied ones with the improved performance of services and appropriate solutions. The public resources or infrastructures preserved, issues could be fixed early, and citizens will be kept from the victim. Mobile technology increasingly becomes advanced from time to time. Most mobile devices have GPS and camera services. Complaints and Suggestions can be supported by the Geo-spatial information to specify the location where the problem is situated. The customer suggestions or complaints can contain GPS coordinates and the problems in a visual form. Based on the coordinate the issue could be plotted on the google map for the concerned public authority to indicate the exact location of the problem. The public body can easily locate the place where the issue has been occurred based on geospatial data. The citizens may not be expected to explain the issue; they can capture the photo of the issue and sends it to the

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concerned government office through his/her mobile phone.

## 2 STATEMENT OF THE PROBLEM

Good governance is impossible without the citizen's participation [3]. Ethiopia is one of the democratic countries in Africa; the government has been working with citizens cooperatively. However, currently, there is a semi-manual complaint and suggestion management mechanism to keep public resources, customer satisfaction, and to receive customer suggestions and complaints. Currently, citizens can communicate to the government organizations or public bodies through a phone call, website, or by going to the office in person. These reporting mechanisms may not be efficient, the phone number of the service providers may be unavailable, and the phone line may be congested at pick time or the service provider contact information may not be known by the customer. Because of these reasons' customers could not report their suggestions and complaints to the concerned authority which leads to many problems to have occurred.

## 3 RESEARCH METHODOLOGY

The research design is to provide for the collection of relevant evidence with optimum effort, time, and expenditure. Complaints are generated from the customer, and an idea could be suggested by the customer. Collecting relevant data needs a strategic plan; otherwise, the research result may be incorrect [3]. The research data has been collected from Addis Ababa which is the capital city of Ethiopia to get a sample of all nationalities and national peoples of Ethiopia. The data collected via questionnaire, observation, interview, and document analysis. The questionnaire is used to collect data from citizens to know what they do when they face a problem and have a suggestion, opinion of the citizen on services, the existence of the problems. The questionnaire distributed on shopping centers, at home, offices by targeting to meet different persons in different educational background, sex, age, and field of study to get multiple viewpoints on one idea. Obtaining data from participants with different experience prevents information bias and thus increasing credibility regarding the information. The interview conducted at the public service providers, such as Ethiopian Road Authority, Ethiopian Transport Authority, Addis Ababa Water and Sewerage Authority, and Ethiopian Federal Police Commission. These organizations are chosen because they can get information from regional service providers. The organization could have a similar structure and working procedure.

## 4 DATA ANALYSIS

The researcher observes several problems that the citizens could complain on. But, most of the people ignore complaining directly to the concerned bodies. The researcher had got a chance to ask these people the question of why they

do not report to the concerned body. Most of the respondents answered they don't have enough time to lodge complaints and they don't know where to complain. Some of the problems related to transportation, road, waste disposal, electric, and water services are identified below.

- 1) Refuse of short distance ride
- 2) Asking more fee to commuters
- 3) Unsafe driving such as the driver
- 4) Damaged roads, Potholes,
- 5) Floods on the road
- 6) inappropriate waste disposal
- 7) Street lighting problem
- 8) A tree or large branches hide the driver's sight.
- 9) Dead animals on the road



Fig 1.1 Problems Observed in the Community

## 5 RESULT AND DISCUSSIONS

### 5.1 Prototype Evaluation

To accomplish the evaluation, thirty persons have participated. Two software experts are assigned to evaluate the web application prototype. Ten persons are involved in mobile app prototype evaluation. The evaluation criteria were defined well for mobile users. The procedures followed to conduct evaluation are:

- 1) Prepare the Evaluation Criteria (see appendix G) to a mobile app user.
- 2) E-CSMS web service and E-CSMS Web Application are published to the IIS server.
- 3) The two persons assigned on the web application prototype which considered as a service provider complaint handling unit and register their organization. The third person assigned as a system administrator.
- 4) The researcher works as an administrator, approves these registered organizations.

- 5) Install m-CS mobile app to participants of mobile phone
- 6) Release WiFi from a laptop, the customer connected to this WiFi
- 7) Request the user to send complaints or suggestions to any service provider. Follow the status of their complaints. Access detailed information about the organizations.
- 8) The service providers get their complaints sent from mobile users and respond to the complaints immediately.

TABLE 1  
M-CS APP EVALUATION RESULT

Criterion	Yes	No
Easy to use	10	0
Save time, money and effort	10	0
Feed full information about organizations	10	0
Help to easily know the responsibility of organizations	8	2
enable to send for multiple organization	10	0
allow tracking complaint status	10	0

So, the customer needs to ask others or find information about who is the responsible body from different sources. Out of ten respondents, 80% of them said they can get enough information about the responsibility of the service providers from the app. The customers are not expected to remember every service provider's information. The only thing they need to do is installing an m-CS mobile application. This app lets users get any service provider's information such as responsibilities, phone, email, website address, POBOX, and the physical location of the service provider office. Customers can also get service providers by their service category, location, brunch, and so on. The service providers displayed to users in the order of their distance from the current position of the mobile device. The distance is shown for the user in the kilometer measurement unit. This feature reduces the information gap on customers about where they should report the problems, and which service delivery point is nearest to the report. Even if the customer sends the complainants to none concerned body unknowingly, that complaints handling officer of the organization who received these complaints forwards to the concerned body. The evaluation result indicates that 60% of the participants' rate as excellent complaining mechanism to enhance citizen participation on quality improvement and 40% answered a very Good communication mechanism. This convenient mechanism encourages customers to participate in civic issues.

## 6. CONCLUSIONS

Complaints and suggestions are information sources to improve service quality, and customer satisfaction, and safety. Every problem happens inside society so the citizens can watch before the government body realizes it. The preferred alternative is a customer-focused complaints management solution. Handling complaints and suggestions is a complex process that needs the organization's rigorous commitment and customer involvement. To get complaints and suggestions from citizens; there should be a convenient communication channel in which citizens directly meet public bodies. Based on the survey collected, most of the customers did not report civic problems. The reason is lodging complaints and provides suggestions is inconvenient. The researcher has conducted a study to identify the causes that prevent customers from reporting the issues and to provide convenient complaints handling mechanism which is efficient, helpful, accurate, and usable.

## 7 REFERENCES

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