

## MODELLING AND EMPIRICAL EXPERIMENT OF GUI IN IDENTIFIED E-GOVERNANCE AND M-GOVERNANCE PROJECTS OF INDIA IN VIEW OF USABILITY

Nikita M. Balpande<sup>1</sup> and Prashant P. Nitnaware<sup>2</sup>

<sup>1,2</sup>Pillai college of Engineering

**Abstract---** This paper involves modelling, designing and Empirical experiment on some selected e-governance and m-governance projects of India. To understand the depth and the scope of the system's usability we have to consider two parts of the system the visual and the interaction design. The Empirical experiment involves expert evaluation and the user evaluation on the selected e-governance and m-governance projects which are design by applying different principles and rules. In the view of usability the existing e-governance and m-governance project will be modelled and the Empirical experiment will be performed on existing and the modelled web site. For that there are some experts and there respected rules with respect to interaction and visual design to do the evaluation. The new system which to be design and implement is then given to the different type of user and evaluation is done by taking appropriate feedback from them and by using that feedback new theory will be built for developing usable GUI.

**Keywords---** Empirical experiment, e-governance, m-governance, usability.

### I. INTRODUCTION

In Human Computer Interaction field User interface (UI) is an interaction tool for getting the request of user and give back the response. A special type of user interface is GUI (Graphical user interface) that allows users to interact with electronic devices through graphical icons and visual indicators and make the system usable. Usability is the ease of use and learnability of a human-made user interface such as a tool or device which can be used by user to achieve some usable results. So to provide higher productivity by the system the interface should follow some usability criteria's such as learnability, memorability, effectiveness and efficiency.

For effective and efficient GUI there are three things in GUI structured design, interaction design, visual design. But in this project main focus will be on interaction and visual design only. Interaction design is a design of interface elements to facilitate user interaction with functionality. Visual design talks about the presentation and the appearance for that GUI, shortly it is an arrangement of information items like text, images, diagrams, pictures, tables etc. in such a way that it is visually attractive, perceptive, learnable and understandable.

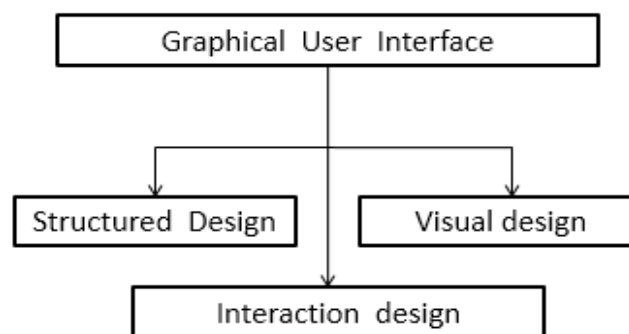


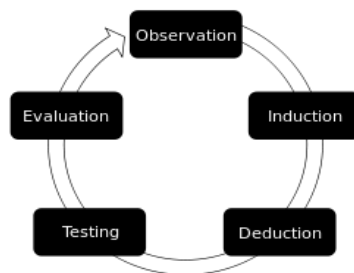
Figure 1.1 Graphical User Interface

There are some characteristics to be consider to design GUI (Graphical User Interface) with the help of an Interface design and the Visual design that are inputs means inputs are expected to the system, Visual programming means what language is used to manipulate program elements,

cognitive computing means how that system works like human brain and last is cognitive load means the total amount mental efforts needed for using any system.

According to these characteristics identification of rules is done which are given by different experts. Then the rubrics are designed with the help of rules and the technical analysis of GUI will be done by using identified rules of experts and using rubrics or expert evaluation and the user evaluation is done for GUI. Implementation of GUI is done by removing the problems which are there in existing GUI associated in technical analysis and finally empirical experiment is to be done for that evaluated GUI with the help of different types of user and the feedback is obtain by giving final result.

Empirical experiment is an experiment which is perform on any developed system by different types of user and taking feedback from that user for the performance of that interface design. We can say that it is a trial and error process for any developed interface design to analyse its performance or it is a comparison between the old and the new interface design.



**Figure 1.2 Empirical Experiment cycle**

Empirical experimentation can be done in 5 steps and 4 phases. 5 steps are shown in Figure 1.2 and 4 phases are preparation, experiment, analyse and re-design. . In this way Empirical experiment and evaluation process is performed on identified e-governance and m-governance projects. Finally, when the evaluation process is done the expected result from the interface design is to give more efficient performance and most usable system. Which is properly design by using rules of different experts and the usability constraints like efficiency, effectiveness, learnable, memorable.

### **1.1 Motivation**

GUI is face of every software where user interact, poor GUI design leads to failure of software. With the awareness levels of the common people on the rise, citizens demand more access to government information and an effective and easy interface in their dealings with the government. Obviously then, more and more citizens these days expect to be involved in the process of governance and to receive a higher standard of service and care from their Governments that is e-governance and m-governance.

E-governance and M-governance projects interact with different versatile user .The GUI which is poor in view of usability will not success to perform his task. Need of standard rules for GUI design is required in India.

### **1.2 Problem Statement**

This project involves designing and identifying rubrics for GUI in Indian e-governance and m-governance projects in the view of a usability and implementing usable system for identified e-governance and m-governance projects.

Mapping, modelling and performing an empirical experiment on identified e-governance and m-governance projects by using reviewed rubrics. Here Empirical experiment is done on identified web site means evaluation process is done on the basis of some usability criteria's like learnability, efficiency and effectiveness.

## **II. PROPOSED APPROACH**

Our approach tries to develop and design intelligent and usable GUI for some identified e-governance and m-governance projects in India. To satisfy users need for any GUI there are some

rules to be followed to design an interface. Some rubrics will be designed after pre-processing and selection of rules after that model will be applied first on the existing system and then on the templates and according to that statistics for the identified GUI will be develop. Then empirical experiment is done on that existing and on templates and feedback will be generated. With the help of feedback theory building can be done.

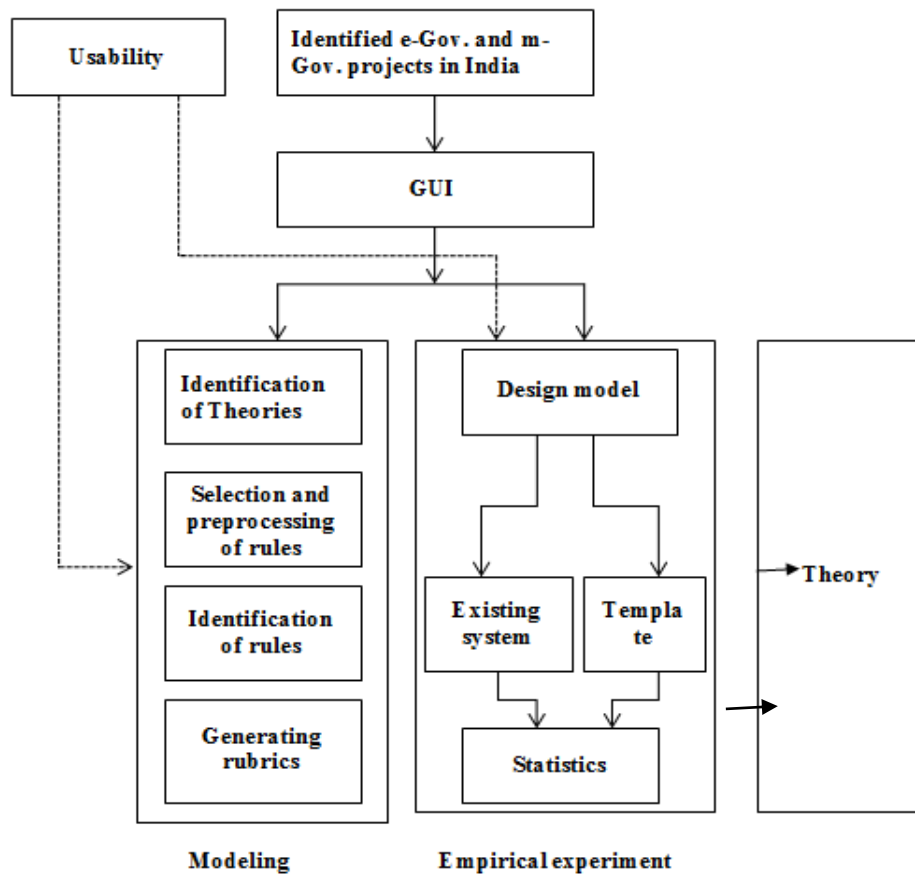


Figure 3.1 Architecture of intelligent GUI

**2.1 Methodology for designing proposed usable GUI:**

In architecture of GUI design there are some steps to follow. In India there are many e-governance and m-governance projects in the form of GUI which are not usable. Modelling and empirical experiment is perform on that GUI according to some usability criteria and with the help of feedback from experimentation theory building can be done. Two main parts in the architecture are modelling and the empirical experiment. Following are the steps to be followed in the architecture of developing intelligent GUI. So modelling is done using following steps.

**2.1.1 Identification of e-governance and m-governance web sites**

There are many web sites in India which are not usable to the user according to some usability criteria hence in this step identification of e-governance and m-governance projects in India is done

**2.1.2 Modelling of identified GUI**

Modelling of the GUI involves some pointes like identification of theories, selection and pre-processing of rules, identification of rules, and generation of rubrics. Identification of theories involves theories written by different experts for interaction and visual design. There are some theories which involves rules or principles for development of GUI. Some theories are for usability criteria’s to show how user can develop usable GUI. And some theories are on evaluation of GUI that is how the expert evaluation and user evaluation is done.

According to the theories by different experts selection and pre-processing of rules is done

for interaction and visual design. Selection of common rules and segregating uncommon rules is done and the expert wise rules list is generated for further evaluation of GUI. Then finally rubrics are generated with the help of rules by experts. First the process will be identified according to some dimensions, dimensions gives some set of rules, and that rules are having some characteristics in this way rubrics are generated. There are total 6 dimensions for interaction design and in that there are 28 set of rules for respective dimensions like user centric, reduced user memory load, uniform within application, fully interactive, match experience expectations emotions and fun, optimize operations and for visual design there are 13 dimensions like similarity, grouping, hierarchy, symmetry of order, simplicity, typography, colour and psychologist effects, space, unity, photographic techniques, application messages, animation, support mental model, attention, layout.

### **2.1.3 Empirical experiment on GUI**

It is an experiment which is performed on any developed system by different types of user and taking feedback from that user for the performance of that interface design. We can say that it is a trial and error process for any developed interface design to analyse its performance or it is a comparison between the old and the new interface design. The output of modelling which is in the form of expert evaluated rules and user evaluated rubrics is then applied on the identified existing GUI and on the new template and according to that statistics is calculated to see how existing GUI is not usable to the user and how new developed template is usable to the user .

All modelling and empirical experimentation is done on the basis of some usability criteria's. And with the help of statistics the new theory can be built for developing usable GUI with some user evaluated rubrics. According to the performance of GUI do the discussion with the user, see the result and take the suggestions and build the new theory for modelling of GUI on identified e-governance and m-governance projects. This all work is to be done for my proposed system for developing intelligent or usable GUI.

## **III. APPLICATIONS**

There are many applications of e-Governance and m-Governance projects. There are some applications of using e-governance and m-governance web sites.

1. It will create benchmark for development of e-governance and m-governance projects.
2. Existing e-governance and m-governance projects can evaluate their web sites using rubrics and theories which are developed.

## **IV. CONCLUSION**

This project gives modelled web site for the user which is usable that is GUI which is effective, efficient and learnable to use. So how this usable system is modelled is by performing empirical experiment on the identified e-governance and m-governance project of an India on the basis of some usability criteria's. This is one of the way to improve user's performance.

First the existing web site will be identified which is not proper according to interaction and visual design rules then modelling is done for that identified web site and then evaluation process is done according to the usability criteria and statistics is generated .In this way the modelling and empirical experiment of GUI is done on identified e-governance and m-governance project of India and usable GUI is generated.

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