IMPROVED MODEL TO TEST APPLICATIONS USING SMART SERVICES

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ABSTRACT: Smart applications are getting enormous popularity in the last several years. The research is conducted due to pressing need of rapid testing applications and improves quality models to ensure high quality of Smartphone applications. This work presents a basic approach to improve quality of mobile application by adjusting validation and test concepts for usage in mobile application development. We anticipate that the proposed solution will help the software companies to improve the quality of smartphone applications.

Key words: quality assurance, testing mobile application, smart application, cloud computing, smart grid.

1. INTRODUCTION

The enormous progress nowadays for smart applications production and the marvelous acceptance from users for all categories [1] have become an amazing development in our life. Especially in the world of smart phones in general and in smart services specifically, which led to competitions on application development in case of meeting basic needs of users and enabling them to access different services in all spheres of life. This conversion came with the strategic use of the latest information and communication technologies [11,12] achieving user satisfaction by providing flexible and interactive means of communication and intelligent features which work anywhere and anytime across many devices.

In the current era, there is an application for everything starting from games, passing through configuration tasks to communications and GPS (Global Positioning System) applications. As a result, it becomes incumbent on anyone who tries to establish business and services in the area of internet to put smart phone applications as the priority. Moreover, when developers devise an application, there are a number of important aspects that they take into account, for instance: the idea, design and promotion besides taking into consideration the difference between smart applications and software for traditional computers.

After this development and progress it has become an important issue to support smart devices by several kind of applications with high efficiency. This corresponds to the important role of this area of how we test these applications to represent an intelligent application in smart services [6,8]. We present an advanced model to test the range of efficiency and quality assurance of applications in the framework of smart services.

Further paper is organized as follows. Section II covers the related work and defines the problem to be addressed. Section III illustrates the proposed solution.

2. RELATED WORK

Hammad and Emad [1] discuss the quality of mobile application from the user perspective. That's where the user reviews provide a rich data source that can be leveraged to understand users concerns and get better prioritize for their quality assurance recourses by developers. For this purpose the study uncovers twelve types of user complaints. Besides, providing developers' insight into the users reported issues of IOS applications along with frequency and impact for each complaint. The search provided with clear and reasonable vision but it did not describe a particular model. The results need to be tested further by considering more applications across other mobile platforms.

E-Learning systems are major field of interest in the last several years [2]. Multiple approaches and solutions specifically in this domain have been developed. Conversely, testing in E-Learning software is the most important way of assuring the quality of the application in cause of preventing system from failing and proving that the program is free of errors. For this propose adducing a reliable code coverage technique which will ensure a bug free delivery of software development will be a solution. Besides, that it is designed to make sure that software is working satisfactorily as per requirements. The study is useful in general but these manual tests is not executed it needs to be Automated tests which reduce effort and time during work. Considering few points from the author overview that Automated test are very sensitive to software changes and do not handle unexpected behavior well. These drawbacks have to be overcome to achieve even high performance in the future.

Correct implementation of lifecycles in mobile applications is crucial to achieve high quality [3]. Conversely, a faulty or insufficient implementation of the mobile application lifecycle can be the source of many problematic faults. In this work with various mobile platforms, they found that the given lifecycle models and corresponding documentation are often inconsistent, incomplete and incorrect. For this propose they present a way to reserve engineer application lifecycle of mobile platforms by testing, applied on three mobile platforms (Android, iOS and Java me). In addition how developers can use these results to get correct lifecycle model for these platforms. The research tests the high quality for mobile applications lifecycle focusing in the different process related states of an application during runtime rather than software system development process. As future work they plan to evaluate the applicability of the presented method to further current mobile platforms and to check its adaptability to platform changes.

Software smart applications play increasingly important roles in our lives. Every software product faces a set of quality issues that affect us in different ways [4]. For this case it's imperative to devote much attention on the quality evaluation of smart phones application. This concern forced

the author to improve a standard thesis with the aid of ISO/IEC 9126 quality model to evaluate the quality of prototype which designed and developed on Android platform. The prototype was a time management application based on pormodoro technique. The research need to be more inclusive it focus on product quality rather than process quality of the product .In future work solutions are needed in order to use the cache memory efficiency while user loses network connection. Besides, the research can be expanded to adapt the metrics mapped to quality characteristics for other mobile devices such as cellular phones and personal digital assistance (PDA) devices.

Measuring the service quality and customer satisfaction on smart phone trading services are classified in three categories: service contents, wireless network services and features of smart phones [5]. An extended model for measuring the smart phone trading services' quality is developed by using SERVQUAL and WebQual models. In addition, PLS model which is one of the Structural Equation Modeling is used to test research hypothesis and the reliability with validity that has been also tested. Besides, wireless internet services that have significant impact on customer's satisfaction. The study submitted the research in interested view but it needs to study the issue in more detail, appropriate manner and general for all categories of people. Besides, it didn't consider the different of user's levels to be sure of the result. Rectify past mistakes and more inclusiveness will give an advanced model on Smartphone trading services. Under the recent proliferation and competition in mobile software market and what is remarkable on the new technology and new devices that are emerging at phenomenal speed [6].

A large number of mobile applications are increasing day by day on the other hand. Quality factor is very importance and has a major role in such a scenario. There is pressing need for an improved quality model to provide guidelines for improvement and maintenance. A quality model is proposed for mobile application development to provide a high quality product to end users. It is written with good domain knowledge but it's not supported with validations. More specific characteristics determination for quality models will improves mobile applications with fundamental validations.

A number of mobile applications grow software's quality it becomes more and more an important issue in this realm [7]. In this case an appropriate mobile quality framework would serve developers, as a guideline for (QA) quality assurance. One of many solutions from the author overview is to provide a software quality framework for testing mobile application and present an approach for it. This framework is based on a mobile software quality model, defining key quality of mobile applications, providing patterns for mobile application development and metrics for testing it. The information that is presented in the study has good knowledge that can be useful but it's so general and there are no validations. An evidence adjusting validation and test concepts for usage in mobile application development in more specific way will become an enforceable framework for testing mobile application.

Jerry and his colleagues [8] provide informative and insightful discussion about mobile testing as a service (MTaaS), including basic concepts, motivation, distinct features and requirements, test environment and different approaches. In this case the paper proposes a model business test regarding into cloud infrastructure for mobile TaaS, discussing the required mobile test frameworks and its environments. Besides, that it addresses existing issues, challenges, and emergent needs. The study is very advanced but it needs to be applied on a test model. In future as more constructions and deployments of mobile APPs and web applications on devices, engineers will need more quality validation research and test automation tools to deal with the discussed issues and challenges.

Cloud computing is entering an explosive growth over the recent years [9]. Consequently, Cloud testing is becoming a hot research topic in cloud computing and software engineering community. In this regard, this study provides a comprehensive tutorial on cloud-based application testing. It answers the common questions raised by engineers and managers, and it provides clear concepts during discussing special objectives, features, requirements, and needs in cloud testing. In addition, it examines the major issues, challenges, and needs in testing cloud-based software applications. This study is detailed in a clear overview, but it wasn't based on a particular model.

Smart services are expected to play key roles in our society [10]. It is an emerging paradigm for delivering services with 'smartness' features. A key ingredient of smart services is various types of contexts including mobile and social contexts. Moreover, with the advent of sensor technology and availability in mobile devices, contexts become a key source of information from which situations can be inferred. However, a number of fundamental technical issues remain unresolved, especially in the area of software framework for developing and deploying smart services. For this propose the authors present a software framework for context-aware smart life services and Smart Service Framework (SSF).

The objectives of this study are to cover several limitations of [1,8] and the lack of comprehensiveness in testing models [4,5] in terms of achieving service efficiency as well as flexibility. As a result, these limitations lead up to write this research as a case study in how to test application from various aspects so as to be entitled under smart applications that serve smart services globally. The main focus has been placed on proposing a clear insight of the importance of smart applications activities and the technical quality features. In this regard, an advanced model is proposed in this research with the aid of International Standard Organization (ISO) 9241-11 and ISO 9126 quality models (QMs). The objective is to evaluate the quality of applications serving smart services using health, education, politics, entertainment, communication and traffic systems.

3. THE PROPOSED SOLUTION

An advanced model is presented in this research to facilitate testing which would simultaneously ensure the quality of the application while achieving quality of service (QoS). The proposed testing model ensures the validity of smart application p; meeting all conditions for user's needs/challenges and issues. With user acceptance, the performance of service, smart features and other phases will illustrate more through the study. The idea is represented in improving a model testing (Taas) Testing as a service, where its composed of layers(three layers) each has a set of tests for evaluating the application by rating star for each one, to show the extent of passing the stage of

success for every application to serve smart appliances. And thus guarantee the quality of the product to acquire user satisfaction and the quality of the application as shown in fig. 1. Thereafter, it is supported by several objectives to be applied. In this regard, smart applications are represented to have several specifications as follows.

• The application should be unique compared with others and quite distinct from similar applications that perform the same purpose. Besides solving duplication challenges, other than that focusing on quality assurance plans for singles applications.

• Associated with administration databases and huge servers to save the vast amount of information that serves several ranges like: governmental, otherwise practical (educational and health areas), social even if it was for entertainment issues such as social communication, Instagram and long games.

• Include Cloud Computing Technology where it has recently received significant attention for changing the way of computation and servers to customers, facilitating solution finding for the challenges and issues of security, privacy, buck up and recovery, the efficiency of applications performance and quality assurance anywhere and anytime.

• The containment of digital cameras beside multimedia properties (video and audio) where applications contain the property of capturing images and recording audio clips during run time.

• Systems guarantee the adaptability and upgradeability for applications constantly over application lifetime to insure the integrity and efficiency of application within the users need forever.

• The possibility for access from the same application to other effective applications in order to assist other services such as emails, Google, social communication and many more examples.

• Take the necessary precautions for security: such as creating accounts that are involved and other internal operations is also administrations responsibility.

• The availability to use, interact, communicate with contacts anytime.

• The reliability and efficiency is a conclusive issue at the maximum extent.

• The large dependability on telecommunications and in particular the wireless communication with the aim of smart grid technology.

• The importance of consciousness in issues of economic and financial return during the smart applications design and development that prefer high acceptance from professional users.

Therefore, the test achieve few points according to the efficiency of high level of quality, where the test is intended to determine the several emerging standards of characterization to be followed in determining the presented services for the priority of resources and techniques that are used. In this regard the application meets the users' needs and immense desires that are submitted for certain range besides flexibility, usability, privacy, safety and security during the usage of these kinds of applications. It tends to develop smart applications including the development of work functionalities within multiple platforms and APIs. Therefore, the model offers the measurement criteria of

smart applications quality and their fundamentals in the following three layers.

A. Headmost Testing Layer (Wireless Connectivity &Smart Features

At first, the headmost testing layer describes smart services features which are presented through applications and it describes an enhanced level of quality for the provided services during functionalities at daily life such as intelligence, safety, security and recovery. In accordance with test requirements applications should be connected anytime and anywhere for a long- term with smart grid network and wireless connectivity. The interested party for this model is Testing Cloud Computing Technology, where cloud computing is obtaining a major development and apparent changes in smart applications, besides becoming the next stage of internet evolution. Moreover, this technology supports a large scale of user accesses at distributed locations over the internet communications offering on-demand application services at any time. Main benefits are reduced time, cost and effort. It is the most cost efficient method to use, maintain and upgrade as well as the unlimited storage capacity that it offers without warring about increasing current storage space availability in your own appliance. In this regard, it ensures the integrity and quality messages to and from distributed control equipment between users and their contacts in smart application and other communications. Today's smart systems require the use of an embedded smart database design. An embedded database can function in an environment where all aspects of deployment and administration can be either fully automated or programmatically addressed. Moreover, mass database is crucial in providing secure and reliable storage, while also providing fast and continuous access to the vast amounts of data collected by applications, processes, or sensors. In case of it being completely self-monitoring and self-administering, it requires minimal human intervention beside its presence is not known to the end user, whether it be a person, process, or device . In this regard, an embeddable database should be able to deploy a ready-to-use database instantly and easily. In this regard, there are several points as follows related to the role of databases in smart applications:

• All database functions must be programmatically accessible. To facilitate self-administration and self-healing, the database must be equipped with capability to be fully programmatically managed.

• The database can be configured and maintained remotely.

• All functions of a running database must be accessible through a Structured Query Language (SQL) interface for smart applications.

• Applications can easily automate maintenance tasks and error handling without an intervention.

• The database integrates easily with other applications by supporting a wide range of standard communication mechanisms and application programming interfaces (APIs).

Therefore, smart life services enables a highly effective communicability with people and inter-of things in an efficient and creative way, therefore, testing all of these features is necessary in this layer alongside with security

especially in smart application development systems and its successful deployments.

B. Posterior Testing Layer (User Experience and Acceptance of Smart Services)

The second layer is Posterior Testing Layer, which tests the extent of reaching users satisfaction and achieve their requirements and experience at the fullest extent during developing quality features of applications. However, this purpose is represented on user's acceptance of the presented service through the portable appliances. In this regard, it is important to identify user's current satiations and their experience fully as possible to understand what services are required by them as well as the selection of appropriate technologies that boost smart services for applications. And that relies on a service-oriented architecture (SOA) to organize loosely coupled services with functions to bind them and manage their life cycle, such as deployment and updating of services. These key features are crucial for service interaction into a configuration of independent services with well-defined interfaces, technologies and tools that focus on how we improve the feasibility, availability and accessibility of services to skillful users of smart applications in dynamic smart interfaces with smart grid connectivity. Further, it is a major feature for smart application to have an interactive interface with clear and understandable easily functions to prefer using specially with including a single service for each application as well as the maturity of the performance tasks during runtime, which also includes varied features as handling new (GUIs) interfaces and touch-screens. Computers touch screens nowadays spread in every aspect of our lives, performing critical functions in diverse areas including education and training, home and entertainment, medicine, and work. The importance of computers in our lives makes human–computer interaction one of the most critical factors in systems design. One fundamental issue in human–computer interaction is that limitations exist on the communication between the human and the computer. Therefore, one of the techniques which this model tests are brain–computer interfaces (BCIs) that will push applications beyond human–computer interfaces and into the very nature of how people interact with computers and their environment including the necessary need for smart applications to be supported with different multimedia (video and audio) technologies in term of several benefits. Subsequently, smart application is now able to perform a number of functionalities including connectivity with other devices, ability to have resolution photographs and also video recording. Accordingly, testing all the previously reported characteristics in this layer is not sufficient several points are more important for the Posterior Testing Layer, such as:

• The feasibility of applications is an extremely important issue, while effective and feasible smart application provides a longer time period, cost and effort during daily life. In the meantime, smart life services provides an increased level of productivities for performing several activities, so testing the feasibility is the main feature for applications development.

• The economic and financial return of smart applications depends on smart economy framework which improves it to a high quality in our technical environment.

• The model examines key transport and technology challenges and issues that related to accessibility; which is defined as proximity or facility for spatial interaction. Many respondents indicated that decisions about accessibility are not in developer's control. Professionals are creating information and communication technologies (ICT) considering accessibility through their work, for testing interactive programs of user experience (UX) and human computer interaction.

C. The Eventual Testing Layer (Performance of Functionalities)

The last layer is the Testing layer. It tests the performance of functionalities with the aim of the standard model (ISO 9126 QM) as is shown in fig. 2. At this high time, it has become crucial to have standard specifications to serve developers as a guideline for quality assurance.

Figure 1 . the proposed advanced model of testing apps as a service for smart applications
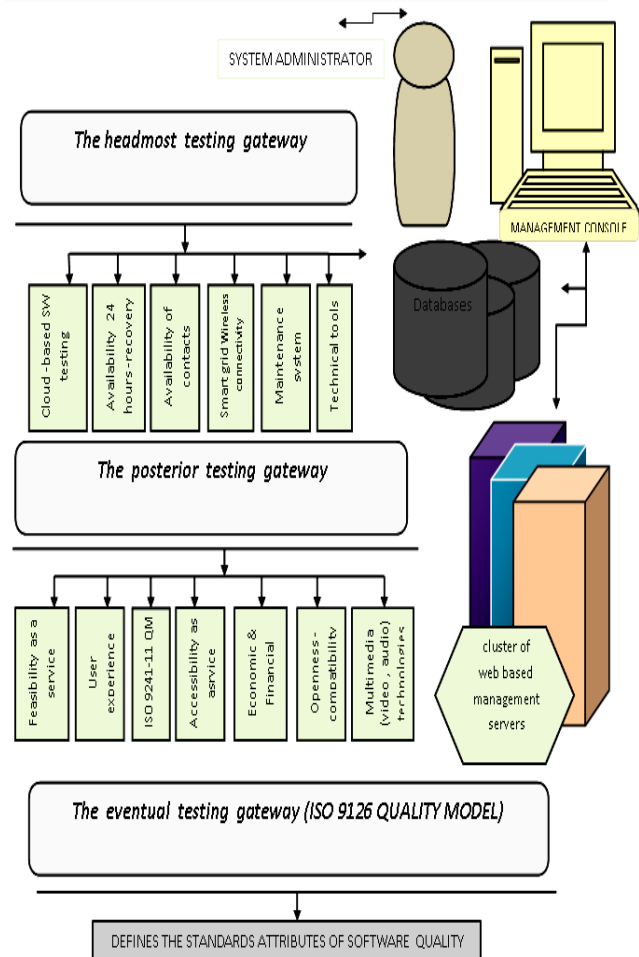
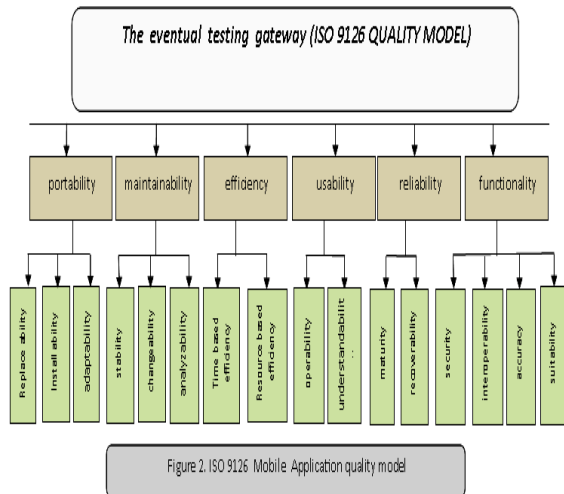**Fig. 1. The proposed advanced model of testing apps as a service for smart applications**

Fig. 2. ISO 9126 mobile Application quality model

In this regard, the Eventual Testing Layer evaluates the internal and external consistency of applications. The design are an important factor as well as structures, interactions and behaviors which match the user experience along with the natural features in applications where it prefers the automatically familiar and easy using of applications. Therefore, usability of smart applications is one of the most important issues to improve user experience and response such as flexibility and simplicity to achieve accuracy of smart applications at a high level.
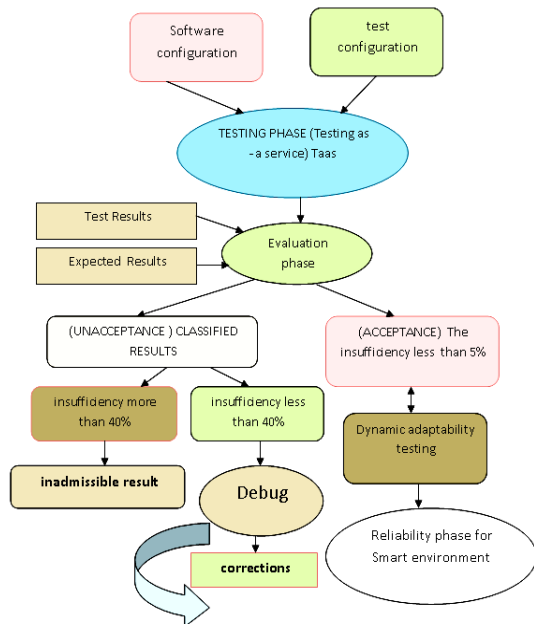

Fig. 3. Flow chart test the result of the proposed model using rating stare

4. CONCLUSION
Smart services assist human beings in daily life activities to improve quality of life. The popularity of wireless technologies in daily life is increasing, leading to research interest in the areas of quality assurance and testing models.

This research is conducted to propose an improved model to testing apps as a service for smart applications. The proposed model requires commitment to the outcome of the test, where a given flow chart in this research tests the result of the proposed model using rating as shown in fig. 3. In the evaluation phase, according to star rating evaluating, we measure the level of acceptance that application has achieved. If the insufficiency is more than 40% the application planning of the presented applications is rejected. On the other hand, if the insufficiency is less than 40% the application planning is under measure and development till it is 5%, to be able to be entitled under smart application with the same specifications that proposed model required in this testing system. In addition, this model tests new smart applications during planning phase. Further, this method reduces problems of adaptability between appliances platforms and the numerous installed smart applications.

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