

ATENEO DE DAVAO UNIVERSITY
Computer Studies Division



Major Project Proposal

survGEN: A Survey Application/Tool for Android using Python and SL4A

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This study aims to develop a survey tool on a portable device that would allow it to be carried easily and allow for surveys to reach farther than before. A PC end component will compile the Surveys to be used on the Mobile App. The survey component will be developed for use on an Android based smart phone or tablet and use Python for its programming language and SL4A, a scripting layer to allow it to work. CSV Files will be generated to allow for easier compilation and tabulation of data. Both will be developed on the Eclipse IDE with the Android SDK and PyDev plugins.

Keywords:

Survey, Android, Python, SL4A, Smart Phone, Tablet, Eclipse IDE, Pydev Plugin, Android SDK

1. BACKGROUND OF THE STUDY

Surveys are a common way for many to build upon pictures of people's opinions and situations. With time, more methods for conducting surveys came up such as fax surveys and the more commonly used online surveys. However, even these survey methods have weaknesses. The constraints of using online based services or solutions to create surveys is that while you can use the internet to spread it far, places with no network connection will be rendered unreachable. The intent of this study is to develop a program capable of storing data collected on file that may be accessed for processing at a later time, the medium selected would be handheld devices like smartphones or tablets given their recent widespread use and for the sake of convenience on the part of whosoever conducts surveys

2. TECHNOLOGY APPLICATION CONTEXT

The field of data gathering is primarily concerned with the methods of how one would proceed in collecting data depending on the purpose of the study, while various means to gather data for research studies have been developed with the passage of time. However, these various methods all have their own sets of risks and problems. Be it in data integrity, quality control, quality assurance and security.

Surveys are among the most commonly used tools for data collection, as mentioned earlier are used to build up pictures on demographics or opinions regarding particular subjects. There isn't really one true survey type as surveys tend to vary based on the requirements for the study.

However with the rise of the internet, surveys were quickly adapted to make use of this technology to deliver surveys anytime, anywhere. With its rise, one can now simply create surveys and share links. And easily gather results without having to be on site physically. However there

have been concerns with security given how most of these services tend to rely on online servers to store all their information

3. RESEARCH OBJECTIVES

The General Objective of this research is to develop a survey application/tool for the Android OS.

The specific objectives are:

- To create a framework for the SRTDO Social Research Training and Development Office in regards to utilizing the proponents application
- To design the application according to the client's exact specifications
- To test whether the application met the specific requirements of the client
- To understand the needs and the workflow of social research when it comes to survey

4. SIGNIFICANCE OF THE STUDY

While the program itself is being developed for the benefit of the SRTDO , there are others who could possibly benefit from the proponent's application once this study is completed.

The first possible future beneficiaries of this program would be any team of researchers conducting field surveys among smaller populations. This would minimize their time spent tallying and compiling their results, which would allow them to focus more on analyzing all the data they acquire.

The second group of people or organizations that could possibly benefit from this would be NGO's and government institutions. More often than not they would perform surveys related to their department's needs. And from time to time, they conduct these surveys in remote areas with no possible way to access the internet. With the proponent's application to be used as a basis, they will be able to easily save their data and store it until the time they can make contact with their department or personally submit their data to whoever needs it.

The proponent's study will also benefit the Information technology sector as a whole. Particularly in regards to mobile application development on android devices. This particular research would encourage a more widespread use of SI4A and python and other alternative programming languages for developing mobile applications on android and hopefully, a wider variety of applications on the market in the future.

5. SCOPE AND LIMITATIONS OF THE STUDY

Arguably, the first and foremost limitation regarding this study would be manpower and resources available to the proponent. As the proponent is on his own, he is only limited to what he can access.

Another limitation of note is that the program in development will be tested only on one type of device with only one Android OS version due to manpower and time constraints. The device in question also arrived rather late, further limiting the time the proponent had to develop the application

In regards to the scope of the program the proponent is developing, the program will only

cover a single survey and cater to the specific needs of the client. Any changes to this scope are to be defined by the client as the proponent meets her to assess how far along the program is coming along

As for SL4A while it's python for android component has a version that supports python 3.0, there still some stability concerns which the proponent decided not to risk, picking the more stable version that supports python 2.6.2.

6. REVIEW OF RELATED LITERATURE

There are several applications available on the market that offers services for creating and delivering surveys via tablets. However all these apps require online connections to allow you to compile and check overall results.

A study conducted by Wall, N. in 2011 proved the feasibility of using mobile devices as an alternative means to how Griffith University gathered feedback on their classes. A small experimental class was handpicked for polling with their devices instead of having to do things traditionally with clickers. By the end of the experiment, the class overall has agreed that mobile polling is a more convenient way for the class to conduct polls in their classroom and now the proponent of this particular study is hoping to spread its use in the near future until their system is fully integrated into the University. [Wall, N. 2011]

A hand on approach study to the feasibility of using mobile phones as devices for polling for use by health workers stationed in South Africa was conducted by Tomlinson, et al. The system was web based and allowed for questions to be sent to entry level phones. The results drawn from the conclusion of the activity state that mobile phones are a feasible method for the delivery of polls and surveys and that this direction will need further exploration.[Tomlinson et al. ND]

This study by Menon, et al focuses on the practical applications of PDA's for use mainly in classroom polls. The concept was given a test run on a summer class with a handful of students, each being equipped with a palm OS PDA along with wireless Bluetooth cards to access the server where the questions were stored. At the trial's conclusion, the students generally gave positive feedback in regards to the test and has contributed to streamlining the process for its next run [Menon, et al. 2004]

7. PROJECT METHODOLOGY

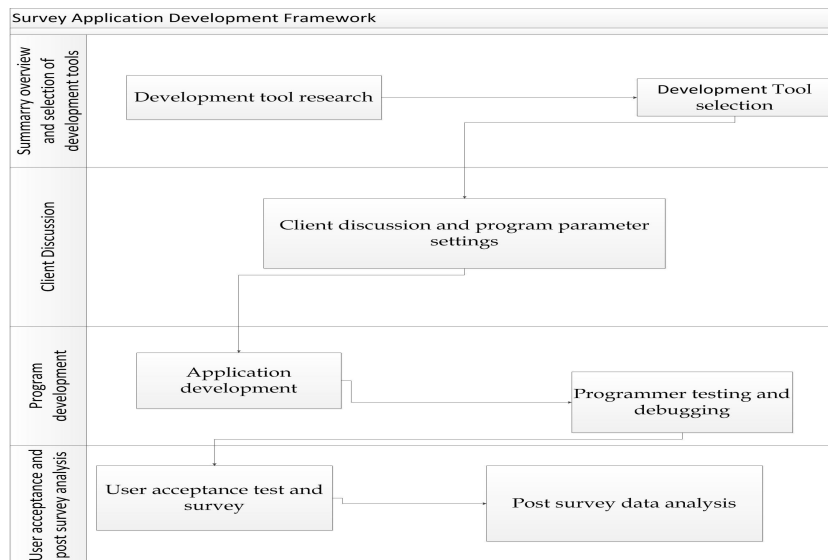


Figure 1. Methodological framework

This study is divided into four (4) main phases. The Summary review and selection of Development tools phase (1), Client Discussion phase (2), Program Development phase (3), and finally the User acceptance and post survey analysis phase (4).

7.1 Summary review and selection of Development tools

In this phase, the proponent will carefully analyze and select the appropriate tools he will use for the development of his program. Things included in the selection of tools included compatibility with Python and HTML as well as android development support. Given the above factors, the proponents have decided on the use of the Eclipse IDE along with its Pydev and Android SDK Plugins for background scripting and Adobe Dreamweaver CS6 for front end HTML development. Both tools have been decided on by the proponent because of their compatibility with all the aforementioned components. And While Eclipse is capable of supporting HTML, the proponent ran into technical difficulties regarding its installation, requiring the use of an

alternative tool for HTML development. Both selected platforms are relatively stable with sufficient documentation.

7.2 Client Discussion phase

This phase is focused around setting the parameters, scope and standards of the program to be developed by the proponent based on discussions held with the people in the SRTDO. The proponent has scheduled several visits to the aforementioned department to discuss about the necessary functions of the program as well as any possible additional functions should the proponent have time for these. From these visits and discussions, the proponent has managed to come up with a list of functions the core program should possess... however due to limited time and manpower, the proponent was incapable of developing any of these secondary functions that came up in the discussion

7.3 Program Development

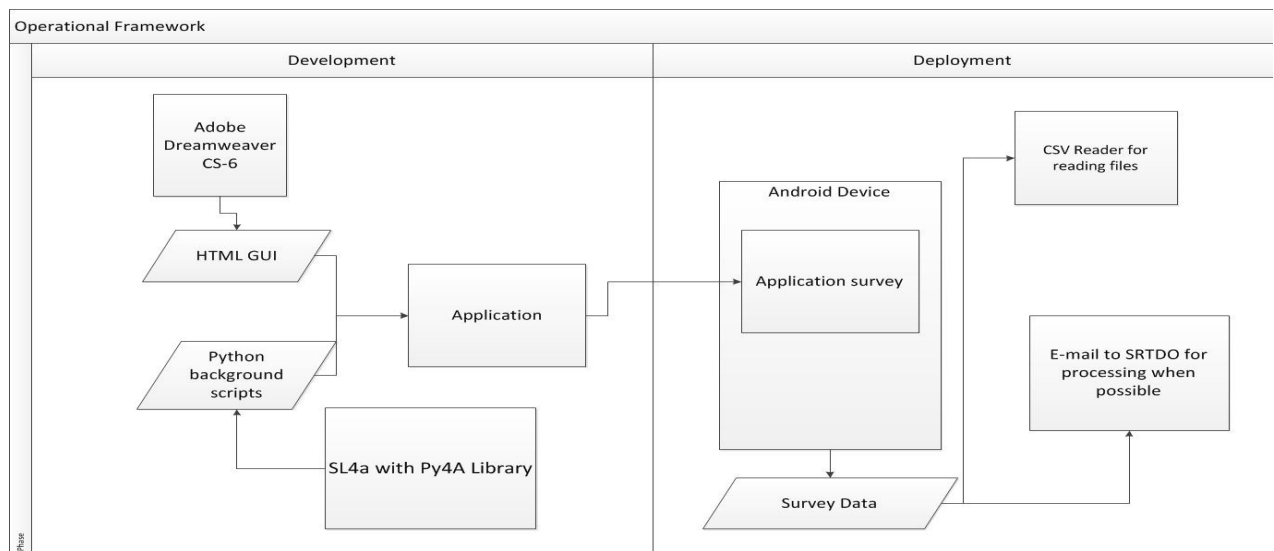


Figure 2. Operational Framework

This phase of the research is centered on the gradual development of the proponent's application. Built in increments, the application was put under heavy programmer debugging to ensure no errors occur. And once the planned items for the increments were developed, the proponent would demonstrate it to the client to see whenever it would suffice or there were additional functionalities the client wanted to be incorporated into the program. An external csv reader is to be utilized for quickly accessing the data any time integrity and accuracy is to be checked

7.4 User acceptance and post survey analysis

Once the client deems that the program is sufficiently developed, the correspondents will be called in for a general device ownership demographic and user acceptance test. The former has been implemented by the Proponent to obtain a general idea on how many of the proponents own Android devices. The latter is essentially the proponent's evaluation on user satisfaction. The following formulae listed in the table below are to be used for analysis fo the data collected from the tests

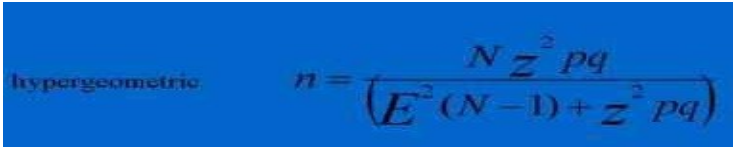




Sample size	 $n = \frac{N z^2 pq}{E^2 (N-1) + z^2 pq}$
Sample mean	 $\bar{x} = \frac{\sum x_i}{n}$
Standard error	 $s = \frac{\sum (x - \bar{x})^2}{n - 1}$
Standard deviation	 $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$
Sample variance	 $s^2 = \frac{\sum (X - \bar{X})^2}{N - 1}$

Table 1. List of descriptive statistics formula utilized by the proponent

The results from the Tests will be discussed in section 9. Results and discussions.

8. TECHNOLOGY BACKGROUND

Android is a mobile OS developed today by Google.inc and is primarily used in both smart phones and tablets across various brands. The primary reason for using Android in this study stems primarily from the wider variety of devices that employ the OS. Currently the proponent is using android version 4.1.2 as it is the packaged software the device was supplied with

SL4A or Android scripting layer is a scripting layer add-on for any Android OS. While Android is a Java based OS and the Java language is flexible in many aspects. There are some who either have a hard time understanding or grasping some of the more advanced concepts in java. Or the programmer prefers using Programming language A over B. SL4A is here to facilitate that.

As of this writing, SL4a's latest version is rev6. Although there is a developers build which the proponent has selected which is rev 6x. Rev 6x has a handful of experimental commands which the proponent has tried out for use in developing his program. As for the python libraries for SL4A, its current release supports python version 3.0. however due to not having much experience with the many changes between 3.0 and 2.7, the proponent has decided to stick with their most stable library version which supports python 2.6.2

9. RESULTS AND DISCUSSION

After the program has been developed the proponent will conduct evaluation and testing of the program by having the staff test out the device. With the use of the hypergeometric formula with a confidence level of ninety five percent (95%) for determining sample sizes from small populations and the SRTDO's total survey correspondents coming in at 18 people. The proponent has determined that everyone must be included to ensure the accuracy of the data gathered. The tests were conducted in 2 batches, the 1st batch being most of the SRTDO's affiliates who in general were veterans in the field of social studies and were knowledgeable in regards to statistics and surveys. The 2nd batch held fellow college students from the International Studies Course who were affiliated with the SRTDO. The proponent's program has been designed in a way to allow data to be submitted to the local csv file. If during the survey, the user cannot acquire any data to answer some of the necessary fields. Validations will ensure that these empty fields will be accounted for and that a substitute value will be used instead to ensure that the order of data passed will not be disorganized.

9.1 Device Ownership results analysis

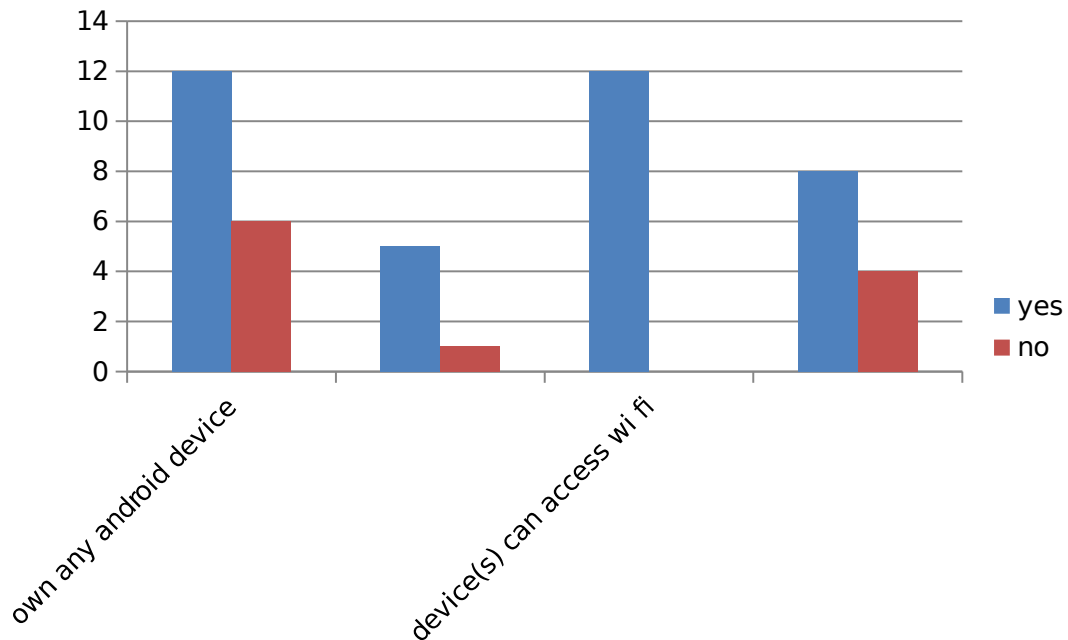


Figure 3.1 showing the general Results in relation to ownership of android devices

As shown in the figure above over a third of the 18 correspondents do not own smart phones yet majority of them have experience using such devices. And as for the correspondents who do own such devices. All twelve (12) correspondents who own devices that can access Wi-Fi and two thirds of them have some form of data plan, giving them access to their respective cellular 3G or 4G networks. Overall it is likely that most their correspondents own an android device and the few who don't are likely to have at the very least, handled such devices. These results are rather encouraging as it means that integrating the proponent's program into their workflow shouldn't pose too many problems or negatively impact their efficiency at work.

9.2 User acceptance test analysis

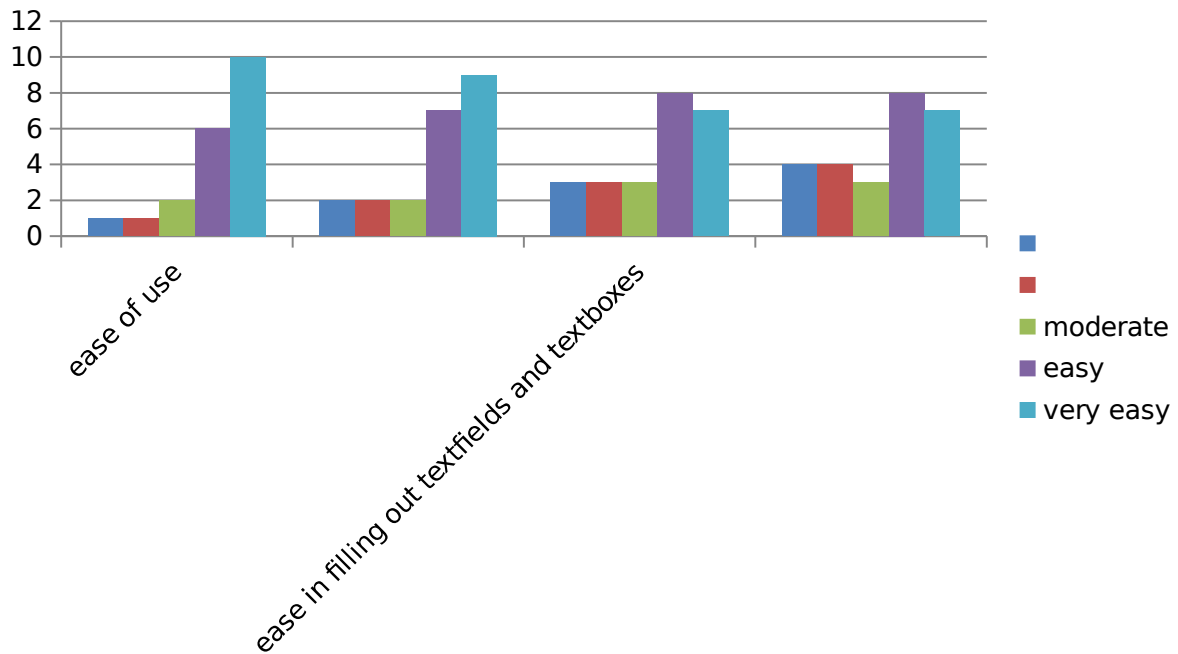


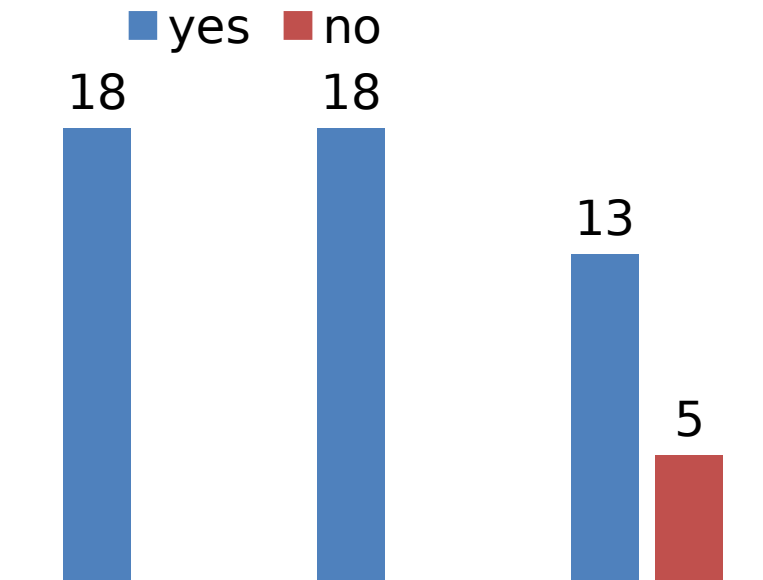
Figure 3.2 showing the general results of the User Acceptance tests.

parameters	Mean	Standard Deviation	Median	Mode	Standard Error	Sample variance
Ease of use	3.6	4.335896 678	2	0	1.939071 943	18.8
Ease in viewing data	3.6	4.335896 678	2	0	1.939071 943	17.3
Ease in filling out textfields and textboxes	3.6	4.335896 678	2	0	1.939071 943	14.3
Ease in selecting items in multiple choice questions	3.6	4.335896 678	2	0	1.939071 943	14.3

From the results above it can be generally concluded that everyone found the program easy to use. Virtually no one checked off any items being very difficult or difficult to understand with those having the most difficulty only selecting moderate. Majority found the program to be rather easy to use and only a handful finding it moderately easy to use at most. The mean noted from the proponent's analysis of Data has been found out to be the same across all criteria (3.6) meaning that this shows consistency with how satisfied they are regarding its performance.

While overall ease of use and viewing of data is very ease, overall ease lowered slightly into easy when it came to criteria rating how easy or difficult it was to actually interact with the application itself, steps to rectify this though possibly unnecessary are already being considered

by the proponent for future builds. Their behavior towards the use of the program have also been encouraging, this however will be discussed in the next sub-section which will be the Acceptance Test observation.



Feel that the program is accurate

Figure 3.3 showing ratings regarding accuracy, willingness to utilize the application in the future and program completeness

As shown in the third figure above all correspondents testified that there are no problems in regards to accuracy after having the correspondents check the CSV file where their data was kept. and everyone is eager to utilize this application in the future once it has been integrated into their system. In regards to missing features, thirteen (13) out of the eighteen (18) correspondents believe that the proponent's application as is already sufficient for their work. The other five (5) who feel like there are missing features pointed more to oversights in the layout and a somewhat deeper integration with their system in the near future. The former which has already been addressed by the proponent and the latter already being considered by the proponent should he decide to work with them in the near future