**Acknowledgement**

Firstly, we would like to express our sincere gratitude to **Er.Sudhir Shrestha,**White House Institute of Science and Technology, for helping us confirm our project, for boosting our efforts and morale by his valuable advices and suggestions regarding the project. We would also like to thank **Mr.Chandraman Shrestha**, for directly supporting us in tackling various technical difficulties and providing us the concept of efficient coding. We would also like to thank **Mr Utsav Singh Rathore** for providing us the knowledge of php which is used in this project. We are indebted to project coordinators to **Er.Sudhir Shrestha** and Department head Mr. **Gyani Roy,** Electronics and Computer Engineering Department, White House Institute of Science and Technology for his encouragement, support, managing of necessary equipments, facility, work environment and proper guidance throughout project duration and report preparation, without which it would have been difficult task for us. We would also like to thank all teaching and non-teaching staffs, family members and seniors for their support, motivation and encouragement which helped us achieve our goal. We would highly appreciate and heartily welcome suggestions for further improvement if any.

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**Abstract**

A survey is a detail study of geographical area to gather data on attitude of impression, satisfaction, opinion, level etc by polling a section of population.

In Nepal the survey methodology is hectic. The manual survey includes piles of Questionnaire papers, time consuming data manipulation and data entry. Information provided in the survey is very valuable if it is correctly gathered. It decides the implementation of development activities and actions. It is estimated that for a medium level of survey it requires almost 3 month to complete. Manual error cannot be overlooked.As a computer student for a final year project we have decided to build a mobile survey system that could help such survey to be taken within an hour with almost 100% accuracy.

For the implementation of the project we have chosen android operating system on mobile. There are basically four steps of how this works: 1) Login to the server and create questionnaires. 2) Download the forms and questions from the server via internet on to your device. 3) Conduct mobile surveys on one or multiple Android devices. 4) Upload results from your Android device to the server for analysis.

**Introduction**

**What is Android OS?**

Android is a *noun* which means a robot with a human appearance in science fiction.

**Android** is a [Linux](http://en.wikipedia.org/wiki/Linux)-based [operating system](http://en.wikipedia.org/wiki/Mobile_operating_system) designed primarily for [touch screen](http://en.wikipedia.org/wiki/Touchscreen) mobile devices such as [Smartphone](http://en.wikipedia.org/wiki/Smartphone) and [tablet computers](http://en.wikipedia.org/wiki/Tablet_computer). Initially developed by Android, Inc., which [Google](http://en.wikipedia.org/wiki/Google) backed financially and later bought in 2005, Android was unveiled in 2007 along with the founding of the [Open Handset Alliance](http://en.wikipedia.org/wiki/Open_Handset_Alliance): a consortium of [hardware](http://en.wikipedia.org/wiki/Computer_hardware), software, and telecommunication companies devoted to advancing [open standards](http://en.wikipedia.org/wiki/Open_standard) for mobile devices. The [first Android-powered phone](http://en.wikipedia.org/wiki/HTC_Dream) was sold in October 2008.

Android is [open source](http://en.wikipedia.org/wiki/Open_source) and Google releases the code under the [Apache License](http://en.wikipedia.org/wiki/Apache_License). This open source code and permissive licensing allows the software to be freely modified and distributed by device manufacturers, wireless carriers and enthusiast developers. Additionally, Android has a large community of developers writing applications ("[apps](http://en.wikipedia.org/wiki/Mobile_app)") that extend the functionality of devices, written primarily in a customized version of the [Java](http://en.wikipedia.org/wiki/Java_(programming_language)) programming language. In October 2012, there were approximately 700,000 apps available for Android, and the estimated number of applications downloaded from [Google Play](http://en.wikipedia.org/wiki/Google_Play), Android's primary app store, was 25 billion.

**Why Android?**

We are not the involved in promotion of Android OS nor we are sponsored by android company. We found android interesting and easy due to following reason:

1. Android is an open source and can be developed for free of cost if someone has knowledge of JAVA.
2. The popularity of android is growing day by day and it the world most powerful and feasible Smartphone operating system which will overrule the world due to its flexibility.
3. Since JAVA is in our course of Study and android is based on JAVA so it is very easy for us to understand how to develop an application.

**Survey**

Survey is a processing of gathering data from a particular population and environment prior to the implementation of activities. A survey is consist of sample or whole population, method of data collection and individual question item that eventually becomes the data that has to be analyzed.

**Importance of survey:**

1. To Discover What's Going On in a non-threatening survey environment, your organization will learn about what motivates survey respondents and what's important to them.

2. To Provide An Opportunity To Discuss Key Topics With Your [Target Population](http://knowledge-base.supersurvey.com/glossary.htm#target_population)  
Communicating with respondents about your survey topic allows for deeper insight into your survey problem, and can shed light on topics related to your survey problem within a larger context.

3. To Prioritize Your Actions Based on Objective Data  
Rather than relying on subjective "gut" feelings, you can gather objective information to make sound data-driven decisions. Therefore, you can immediately address issues that are important, rather than wasting resources on things that no one cares about.

4. To Provide a Benchmark  
Surveying provides a "snapshot" of your target population and their attitudes about your survey problem. This helps you to establish a [baseline](http://knowledge-base.supersurvey.com/glossary.htm#baseline) from which you can compare whether target population attitudes and perceptions relative to the survey problem are getting better or worse over time.

## Types of Survey

## There are many types of surveys from which to choose. After determining your survey design, use the comparison chart below to help you decide whether Web surveys, mail surveys, telephone surveys, or personal interview surveys are best suited to your specific needs and applications:

|  |  |  |  |
| --- | --- | --- | --- |
| Type of Survey | Advantages | Disadvantages | Recommendation |
| Web Survey | * Very low cost * Extremely fast * Complex questioning assures better data * Anonymity of respondents results in more honest answers to sensitive topics * Respondents provide more detail to [open-ended questions](http://knowledge-base.supersurvey.com/glossary.htm#open-ended_question). * Survey software simplifies compilation and analysis of data collected. | * Do not reflect population as a whole * Respondent completion rates lower for longer surveys * Random respondents may reply if your survey appears on Web page. | * When desired target population consists mainly of Internet users.   Examples:   * Business-to-business research * Employee Attitude surveys |
| Mail Survey | * Frequently used for [social research](http://knowledge-base.supersurvey.com/glossary.htm#social_research) * Low cost (almost 75% less than personal interviews) * Eliminates potential bias | * May result in biased sample * Low response rate * Time! Need to wait at least several weeks for all responses to arrive | * Target population is highly literate or is in a group with specialized interests |
| Telephone Survey | * Reach 96% of all homes * CATI software streamlines process * Interviewers can ask for clarification on responses; additional detail | * Sales calls often pose as "research" calls * Typical calling window interrupts respondents' personal time * Call screening is common * No visual support | * General population surveys |

**Android Survey:**

Android Survey is a kind of mobile survey typically developed for Android OS. This is actually android applications that run in an Android mobile. However there are certain differences in this application that any other application. The major difference is that it is not downloadable through Google play. The basic idea behind this is to constrain this application for limited user.

In Nepal the Android phone is still not widely used in rural areas also there is a huge communication problem in rural area. Moreover people are not literate enough to use these kind of application rather they prefer answering in oral form and the person who is conducting survey writes in the questionnaire paper.

Hence we are targeting this application to a company which conducts such kind of survey basically in rural area and in critical situation like disaster management and rescue projects.

Android Survey consists of two major ideas: A server that is responsible for creating users (here users are those who perform the survey), creating forms for various organizations (eg. medical survey form, student survey form) with related questions. Secondly an Survey Application deployed on to the mobile which downloads the form and question from server and generates the android user interface forms according to the type of questions( radio type, check box type) etc. and collects the answer temporarily on to the Sqllite database of the mobile itself. The processing of uploading and downloading requires the internet. Finally the data are uploaded to the server database and a graphical chart generator generates the specific charts in the web interface.

In this way a survey can be conducted with more automated and accurate way rather than lengthy and costly manual survey.

**Objectives:**

* To save a remarkable amount of capital used for conducting surveys.
* To reduce the time frame of total survey methodology.
* To provide a correct and error free data and result reducing manual errors.
* To conduct an automated data analysis and prompt result.
* To help the government and other institution by providing a quick survey in critical cases such as health hazard, disaster etc for prompts decision.

**Scope of the project:**

Android survey helps to conduct a smoother, quick and automatic survey. It can be used by the various consultancies which perform survey and research. This application can be used by the government for research and survey like census. There are various NGOs and INGOs which frequently conducts survey in sectors like health, infrastructures etc.

Android Survey is an application that suits in every sector where survey is very important conduct as it has capacity to hold dynamic forms and questions.

**Problem Analysis and Motivation:**

During our third semester one of the group members Mr. Ashim Ghimire was working in a research program conduct by a Local NGO( JAMARKO NEPAL). It was a large scale survey program conducted in remote areas like jumla, mugu and humla. The survey was conducted to find out the average life standard of people living there. According to him there were thousands of questionnaires that was carried all the way to the target area. The people who were carrying the loads of paper had a troublesome and time consuming journey via flights and helicopter.

Another difficult task was to provide training for respondent to fill the forms. It took almost 2 weeks to make them understand about why the survey is being conducted. It took 2 more months for the NGO to receive the forms which was only 75% complete out of expected response.

Next phase was the hectic data entry that took almost 1 month finally the survey was analyzed and findings were evaluated. We were also involved in the data entry which was very confusing due to various reason such as handwriting was not clear and somewhere we had to guess the answers, incomplete form were another trouble, we spent most of the day typing bunch of questions.

Realizing these aspect of survey we came to a mutual decision to develop a mobile survey application that could solve all the problem of time, money and accuracy. Since JAVA was a part of our subject so we choose Android operating System.

**System Analysis:**

**Requirement Specification:**

The system requirement analysis was done in order to acquire the details of system and desired functionality of the system effectively and efficiently which includes both the hardware and software requirement for the satisfactory output and functionality of the application that we have planned to develop.

**Hardware Specification**

* Personal Computer

Processor –above 1Ghz

Ram-above 1GB .

* Android mobile with internal at least 32 GB internal memory and processor above 1 GHz.

**Software Requirement**

* Domain Registration and Sever Hosting minimum 1GB.
* Operating System.-Windows 7 and above
* Eclipse.
* Blue Stack Emulator.

**Feasibility Study:**

A feasibility study is an evaluation and analysis of the potential of the proposed project which is based on extensive investigation and research to support the process of decision making.

Technical feasibility:

* The android-adt bundle which provides the platform of coding exits in Eclispe environment.
* The problem of data transfer between server and a mobile phone can be solved through JSON (Java script object notation).
* The large data transfer could create a UI delay and hang during running condition it can be solved through Asynchronous Task which provides background loading mechanism with an option of setting loading information display during pre execution.
* Internet is required to upload the forms and question on to the mobile database. After the form is uploaded on mobile there no need of internet until the form is completed and ready to send this reduces the dependability of internet.
* The questions types (single choice, multiple choice etc) are detected and corresponding user interface (check box, radio button) are generated. This increases flexibility in questions.
* The mobile internal database will be enough to store temporary data .Once the data are send the information can be deleted from mobile database.
* Since the project is lightweight it can be deployed in least API level .

Operational Feasibility

* The language used will be in simple English that can be understood by the people with basic knowledge of English.
* The UI will be friendly and user manual will be provided.

Economic feasibility

* The major expenses will only include a mobile and a hosting cost which will be very cheaper in comparison with traditional Survey methodology.
* Android is a open Source, the knowledge of JAVA is only required. The development cost is free.
* The total market price of this Application will only include a hosting charge and development charge.

**System Design:**

The System design includes System Architectures, Flow Charts, Data Flow Diagrams, E-R Diagrams, and Class Diagrams which are shown in the figures below.

System Architectures:

Mobile Database

Internal mobile database access System

Data uploading System

Form Processing System

Data Downloading System

Remote Server

Login System

Web Interface output through chart generator

Server Database

Internet Based System Non-Internet Based System

Fig: System Architecture

DFDs

Level 0 DFD:

Request Correct Answers

Send Forms and questions

Sends Correct Answers

Response Correct answer

User on Mobile

Administrator

On Server

Level 0 DFD of Android Survey Application.

Response Output

Sends data

User on Web Browser

Server

Database

Request output

Level 0 DFD of Php Chart Generator.

Level 1 DFD

Define specific user

Sends Correct answer

Request

Response

Mobile internal database sqlite

Sends data to mobile database

Sends forms and questions

Server database

Figure: Level 1 DFD of Android Survey Application.

yes

If login =true

Upload the answers to the server

Is Connected

Fill Forms and store in mobile database

Download forms and related questions

Internet

connection ?

Shared preferences (User id ,login=true)

Is user valid?

Username

Password

no

no

yes

yes

no

yes

Fig: FLOW CHART OF ANDROID SURVEY

no

Methodology:

There a mainly Six components involved in this project which are as follows .They are briefly discussed in this section.

1)Server

2)Login System

3)Data downloading system

4)Form processing System

5) Internal mobile database Access System

6)Data uploading System

Data Uploading/Downloading System.

Understanding JSON:

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the [JavaScript Programming Language](http://javascript.crockford.com/), [Standard ECMA-262 3rd Edition - December 1999](http://www.ecma-international.org/publications/files/ecma-st/ECMA-262.pdf). JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language

JSON is built on two structures:

* A collection of name/value pairs. In various languages, this is realized as an *object*, record, struct, dictionary, hash table, keyed list, or associative array.
* An ordered list of values. In most languages, this is realized as an *array*, vector, list, or sequence.

For example

{“key”:”value”, ”keyarray”:[{“key1”:”value”,”key2”:”value”2”}]}

Data Interchange Process:

Creating URL

API

Reads JSON

With the help of JSON the data are fetch as per the requirement and with the help of SqlliteOpenHelper class we connect and create the exact table that exits in server and perform SQL query to add the data to mobile Server.

Uploading is done with the help of Httpget Request by passing the parameter in the url itself.

For Example: http://10.0.2.80/survey/api.php?action=setanswer&correctanswer=yes

SERVER:

A **server** is a system ([software](http://en.wikipedia.org/wiki/Computer_software) and suitable [computer hardware](http://en.wikipedia.org/wiki/Computer_hardware)) that responds to requests across a [computer network](http://en.wikipedia.org/wiki/Computer_network) to provide, or help to provide, a [network service](http://en.wikipedia.org/wiki/Network_service) and resources.

Server include databases where data are stored in the form of table. In this project the server includes following files and services:

* Mysql database to store data.
* APIs (PHP files) : Work as interface between client(mobile) and server.

LOGIN SYSTEM

The database in the server has a user table which is created by the Administrator on the server. This table includes information of the end user provided with the password and username. The application has to be installed in the end user mobile and administrator must create user defining username and password and other information. Each user is unique.

Android Survey Application Starts with a login form which contain username and password field. The end user is provided with his own unique username. The username and password entered on the mobile phone is sent to API which checks whether the provided username or password is present in the database or not. If it is found to be true it sends a acknowledgement by flag to the mobile along with the user id then it is stored in the shared preferences of the mobile so that once the valid user is logged in there is no need of typing the username and password each time he/she starts the application.

**if** (status.matches("on"))

{

SharedPreferences pref = getSharedPreferences(*PREF\_NAME*, Context.*MODE\_PRIVATE*);

Editor edit = pref.edit();

edit.putBoolean(*PREF\_KEY\_STATUS*, **true**);

edit.putString("USERNAME", userget);

edit.putString("userid", id);

edit.commit();

}

**boolean** b = p.getBoolean(*PREF\_KEY\_STATUS*, **false**);

if(b)

{

Start dashboard

}

Else

{

Throw the error “Acess denied”

}

On the API the query is made free of any sqls injections.

$sqlpo=sprintf("Select \* from `user` where `password`= '%s' and `username`='%s' ",mysql\_real\_escape\_string($password),mysql\_real\_escape\_string($user));

If no of rows returned is 1 then it only checks the further conditions of validity if everything is valid it sets the status=on else status=off.

Internal Mobile Database Acsess System:

In this project we have used SqliteOpenHelper Library and have implemented DAO approach.

SqlliteOpenHelper is a library that we must extend in our working class also we must override two function.

* onCreate(SQLiteDatabase db)

{

Query to create table is written.

}

* onUpgrade(SQLiteDatabase db, **int** arg1, **int** arg2)

{

Delete query is written here. In case of upgrade in the Application version this function is called.

}

DAO(data access Object) is basically a coding practice that separates query from the logic. In DAO approach query is written within function that may/may not return the query result, in separate class and it is accessed by calling the functions in the Logic.

For Example

In DAO class

**public** DAO(Context context)

{

dbHelper = **new** DbHelper(context);

db = dbHelper.getWritableDatabase();

}

Public void addresult (String Corrans)

{

Insert query

}

In Logic class

DAO d=new DAO(this)

d.addresult(“yes”);

Form Processing System:

Activity Class

Access R file and converts into VIEW.

“R “ file: XML Components are in the form of integer

XML file contains UI like radio button, textfield.

DISPLAY

In this project the XML file are dynamically interchanged according to the type of question.

For example: If the type question is of single choice then the Activity class which is rendering the XML of radio button is started.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ques type:1 | Questype:3 | Questype:2 | Ques type:4 | Ques type: 2 |

Index=0 index=1 index=2 index=3 index=4

If question type of index value is

Checkbox

Spinner

Textfeild

Radiobutton

1 2 3 4

PROJECT MANAGEMENT:

Team:

|  |  |
| --- | --- |
| Resources | Roles |
| Er. Chandraman Shrestha | Project Supervisor |
| Mr. Asim Ghimire | Team Leader |
| Mr. Rahul Singh | Developer |
| Mr. Sujan Rai | Developer |
| Mr. Sunil Dangol | Developer |
| Mr. Sunil Mali | Developer |
|  |  |

Team Roles and Responsibility:

|  |  |
| --- | --- |
| Roles | Responsibility |
| Team Leader | Project Planning  Project Status Report  Schedule Tracking  Co-ordinate Schedule activities  Track Deliverables  Team leader also work as team member |
| Team Member | High level and detail design  Integration plan  Coding and Self Unit Testing  System Testing  Manuals  Documentation |

Gantt Chart:



Limitation

* For Large Scale Survey the hosting cost increases, which becomes impractical. In such case private server is recommended
* English Language is used.
* Internal memory of mobile should not be too small.
* There are only 5 answers available in case of single or multiple choice question. Of coarse we can increase the size by adding some fields in the database any time.

Future Enhancement:

* 1. Implementation of Artificial intelligent that would give the appropriate decision after the survey is performed.
  2. Using a Map as output with colored segments are used in the particular geographical area based on various result and findings.

Conclusion:

The purposed system can be implemented successfully on Research and survey Sector which would obliviously create a remarkable impact on the Survey Methodology practice in Nepal.