

## Using mobile to send an Environmental Report to the environmental database

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### Abstract:

The purpose of this research to create an application on Mobile allows volunteers and official staff sends information about various environmental problems suffered by the Iraqi individual in his environment and sends it to the relevant environmental authorities for the purpose of storage and archiving electronically with the ability to display this data and retrieved and modified or deleted. The application is a client - server system and the application development for mobile device is Android Studio while environmental database created on the local host xampp server with web php pages to view reports and search or by using the Capabilities of the local host xampp server itself. Use the application allows the participation of the largest number of volunteers and environmental staff and notification directly about the problems and environmental damage at low cost, and improve the interaction between society and environmental authorities and to increase environmental awareness and improve the popular environmental control and provide the possibility of environmental remediation faster and achieve a something of Sustainable development social and environmental dimensions.

**Keywords-** Sustainable development, environmental awareness, Environmental Control, mobile, Android Studio, xampp, client- server system.

### أستخدام الهاتف المحمول لأرسال تقرير بيئي الى قاعدة بيانات بيئية

#### الخلاصة

الغرض من هذا البحث أنشاء تطبيق على الموبايل يتيح للمتطوعين والموظفين البيئيين الأخبار عن المشاكل البيئية المختلفة التي يعاني منها الفرد العراقي في بيئته وارسالها الى السلطات البيئية المختصة لغرض خزنها وأرشفتها إلكترونيا مع إمكانية عرض هذه البيانات وأسترجاعها وتعديلها أو حذفها. التطبيق هو نظام زبون-خادم وبيئة تطوير تطبيق جهاز الموبايل تمت في برنامج Android Studio بينما أنشئت قاعدة البيانات البيئية على local host xampp server مع صفحات php web pages لعرض التقارير والبحث أو باستخدام إمكانات ال local host xampp server نفسه . استخدام التطبيق يتيح مشاركة عدد أكبر من المتطوعين والموظفين البيئيين في الأخبار المباشر عن المشاكل و الأضرار البيئية و بكلفة قليلة و تحسين التفاعل بين المجتمع والسلطات البيئية وزيادة الوعي البيئي و تحسين الرقابة البيئية الشعبية وإمكانية معالجة بوقت أسرع وتحقيق القليل من أبعاد التنمية المستدامة الاجتماعية والبيئية .

**الكلمات المرشدة:** التنمية المستدامة ، الوعي البيئي، الرقابة البيئية ، الموبايل ، xampp ، Studio ، Android، نظام زبون -خادم.

## **INTRODUCTION**

Iraq and its environment has suffered as a result of many wars and after long years of neglect towards the Iraqi environment and its protection requirements, many environmental problems appeared that reflects negatively on the human and natural sources of water and rivers, soil and air [1].

Varied and multiple environmental problems in Iraq include all aspects of life, the infrastructure in many residential areas was destroyed where water supply systems or sewage systems are in poor condition and the best one are in the capital city of Baghdad, The accumulation of municipal and medical waste which carry the risk of epidemics, pollution of air and water with heavy metals and other hazardous material, As well as environmental problems resulting from the leak of crude oil and petroleum materials, damaged soil due to lack of water and increased salt, and not to increase afforestation, which led to increased desertification, islands appear in rivers, electric generators lead to increased noise and poses fat waste and release toxic substances such as lead in the air [1,2].

The term sustainable development appeared in the framework of the global quest for continuing global economic growth without having to make fundamental changes in the global economic system. the multiple environmental problems have a major impact on the development in the worlds for that appeared the idea of the sustainable development to preserve the environment and its elements from finishing And preservation it's in a balanced manner and improving the living conditions of people in the same time without exhausting natural resources and keeping the rights of future generations. Sustainable development has three dimensions economic and social dimension and the third dimension is the environmental dimension to preserve the environment and natural resources, then the sustainable development need to be comprehensive to achieve human rights and development and environmental protection, as well as the use of technology to solve environmental problems, this showing the importance of this term and its application [1,3]. Iraq has accompanied these developments, especially after the year 2003 the establishment of the Iraqi Ministry of the Environment to address environmental problems that has plagued Iraq and finding appropriate solutions and legislation of environment laws, especially in 2009, proceeded to protect and improve the environment and the establishment of an environmental police and of its objectives also Law protection to water and air and noise reduction and increased environmental control levels [1].

The Iraqi environment suffering from different challenges like using small electric generators around the Iraqi cities despite the harm to the environment, the growing phenomenon of dust storms, deterioration of sanitation and other problems which effect on the Iraqi individual. That is why the idea of sustainable development and improving the living conditions of the Iraqi society and solving environmental problems is very important, especially with the availability of the required ground of the existence of legislation and environmental laws that recently initiated in Iraq, as well as the executive side, represented by the Ministry of Environment, And for the purpose of reaching the objectives of sustainable development it is needed to activate the environmental work by supporting and activation of the Environmental Monitoring [4].

One of the important tools in environmental management at several levels is the official Environmental Monitoring, which represented in the Ministry of Environment

and legislative control, and the popular control exercised by individuals on the general environmental situation [4]. And as a result of many environmental problems in Iraqi cities, and the vast geographical area, appeared the need for specialized staff, preferred encourage the Popular supervision and supported but the Popular supervision cannot be fully effective and influential if people don't have the necessary environmental awareness to solve environmental problems and preserve the environment through the sustainable development of resources Iraq [1]. Low environmental awareness adversely affects the environment and thus affects the elements of sustainable development. So prefer in densely populated cities take advantage of the positives of the individual's interaction with society environmentally and use that to protect the environment [5]. The world has witnessed rapid development in the use of mobile devices which available now everywhere, and used by the majority of the population and that provides a fast connection speed and spread of information, the smart mobiles have the largest share in mobile devices and have many features like using applications and camera [6].

The mobile and applications can be used to help sustainable development in several areas such as use of environmental technologies to the problems arising from water and air pollution and documented in the environmental databases that are subject to analysis and then address the environmental problems and detect environmental pollutants and determine their locations for the purpose to remove it [6].

The information technology can play an important role in achieving sustainable development, where the knowledge and information is an essential element in society, which will contribute to the diagnosis and determine the environmental problems they face and documented and analyzed for the purpose of processing , and all this will contribute to facilitating and follow up the implementation of sustainable development policies and rationalize the use of resources and energy and thereby the success of its objectives.

The Pollution Reporter application which is the subject of this study, an effective tool contribute to the environmental remediation, taking advantage of the environmental awareness of members of the community and is an important tool for civilian volunteers and official staff assigned to report any environmental damage or problems they observe in order to record a specific environmental information in the application installed on the mobile device then sends it include data about problem site and the sender name with a small summary environmental report.

### **Materials and Methods**

The application of Pollution Reporter is a Client-server system includes software program implemented on the mobile device connects by a Communication system with a database installed on laptop server, enable the volunteer or staff to send a summary environmental report through the use of application which installed on their mobiles device about various environmental problems that Iraqi society suffered. This environmental application is a combination of mobile device, the laptop, software applications and communication system.

### **Hardware**

Android Sony Ericsson Xperia mobile used to install the Pollution Reporter application and this considered the Client side, the server side is the hp Laptop managed by Microsoft Operating System Windows 7.

### **Development Environment and used software**

This system is a Client - server system, the explanation will be for each side:

#### **Used software:**

Android Studio: Is the official development environment to create, develop and build Android applications. Android studio provides the ability to display developed application on emulator and installing on Android Mobile Devices [7].

And has many advantages where the developer can update and review his applications and display it on multiple screen sizes for mobile devices [8].

Xampp: a combination of Apache HTTP Server, MySQL database, PHP used by developers to create a local web site and test it [9].

PHP: PHP is abbreviation of PHP Hypertext Preprocessor which used to develop web application [10].

### **Development environment**

The Pollution Reporter application has been developed in Android Studio and then installed on the mobile device where mobile user use it as data entry application and send the information by communications system to store in Environment database / Reports table installed on the localhost server xampp .The Pollution Reporter application contains the following pages:

#### **Client side:**

Pollution Reporter: MainActivity.java: the programming file. Activity\_main: xml file for layouts.

#### **Server side:**

Receive .php: Page receives data sent from the mobile application to store in the database in the local host.

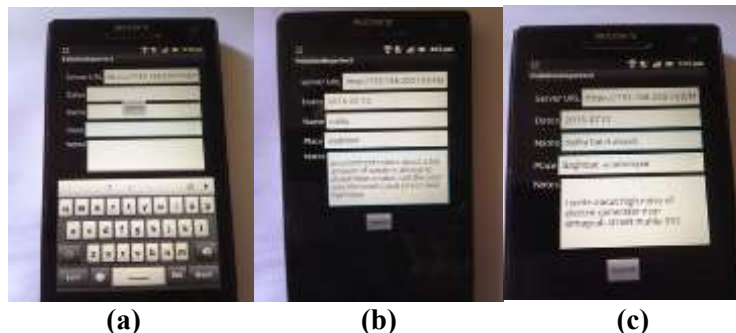
List1.php: To view the full report on the records and fitted with update and Del buttons.

Test5.php: display a full report.

Origin .php and search. Php: by using Origin .php administrators can enter the search word and the required search result display by search Page.

### **Results and Discussions**

Mobile device: When the user opens the Pollution Reporter application on mobile the following interface appear in Figure 1(a): After entering the data (b) (c), note the ease of data entry.

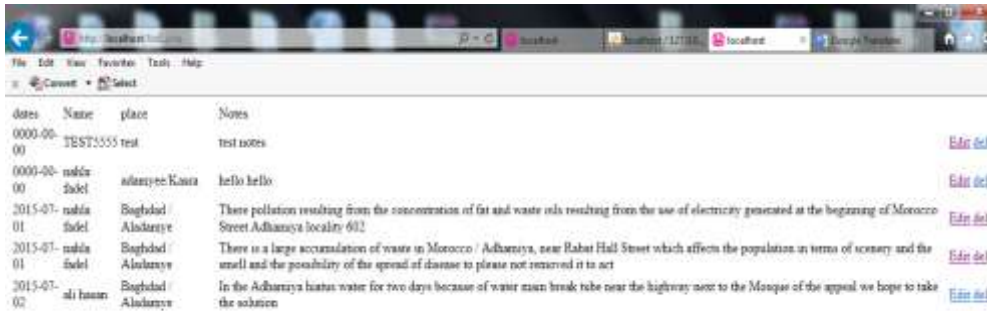


**Figure (1). Mobile application interface (a) before writing (b) report 1 (c) report 2**

To confirm receipt of the data the following sentence appears on the laptop server browser Figure 2, so the administrator make sure of data access to the server and stored in the localhost xampp server.

**On server laptop**

Using PHP pages: on the IE browser or the Google Chrome browser shows following results: To show the report of all records with the possibility of modification and delete as in the following Figure 2: observe that administrator can modify the information of each record or delete it easily.



**Figure (2). Full report**

This report reviews the full records stored in the database environment / Reports table. See Figure 3.

complete report

id	dates	name	place	notes	test notes
5	0000-00-00	TEST5555		adamiye-Kaara	hello hello
6	0000-00-00	nahla fadel			
10	2015-07-01	nahla fadel	Baghdad / Aladamiye		These pollution resulting from the concentration of fat and waste oils resulting from the use of electricity generated at the beginning of Morocco Street Adhamiya locality 602
11	2015-07-01	nahla fadel	Baghdad / Aladamiye		There is a large accumulation of waste in Morocco / Adhamiya, near Rabat Hall Street which affects the population in terms of scenery and the smell and the possibility of the spread of disease to please not removed it to act

**Figure (3). report**

It can perform the search when enter any word more than three letters concerning the date, name, place, and notes. Search by name: administrator can search for records of specific name by entering name only, see Figure 4.



Figure (4). Search by name

The result View all records belong to the name of the volunteer nahla, see the following Figure 5.



Figure (5). Search result

Search result for volunteer ali name, see Figure 6.



Figure (6). Search result for name ali

Find records in certain date in 2015 - 07-01, the result: Figure 7. Administer can search for records sent from volunteers and staff on a specific date.



Figure (7). Search result in certain date

Using localhost xampp: When administer open localhost xampp he can browse the required database table and review the records and extract report to be displayed on the browser or in word document 2000, as an example, and print it on paper. Following Figure 8 show database image in the local host xampp and browse records of Reports table .Observe that administer can open xampp server and see the database and table records.

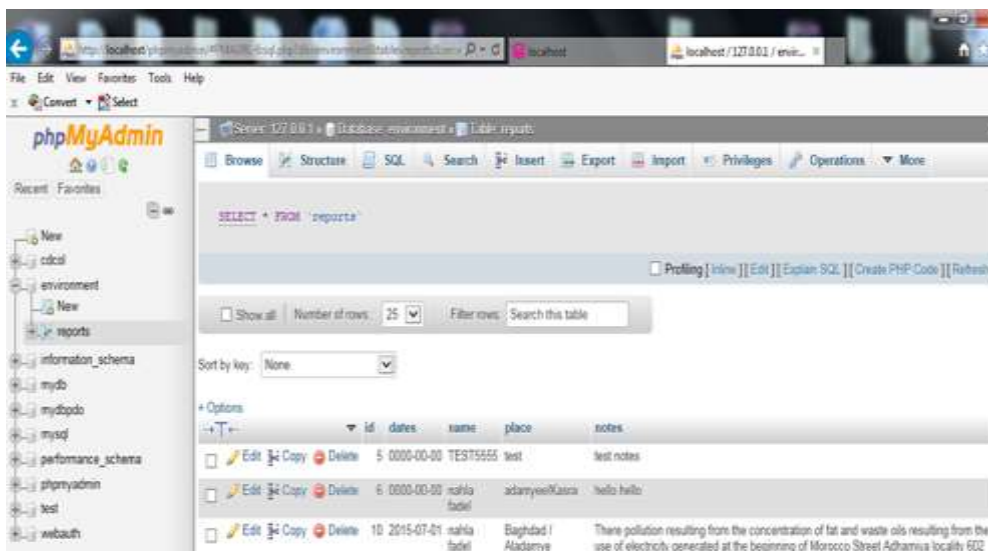


Figure (8). Database image

Now administer can display all records of table reports by using the print view or print view (full text).observe that Local host xampp allows administer to review all table records and displayed in the browser and printed directly from server xampp. Next Figure 9.



**SQL result**

Host: 127.0.0.1  
 Database: environment  
 Generation Time: Jul 01, 2015 at 01:15 PM  
 Generated by: phpMyAdmin 4.3.11 / MySQL 5.6.14  
 SQL query: SELECT \* FROM reports LIMIT 5, 25  
 Rows: 5

id	date	name	place	notes
1	0000-00-00	TEST1555	test	test notes
6	0000-00-00	nahla (abel)	adhatayra-Kassa	nahla belte
7	0000-00-00			
8	0000-00-00			
10	2015-07-01	nahla (abel)	Baghdad / Alsharaya	There pollution resulting from the concentration of fat and waste oils resulting from the use of electricity generated at the beginning of Morocco Street Adhatayra locality 602

Figure (9). records of table reports

To print a report of the records directly from the environment database / table reports in the local host as following Figure10: Observe there is the possibility printing paper report. Following Figure 10.

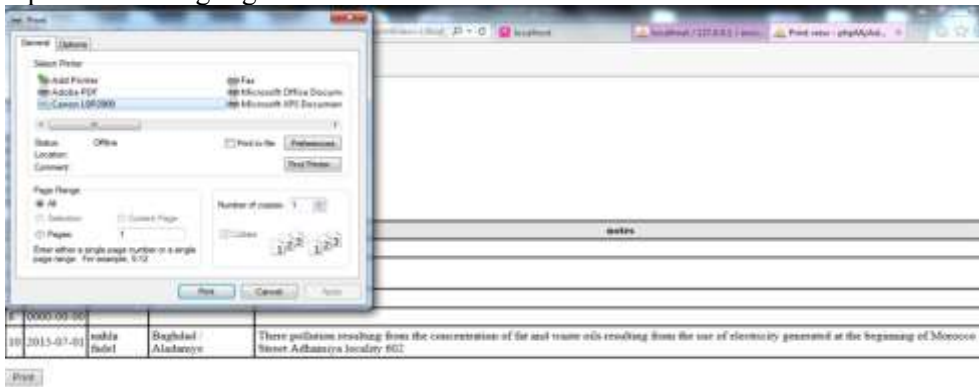


Figure (10). Print a report

To save the records in the Word document: Observe there is a possibility of store records data in word document format. Next Figure 11.

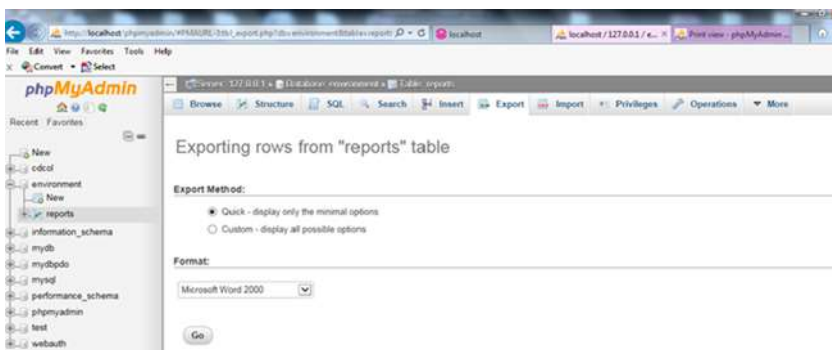


Figure (11). Save records in Word document

Records after being sent to the word document: Showing the word document. Next Figure 12.



### Database environment

#### Table structure for table reports

```
Column Type      Null Default
id              int(11) No
date           date   No
name           text    No
place          text    No
notes          text    No
```

#### Dumping data for table reports

```
5 0000- TEST5555 test          test notes
00-00
6 0000- nahla fadel adanyaw/Kasra  hello hello
00-00
10 2015- Baghdad /      There pollution resulting from the concentration of fat and waste oils resulting from the use of
07-01 Alahanyw           electricity generated at the beginning of Morocco Street Adhanyaw locality 602
```

Figure (12). The word document

### Conclusions

- The system is a client- server system.
- Ease of use of the application on mobile and does not require a great effort.
- Application placed one copy on the personal mobiles for many volunteers and staff.
- The cost of building the hard ware and software system is inexpensive.
- Take advantages of the mobile device where the application can be used at any time and place.
- Environmental data stored in a central database.
- There are two possibilities to administer to review the data through web pages or by using the local host xampp himself.
- By Using web pages administer can show a report with the possibility of update and delete record, as well as search and display specific records.
- Using local host xampp able administrators to browse records and applied many procedures: filter row, sort by Key, copy delete update each record, word doc 2000 report.
- Sending information on environmental problems directly and fast and documented.
- Eliminate the need to send the complaint on paper or by telephone.
- Electronic storage is best from paper.
- Reduce the cost of search about environmental problems for official staff.
- Increase cooperation between the volunteer environmentalists and environmental authorities.
- It leads to increased environmental awareness among society members and their importance.
- Improve environmental control and cover a larger geographic area.

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