



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4

Issue: V

Month of publication: May 2016

DOI:

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

Remote Data Acquisition System for Combat Vehicle

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Abstract: Combat vehicles have their circuits integrated. The system shuts down when there is a problem in any of the circuits. Hence it is proposed to have a display for each of the data recorded so that the particular circuit's problem can be identified. And an android application is created for the same so that those data can be viewed within defence circle. As the Android operating system is getting more popular, the application based on Android SDK attracts much more attention. The proposed system describes an intelligent Monitoring System which is based on android platform gives facility to access monitored parameters quickly on mobile handsets. The paper presents all of the data acquisition process with data characteristics, data storage and triggering of the data.

Keywords: Remote device, data acquisition, combat vehicle, SDK.

I. EXISTING SYSTEM

In the existing system the mobile device acts as the whole data acquisition system. Here the sensors are installed in the device and the data are also stored in the device. This limits the capability and reliability of the system. Since the data is centralized in the device destruction or damage of the device would lead to loss of vital information. The compact mobile device cannot hold all the sensors required for a combat vehicle thus reducing the capability of the system.

II. PROPOSED SYSTEM

In the proposed system the data acquisition follows a three-tier architecture thus providing more reliability. Here the sensors are installed in the combat vehicle and the data are transferred to a remote server which in turn sends the data to the android application. Destruction of the combat vehicle would not lead to loss of data as it is stored in a remote location. Therefore the system is more resilient. The android application provides a secure access to the combat vehicle's information.

III. INTRODUCTION

By default, Android Studio displays your project files in the Android project view. This view shows a flattened version of your project's structure that provides quick access to the key source files of Android projects and helps you work with the Gradle-based build system. When you use the Project view in Android Studio, you should notice that the project structure appears different than you may be used to in Eclipse. Each instance of Android Studio contains a project with one or more app modules. Each app module folder contains the complete source sets for that module, including `src/main/` and `src/androidTest/` directories, resources, build file and the Android manifest. For the most part, you will need to modify the files under each module's `src/main/` directory for source code updates, the `gradle.build` file for build specification and the files under `src/androidTest/` directory for test case creation.

Data acquisition & control plays an important role especially in military application, to study & monitor environmental changes in forests/oceans, surveillance application, home & industry automation. In this application, it is necessary to monitor & control of physical environments remotely with great accuracy & ease [1]. In many cases, remote data should be transferred to monitor centre which is far away from the manufacturing field. Traditional data acquisition system by means of wires could not satisfy the requirements. With the rapid development of embedded system, wireless communication technology and 3G technology, the remote data acquisition system which is based on embedded systems platforms and depend on 3G as wireless data transmit terminals, will be used widely on industry.

In recent years, the emergence of smart phones has changed the definition of mobile phones. Phone is no longer just a communication tool, but also an essential part of the people's communication and daily life. Various applications added unlimited fun for people's lives. It is certain that the future of the network will be the mobile terminal.

Now the Android system in the electronics market is becoming more and more popular, especially in the smartphone market. Because of the open source, some of the development tools are free, so there are plenty of applications generated. This greatly

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inspired the people to use the Android system. In addition, it provides a very convenient hardware platform for developers so that they can spend less effort to realize their ideas. This makes Android can get further development [2-5]. we utilize the Java language, the Android studio platform, Android ADT and the Android SDK to develop these three mobile applications. The fig.1 represents the general architecture of the acquisition system.

The tools used for creating the system are:

Android Studio: **Android Studio** is the official integrated development environment (IDE) for developing for the Android platform.

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. 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.



Fig.1.Architecture diagram

Combat vehicle-This is heart of the system and is centrally located under the operator's control.

Data acquisition system -This unit is installed from where the process is actually monitored. It gathers required data about the process and sends it to the master unit.

Website: A human machine interaction for the purpose of monitoring the status of various relays and engines, also parameters of various sensors in ECJB (ENGINE CONTROL JUNCTION BOX) in TANK for easy identification of any malfunctions in the TANK. Earlier, there were many complications, in detecting the malfunctions of various parts of a tank like, the engine status, temperature etc., and different status are to be found using different tools which are tend to be time consuming process. Now, a web application is to be developed for the purpose of providing a Human Machine Interface that has to be designed which will display the status of various relays, engines and also parameters of various sensors.

The data from the combat vehicle is retrieved and stored through the sensors installed in the vehicle. The data is transferred to the remote system through the database. The data is then represented to the user surroundings by means of an android app created using the Android Studio. fig2. represents the data flow of the acquisition system. A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

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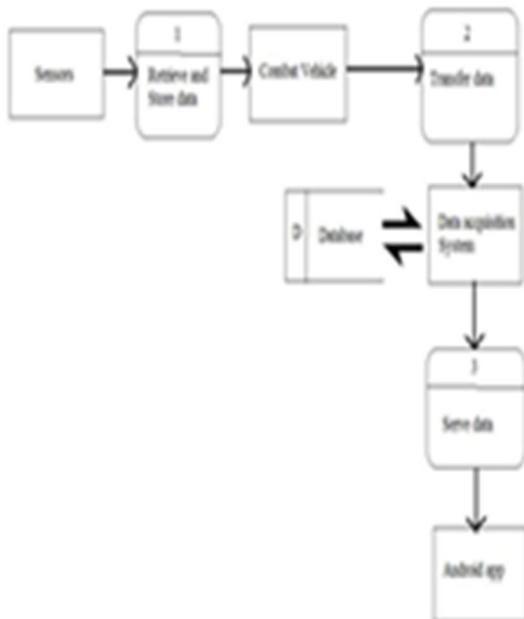


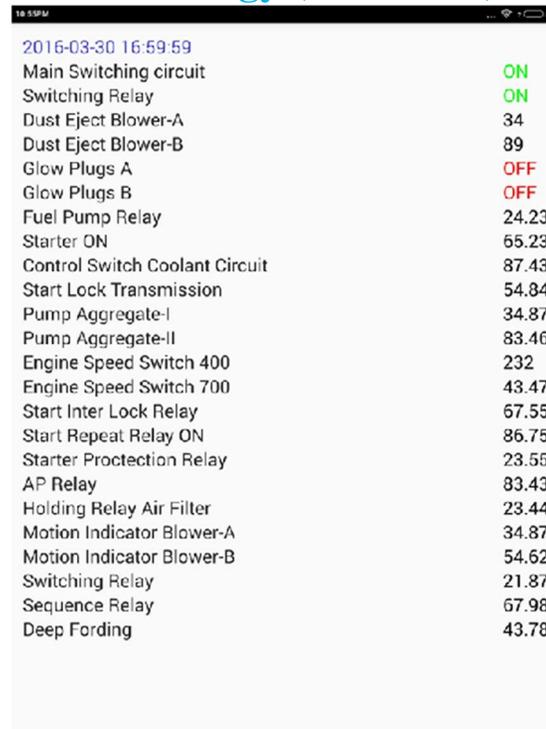
Fig.2 Data Flow

The overall view of the application be like fig3,4



Fig3. Login page.

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Component	Status/Value
2016-03-30 16:59:59	
Main Switching circuit	ON
Switching Relay	ON
Dust Eject Blower-A	34
Dust Eject Blower-B	89
Glow Plugs A	OFF
Glow Plugs B	OFF
Fuel Pump Relay	24.23
Starter ON	65.23
Control Switch Coolant Circuit	87.43
Start Lock Transmission	54.84
Pump Aggregate-I	34.87
Pump Aggregate-II	83.46
Engine Speed Switch 400	232
Engine Speed Switch 700	43.47
Start Inter Lock Relay	67.55
Start Repeat Relay ON	86.75
Starter Protection Relay	23.55
AP Relay	83.43
Holding Relay Air Filter	23.44
Motion Indicator Blower-A	34.87
Motion Indicator Blower-B	54.62
Switching Relay	21.87
Sequence Relay	67.98
Deep Forcing	43.78

Fig4.Data Displayed.

processes that can include multiple sites, and large distances.

IV. CONCLUSION

With the vigorous development through Android, mobile applications have been widely used on the various mobile devices. Android mobile applications are evolving at a meteor pace to give a rich and fast user experience. The maturity of the hardware and software platforms of mobile devices and the promotion of the Mobile Internet have brought a great opportunity to the migration of the web applications to mobile platforms. In this paper a smart Remote Monitoring system is explained which does data acquisition from various channels in analog form digitizes it. Thereafter ,stores into database server. This application ,Internet-based data acquisition system has been designed and implemented that should find interest from researchers. This paper puts forward an innovative idea of making GUI in android application which can access data stored in dedicated web server anywhere from the world just by touch of ones. A build application is user friendly and more importantly a complete monitoring system is portable that one can carry in mobile phone. The future works of the system will evolve around the controlling of data from the remote device. This can be done by SCADA(supervisory control and data acquisition) is a system for remote monitoring and control that operates with coded signals over communication channels. The control system may be combined with a data acquisition system by adding the use of coded signals over communication channels to acquire information about the status of the remote equipment for display or for recording functions. It is a type of industrial control system (ICS). Industrial control systems are computer-based systems that monitor and control industrial processes that exist in the physical world. SCADA systems historically distinguish themselves from other ICS systems by being large-scale

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