

OUTSOURCING STRATEGIES AND DISTRIBUTION MODELS BASED ON QR CODE – PHARMA SUPPLY CHAIN

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ABSTRACT: In the pharmaceutical supply chain, all players have to ensure the highest level of service while containing costs, because of the ethical issues concerning drugs.[1]The outsourcing of logistics should be recognized as a competitive lever, especially in this complex and highly regulated industry. The main motivation is to improve the system simple.In medical industry one of the major problems is that medicines get expired after its expiry date and because of that,there is a huge loss for human health and life.Also the prescription error and delivery error will often happen in these scenarios. In order to overcome this issue, the existing world concentrates mainly, the QR based prescription is implemented and also work for the automatic database management has done. The Expired medicine can be identified here and proper medicine can be delivered to the people.

Keywords: QR code,SMPS.

1.INTRODUCTION

To overcome the loss obtained by medical companies due to the expiry of medicines, world concentrate to recycle the medicines but which is not a suitable for many medicines. The main reason for that is the expired medicine will be returned back to medical industry with full credit. Even though they paid full taxes for expired medicines, they can't claim back .A survey says average of 1.5% loss every big pharmacy company is facing every year in order to overcome this issue, the existing world concentrates mainly on recycling the medicines but that method can't be implemented in all kind of medicines. Some medicines will have a narrow therapeutic index and also decreases will be little in the pharmacological activity may result in severe consequences for

Patients so, these kind of medications can never be recycled. The proposed system doesn't concentrate on medications before it is getting expired. This can be implemented at the pharmacy shop level but more effective than all other existing method just because it predicts with product expiry date and suggest the vendor to sell medication based on the expiry date and customer requirement. As many different available tools in standard library, enhanced the ability of using lower level language like C and C++ interfacing with standard libraries of other language. Python is very powerful language in using both as a language and as a tool. Standard libraries and very well in writing Internet-facing applications, with pre defined formats and protocols. It has predefined modules for manipulating regular expressions, GUI, connects to the relational databases, arithmetic with arbitrary accurate decimals, unit testing etc., some of standard libraries have specifications but not for majority of modules.[2] These specifications are specified mostly either code or internal documentation and also in test suite if it is applied. Very few modules that must be modified or rewritten with another implementation in most of the standard libraries because most of the modules in the standard libraries are cross platform to python. Nowadays, science and technology are developing with a high speed. As an example we can take an artificial intelligence, task is the understanding of human intelligence. In other words, artificial intelligence is a scientific field, which develops methods, that allows electronic computers to solve intellectual problems, if they are solved by man. Furthermore, artificial intelligence as a scientific discipline consists of several major trends. It should be noted, that nowadays as a progressive direction of artificial intelligence have become expert systems. Purpose of expert system is forming and outputting therecommendations depending on the current

situation, which describes a collection of data and also user input data interactively. Moreover, recommendation issued by the computer must conform to the recommendations of highly qualified specialist.[3] Probabilistic risk assessment (PRA) is defined as a systematic and comprehensive risk assessment methodology used to identify and evaluate risks in each life-cycle phase of complex engineered systems across different industry sectors (e.g. chemical, avionics, aerospace [10-16]).

2. PROPOSED SYSTEM

In Proposed System, Figure 1 shows the advanced QR based prescription system is implemented. Initially, the doctor will generate the prescription QR code; the user will take the prescription to the medical shop. In medical shop the Prescription QR code will be scanned using mobile application and the data is sent to the Data Base Management Unit (DBMU)

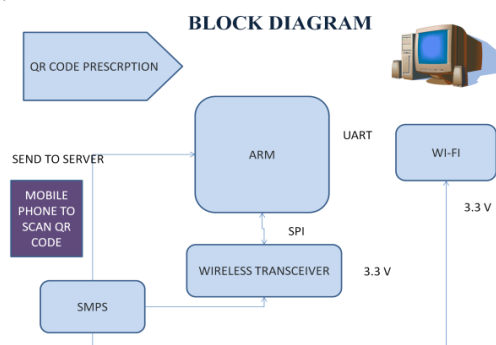


FIGURE 1 : Systematic block of transmitter section.

This study focuses on the evaluation process that should be taking place from the pharmacist perspective towards using the pharmacy information system. The evaluation process in the study will be to measure the effectiveness of the system currently used. Reviewing the past studies with the same research interest enables the researcher to develop an initial draft of the questionnaire. The items of the questionnaire has been used and validated by the other researchers, while few questions have been modified and pretested according to Kuwait settings. In the survey questionnaire, the effectiveness measurement of the pharmacy information system focused on two sections: Quality of information and improvement. The measurement of information system effectiveness continues to be a central

concern of the researchers. Accordingly, there is a growing array of measurement criteria

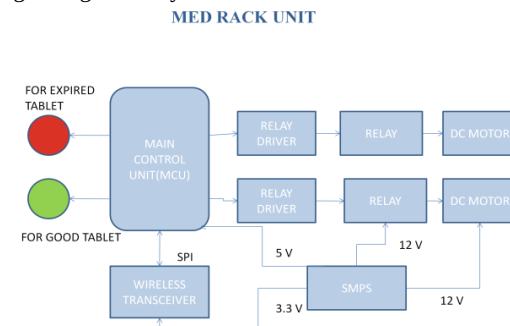


FIGURE 2: Systematic block of receiver section.

which provide a basic for defining the capacity of the information system effectiveness. Effectiveness has been defined as “the degree to which the objectives of the system or organizational units utilizing the system are achieved so it is important to specify criteria for successful measurement because the system being evaluated are used for supporting decision making, and also providing competitive advantage in the health [5] organization. Grover and his colleagues stated that the informational system effectiveness is multinational in terms of types of measures and level of analysis. While Cameron and Wheaten declared that there is no best criterion to rely on in evaluating the information system, because an effective system from one stand point, it may be interpreted as ineffective from another. However most evaluators are specifying the criteria for evaluation in order to perform an accurate assessment and to avoid contradictory results. The above Med box unit in figure 2 consists of LCD display, relay and relay driver and of course it consists of two LED. The LED which glows in red describes that the medicine get expired and the LED which glows green shows that the medicine is not get expired.

3. SYSTEM SPECIFICATION

The requirements specification is a technical specification of requirements for the software products. It is the first step in the requirements analysis process which the requirements of a particular system software including functional, performance and security requirements. [6] The requirements also provide usage scenarios from a user, an operational and an administrative perspective. [4] The purpose of software requirements specification is to provide a detailed overview of the software project, its parameters and goals. This describes the project target audience and its user interface, hardware and software requirements. It

defines how the client, team and audience see the project and its functionality.

3.1.ARM PROCESSOR:

The **ARM7 LPC2148 Development Board** is specifically designed to help students to master the required skills in the area of embedded systems. The kit is designed in such way that all the possible features of the microcontroller will be easily used by the students. The kit supports in system programming (ISP) which is done through serial port. NXP's [1] **ARM7 (LPC2148), ARM Development Kit** is proposed to smooth the progress of developing and debugging of various designs encompassing of High speed 32-bit Microcontrollers.

3.2.UART:

A universal asynchronous receiver/transmitter abbreviated UART is a piece of computer hardware that translates data between serial and parallel and serial forms. UART's are commonly used in conjunction with communication standards. The universal designation indicates that the data format and the transmission speeds are configurable. The electric signaling levels and methods (such as differential signaling etc.) are handled by a driver circuit extended to the UART. A UART is individually an integrated circuit used for serial communication over a computer or peripheral device serial port. UART's are now commonly used in microcontrollers. A dual UART or DUART, combines UART in a single chip. [7] An octal UART or OCTART combines eight UART's into one package, an example being an NXP. Many modern ICs now come with a UART that can also communicate synchronously; these devices are called USARTs (universal synchronous/asynchronous receiver/transmitter). Each UART contains a shift register which is the fundamental method of conversion between serial and parallel forms. Serial transmission of digital information (bits) through a single wire or other medium is less than parallel transmission through multiple wires. The UART usually does not directly generate or receive the external signals used between different items of equipment. Separate interface devices are used to convert the logic level signal of UART to and from the external signaling levels. External signal may be of different forms. Examples of standards for voltage signaling are RS-232, RS-422 and RS-485 from the EIA. Some signaling schemes do not use electrical wires.

3.3.ESP8266 WIFI MODULE:

Figure 3 shows ESP8266 is an impressive, low cost WIFI module suitable for adding WIFI functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone WIFI connected device—just add power! The feature list is impressive and includes: 802.11 b/g/n protocol Wi-Fi Direct (P2P), soft-AP Integrated TCP/IP protocol stack. This guide is designed to help you get started with your new WIFI module so let's start! The hardware connections required to connect to the ESP8266 module are fairly straight-forward but there are a couple of important items to note related to power: The ESP8266 requires 3.3V power—do not power it with 5 volts. The ESP8266 [8] needs to communicate via serial at 3.3V and does not have 5V tolerant inputs. ESP8266 on-board processing and storage capabilities allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. With its high degree of on-chip integration, which includes the antenna switch balun, power management converters, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

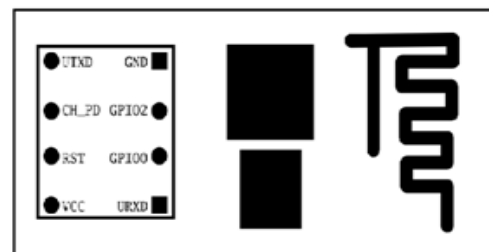


Figure 3 : WI-FI pin point

3.4.ESP8266 PIN DESCRIPTION:

ESP8266 has 8 pins, 4 in the row of 2. The first pin on the top left is GND. The two pins right from the GND are GPIO 2 and 0. The pin on the top right side is the RX pin and the pin on the lower left is TX. These are the pins for communication. The middle pins on the bottom are CH_PD (chip power-down) and RST (reset). **The main thing to remember is,**

that this device works with 3.3V; Even the RX and TX pins. Controller or many USB to serial converters work with 5V.

3.5.INTERNET ACCESS :

Wi-Fi technology may be used to provide Internet access to devices that are within the range of a wireless network that is connected to the Internet. The coverage of one or more interconnected access points (hotspots) can extend from an area as small as a few rooms to as large as many square kilometers. Coverage in the larger area may require a group of access points with overlapping coverage. For example, public outdoor Wi-Fi technology has been used successfully in wireless mesh networks in London, UK. An international example is FON.Wi-Fi provides service in private homes, businesses, as well as in public spaces at Wi-Fi hotspots set up either free-of-charge or commercially, often using a captive portal webpage for access. Organizations and businesses, such as airports, hotels, and restaurants, often provide free-use hotspots to attract customers. Enthusiasts or authorities who wish to provide services or even to promote business in selected areas sometimes provide free Wi-Fi access. Routers that incorporate a digital subscriber line modem or a cable modem and a Wi-Fi access point, often set up in homes and other buildings, provide Internet access and internetworking to all devices connected to them, wirelessly or via cable. Similarly, battery-powered routers may include a cellular Internet radio modem and Wi-Fi access point. When subscribed to a cellular data carrier, they allow nearby Wi-Fi stations to access the Internet over 2G, 3G, or 4G networks using the tethering technique.

3.6.FLY BACK DIODE :

Figure 4 represents a relay coil , it is not only an electromagnet but it's also an inductor. When power is applied to the coil the current in the coil builds up and levels off at its rated current (depends on the DC resistance of the coil, $I = V/R$). Some energy is now stored in the coil's magnetic field ($E = 0.5LI^2$). When the current in the coil is turned off this stored energy has to go somewhere. The voltage across the coil quickly increase trying to keep the current in the coil flowing in the same direction ($V = L di/dt$). This voltage spike can reach hundreds or thousands of volts and can damage electronic parts. By adding a fly back diode the current has a path to continue flowing through coil until the stored energy is used up. The diode also clamps the voltage across the coil to about 0.7V protecting the electronics. The stored energy dissipates quickly in the diode ($E = V \cdot I \cdot t$).

The current stops flowing and the relay turns off. The diode should be able to handle the coil current for a short time and switch relatively fast. Note: A resistor or zener diode can be placed in series with the diode to use up the stored energy quicker. This increases the amplitude of the voltage spike above 0.7V but the energy is used up quicker (i.e. the voltage spike won't last as long). Usually it doesn't matter if the relay takes 1ms or 100ms to turn off.

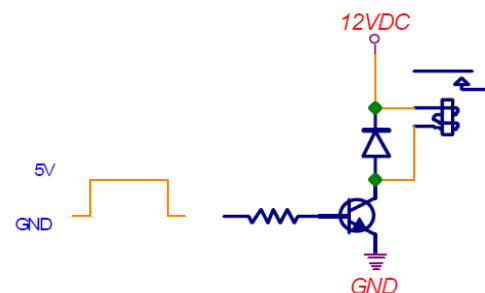


Figure 4 : Fly back diode

3.7.WIRELESS TRANCEIVER:

A transceiver is a device comprising both a transmitter and a receiver that are combined and share common circuitry or a single housing. When no circuitry is common between transmit and receive functions, the device is a transmitter-receiver. RFM75 is a GFSK transceiver operating in the world wide ISM frequency band at 2400- 2483.5 MHz. Burst mode transmission and up to 2Mbps air data rate make them suitable for applications requiring ultra low power consumption. The embedded packet processing engines enable their full operation with a very simple MCU as a radio system. Auto re-transmission and auto acknowledge give reliable link without any MCU interference.

4.COMMON HARDWARE INTERFACING CONSIDERATIONS

The EGBT-04 module will work with supply voltage of 3.1VDC to 4.2VDC. When supplied with 3.3VDC, it will interface directly with the UART port of any microcontroller chip running at 3.3VDC. When used with 5V microcontrollers, The TXD output logic swing of the EGBT-04 still falls within the valid 5V TTL range, hence, can be connected directly to the UART RXD of the 5V microcontroller host. EGBT RXD and inputs, however, are not 5V tolerant, and can be damaged by 5V level logic going in. Some level translation circuit must be added to protect the inputs. A simple diode level translator circuit like the

ones shown in Figure 3 and 7 will suffice in most applications. A better alternative is with the use of 5V input tolerant tiny logic chips such as 74LVC1G125 – a single buffer chip housed in sot23-5 package.

5. KEIL SOFTWARE

The use of C language to program microcontrollers is becoming too common. And most of the time it's not easy to build an application in assembly which instead you can make easily in C. So It's important that you know C language for microcontroller which is commonly known as Embedded C. Embedded **system** means some combination of computer hardware and programmable software which is specially designed for a particular task like displaying message on LCD. If you are still wondering about an embedded system, just take a look at these circuit applications using 8051 microcontroller. You can call these applications embedded systems as it involves hardware (8051 microcontroller) and software (the code written in assembly language). Some real life examples of embedded systems may involve ticketing machines, vending machines, temperature controlling unit in air conditioners etc. Microcontrollers are nothing without a Program in it. **Keil MicroVision** is a free software which solves many of the pain points for an embedded program developer. This software is an integrated development environment (IDE), which integrated a text editor to write programs, a compiler and it will convert your source code to hex files too. Here is simple guide to start working with Keil Vision which can be used for Writing programs in C/C++ or Assembly language

- Compiling and Assembling Programs
- Debugging program
- Creating Hex and Axf file
- Testing your program without Available real Hardware (Simulator Mode)

6. PROTEUS 7.0 SIMULATION TOOL

Proteus 7.0 is a Virtual System Modeling (VSM) that combines circuit simulation, animated components and microprocessor models to co-simulate the complete microcontroller based designs. This is the perfect tool[2] for engineers to test their microcontroller designs before constructing a physical prototype in real time. This program allows users to interact with the design using on-screen indicators and/or LED and LCD displays and, if attached to the PC, switches and buttons. One of the main components of Proteus 7.0 is the Circuit

Simulation -- a product that uses a SPICE3f5 analogue simulator kernel combined with an event-driven digital simulator that allow users to utilize any SPICE model by any manufacturer. Proteus VSM comes with extensive debugging features, including breakpoints, single stepping and variable display for a neat design prior to hardware prototyping. In summary, Proteus 7.0 is the program to use when we want to simulate the interaction between software running on a microcontroller and any analog or digital electronic device connected to it.

7. OUTPUT



Figure 5 : Hardware part

8. CONCLUSION

Many researchers have attempted to identify the impact of information system in various areas and to find the appropriate measurement criteria to access the effectiveness. Quality of information and usefulness of specific function successfully contributed in measuring the effectiveness of the pharmacy information system in Kuwait primary health care centres. Through this, reaching the work objectives is a demand thus every pharmacist must work on and achieve the objectives on the optimum level by using the robust prescribing system. In this study, the sample size collected was 17% of the total population size, which is 3% less than the standard. This small deficiency, however, is insignificant and was deemed acceptable in the representation of the population. Also, the criteria for evaluating the information system can be expanded to encompass different sorts of correlations between the users and the technology.

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