Abstract—Today world every people wanted a better lifestyle in different sector. These different sector one is healthcare. In healthcare sector people wanted to get better medication by a doctor. And they will also want to keep their records to help in future. So we apply NFC (Near Field Communication) technology in our healthcare system. This system helps the doctor to provide better medicine to the patient and prevent wrong medication to the patient. NFC technology is a short range high frequency wireless communication technology. This healthcare system we are also using NFC tag. NFC tag is based on RFID (Radio Frequency Identification) technology. In this system nurse perform various works by just tapping NFC enabled mobile phone to NFC tag. And give prescription to the patient with the help of the doctor.

Keywords—NFC, Healthcare, NFC Tag.

I. INTRODUCTION

Mature societies in many rising countries and developed existing standards call for a need to develop smart explanations to deliver many health care facilities, such as medication facilities. This study advances a NFC-based practical idea for an application that can deliver medication connected services to patients. NFC is a high frequency wireless communication technology, NFC is a small range about 4 inches between two devices. NFC enabled handsets is ongoing and finalized with a simple nearness wave or trace of the two devices to each other. From a practical point of understanding, NFC works at 13.56 MHz frequency. The NFC technology runs several data broadcast rates: 106 kbps, 212 kbps and 424 kbps. NFC permits communication among tags and electronic equipment, which doing as readers or writers [1]. NFC is already being used for applications related to financial payments and ticketing.

Authors propose a novel usage of NFC enabled mobile devices to access external medical tags for identifying patient Health cards. The Health card could be on an external tag or retained on the patient identification. This can provide greater control of sharing personal records with any authorized doctor by a simple tap of mobile devices [2]. NFC enables users to perform spontaneous, safe, contactless transactions, access digital content and connect electronic devices simply by touching or taking devices into close nearness [3]. NFC technology permits three modes of operations: read/write mode, peer-to-peer mode, and card emulation mode. NFC device can perform as a NFC tag emulator or a tag reader [4]. In reader/writer mode NFC device fetches the information in the NFC tag or write the information to the tag. Such tags can be pasted on Smart Poster e. g., permitting the user to recover extra information by understanding the tag with the NFC device [5]. Practically NFC device act as reader for NFC tags, such as the contactless smart cards and RFID tags. It detects a tag immediately in close proximity by using the impact escaping mechanism. An application on an NFC device can read data from and write data to the detected tag using the read/write mode operations [6]. This tag also benefits to initiate various kind of application with the support of NFC device. Data rates supported in this mode is 106 Kbit/s [7]. The Smart Poster concept is built around URIs (Uniform Resource Identifiers [RFC 3986]), which have develop the normal for referencing figures around the Internet. URI’s are very authoritative, and they can describe the whole thing from unique identifiers to EPC codes to web addresses to SMS messages to phone calls and beyond [8]. Second operating mode is peer to peer mode. In this mode this mode data is swapped among two devices. This mode is based on ISO 18092 standards and it ropes two communication modes: passive and active. In the passive mode, the originator starts the communication by creating the RF signal, and the target replies to the originator command. In the active mode, both the originator and the objective need to generate their RF signals. The initiator starts NFCIP-1 communication session and the target answers to the initiator command [1]. Third operating mode is card emulation mode. In this mode makes an NFC device such as a smartphone follow a smartcard. In this mode, the device will halt a producing RF waves and convert passive mode. NFC has two types of communication mode. One is active communication mode and passive communication mode. In active communication mode throughout data transmission procedure together parties generate transporter for themselves [9].
active communication mode the information is sent using amplitude shift keying (ASK). This means the base RF signal (13.56 MHz) is moderated with the figures according to a coding arrangement. If the baud rate is 106 baud, the coding arrangement is the so-called modified Miller coding. If the baud rate is better than 106 k Baud the Manchester coding arrangement is applied. In together coding arrangements a single data bit is conducted in a fixed time period. This time period is distributed into two halves, called half bits. In Miller coding a zero is encoded by a pause in the first half bit and no pause in the second half bit [10]. In passive communication mode the originator mobile phone offers a carrier field and the detached device replies by modulating the current field. In this mode, the detached device may draw its operating power from the Initiator-provided electromagnetic field, thus creation the target device a transponder [8]. Receiving device can communicate in active/passive mode. But the sending device should continuously communicate in active mode else conversation will fail.

II. RELATED WORK

Nowadays, most research in health care system is to improve medical facilities to give better healthy environment to the patient. In much hospital they are very difficult to manage patient record to give better medicine. Because they are very huge data to store to the server and nurses are manually entered using a web browser or a client software application. In previous health monitoring system, doctor need to attend patients when they are taking drugs at home. These professionals can remotely watch videos recorded by cameras placed in patient’s home and then analyze if he is taking drugs correctly. Medical devices that measure, for example, weight, blood pressure or heart rate are integrated within the system. They send the measures to a radio receiver connected to a PC. Users identify themselves using a NFC tag they have to put close to a NFC-reader-enabled PC for storing the measures in the back-end organization [11]. The NFC medium has formed the NFC Data Exchange Format (NDEF) and the NFC medium category Tag Operations. The NFC Tags are contactless cards based on RFID architecture [12]. NFC skill is suitable to maintain user with definite hi-tech experience. With NFC mobile devices, nurses can execute different jobs connected to patient monitoring from beginning to end easy communications. We have developed an education module to support nursing students in several patient care tasks. The NFC mobile phone can interact with RFID tags (known as NFC tags) distributed by the environment [13]. In the health care sector, the operation and procedure of RFID technology has been researched, while its subclass NFC has been scarcely tested and estimated yet. The latest technological expansions have inspired the accessibility and getting of NFC technology and its requests on smart devices, thereby making it an good-looking selection for provided that many personalized facilities. Furthermore, smart devices have become an important part of our lives and their usability has been definitely appraised in general, and also for reduced and aged people. Therefore, opportunities regarding the commercial potential of NFC are tall, although NFC applications still have to prove their contribution and relevance for the medical field. Little research has focused on enhancing patients’ value through the use of NFC and smart devices, although patients can face numerous challenges. For instance, storage of separate drug dosage information and the prevention of unnecessary journeys to a pharmacy in circumstance of stock-out states [14]. In a clinical context, NFC is used by numerous researchers. It has established an NFC-based solution to avoid medication faults in hospitals. As an extra path of medical data achievement, define different NFC-based answers which permit physicians or nurses to gather data by effortlessly touching medical devices with a mobile phone. Yet, none of these studies attention on usability for patient’s pain from reduced fine motor skills. So many applications are established in Reader/Writer mode than others. The reason for such a difference is exposed that so many scenarios can be modified to NFC applications by using reader/writer mode. Smart poster applications are one of the greatest significant applications of this mode and a university smart poster application is accessible. In this application users are able to read data from NFC-enabled posters spending their NFC-enabled mobile strategies.

III. OUR PROPOSAL ON NFC TECHNOLOGY

This paper is an extension of [9] and [6]. Many times economically poor people who resides in rural area or physical unfit people do not go to hospital for treatment, as they fear to lose a lot of money. Our system supports these patients. In our system NFC technology is used because it is easy to understand and communicates very fast between two devices. In this paper discussed is a healthcare system which is developed on NFC technology by using android. Nurse will get different services when she touches NFC mobile phone to NFC tag. Such as patient prescription, patient fee and patient generated request. As a result a NFC application in a mobile phone provides facilities to the rural areas people to give better medication facilities.

A. TOUCH BASED INTERACTION BY NURSE

When a nurse taps the NFC mobile phone to the NFC tag, application will proceed successfully. The main objective or idea of this system is to provide better medication facilities, maintain patient data on the server and also provide quick response to the patient request by a nurse. Nurse gives the NFC tag to the patient to store patient ID number for future reference. This NFC tag is required by nurse to correctly identify patient.

B. PRESCRIPTION TO THE PATIENT

The doctor uses an application that shows all patient request on the screen which is sent by the central server. The doctor selects a request of the patient. The application shows the medical history of the patient. If a patient is new then doctor prescribe him on the basis of their symptoms. But if patient is old then doctor can check old prescription which was given by him and also can see his previous symptoms. Then doctor
prescribe him some medicines based on the symptoms and sends the prescription to the nurse with the help of the central server.

C. HEALTH-CARE SYSTEM

This NFC healthcare system is based on reader/writer mode. In reader/writer mode NFC device can access NFC tag. This system architecture consists of five primary components: Doctor PC application, NFC tag, central server, Nurse NFC enabled mobile phone and patient mobile phone. The server centralizes the conversation between the nurse and doctor. It also contains patient, nurse and doctor database. The server also enables the system administration to manage all this data.

D. Basic Health-Care System Arctitecture

Figure 1 shows firstly, Patient suffering from any ailments comes to Nurse. Then nurse will launch Healthcare application by tapping on service tag or NFC tag. Nurse authenticates herself before application is initiated. If new patient, nurse will assign one tag him. This NFC tags unique identification number will be patients ID. Nurse will fill up all the personal details of patient with his observed symptoms and will send it by GPRS to the doctor. The mobile phone sends the request to the central server through GPRS. After receiving the request, the central server sends it to the patient’s doctor. The doctor can see the medical history of the patient, and he is free to prescribe the drugs he considers appropriate. The new prescription is send to the central server, which in turn sends it to nurse’s mobile phone. After payment of doctors’ fee to nurse, the prescription is send to patient mobile phone. In figure 3 shows Patient registration form. Figure 2 shows detected NFC number. This assigned patients’ unique identity number is permanent and stored in the server.

III. RESULT AND ANALYSIS

Nurse will launch NFC hospital application by providing server IP address to connect to the server. Once connected to the server, NFC tag will be tapped to the mobile to get NFC number. This NFC number is patients’ unique identity number. Figure 2 shows detected NFC number. This assigned patients’ unique identity number is permanent and stored in the server.
**Fig. 4 Nurse Authentication**

**Fig. 5 Patience Prescription Request Form**

**Fig. 6 Doctors Application**
Doctor need to successfully login to view patient request. In figure 6, doctor is able to see patient request form and patient information. If patient is already registered then doctor can also see patient old symptom and prescribed medicine for that symptom.

Doctor prescribes the patient and sends the prescription to the nurse mobile phone with the help of the server. Again nurse need to provide server IP address to connect to server. When NFC enabled mobile phone taps the NFC tag and show same NFC unique ID no. then nurse need to authenticate her to see patient prescription. Patient has to pay doctors fee to get the prescription. Nurse will check the payment and if it is paid she will send the prescription to patient’s mobile phone via SMS (Short Message Service). Figure 7 depicts payment form.

III. CONCLUSION AND FUTURE SCOPE

As advances in medicine and technology increase, the focus is on creating better healthcare systems. With NFC technology, hospitals can better track patient information and doctors’ notes in real-time. Each time a nurse or doctor visits the patient, they can make a note of a change in recommendations and record which medicines were administered. This system helps prevent the wrong medications from going to the wrong patient and creates a streamlined system focused on best patient care. In this NFC healthcare system security is very big issue. In future, our efforts will be concentrated on making this system secure from illegitimate users.

REFERENCES