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## تطبيق ذكي لإدارة علاقة الطبيب والمريض

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## Smart Application for Doctor-Patient Relationship

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### Abstract

No doubt that the way a patient communicates with his/her doctor plays an important role in the therapeutic system. Numerous studies and theories have been presented in this field. In our clinics in Libya, patients suffer from the problem of doctors continuously moving between clinics, hence major -if not all doctors are attending partly to different clinics in different places, which make the situation resemble a game of chase. This work introduces a smart application that aims to help the patient and facilitate the job for doctors and clinics. The Smart Doctor-Patient Application (SDPApp) is a hybrid application that is coded and tested locally before being uploaded as an APK version to be eventually free downloaded as required by either patient, doctor or clinic center.

**Keywords:** Android application, Doctor-patient relationship, Healthcare, Smartphone.

### الملخص

لا شك في أن الطريقة التي يتواصل بها المريض مع طبيبه تلعب دورًا مهمًا في المنظومة العلاجية. العديد من الدراسات والنظريات تم طرحها في هذا المجال. في عياداتنا في ليبيا، يعاني المرضى من مشكلة أن الطبيب ينتقل باستمرار بين العيادات، هذا لأن أغلب الأطباء -إن لم يكن جميعهم- يعملون في عيادات مختلفة في مناطق مختلفة، الأمر الذي جعل الحالة أشبه بلعبة المطاردة. هذا البحث يتكلم على برنامج يهدف لتخفيف معاناة المريض ويسهل مهمة الطبيب والعيادات. تطبيق "Smart Doctor-Patient Application" أو اختصارًا (SDPApp) هو تطبيق أندرويد هجين تم برمجته واختباره محليًا ثم تم رفعه بصيغة APK ليكون متاحًا مجانيًا للأطباء والعيادات والمرضى على حد سواء.

**الكلمات المفتاحية:** تطبيق أندرويد، علاقة المريض والطبيب، الهواتف الذكية، العناية الصحية.

### Introduction

A patient felt painless mass and went to the doctor and asked him about that, the doctor thought it could be something dangerous such as malignancies. "Even if it's rare, but is still possible" doctor said. However, he told her "you should go and do some blood tests and may taking samples be needed," he explained reassuringly "everything will be fine, but we should exclude tumours".

This scenario is common worldwide, but something is new in certain countries and specific situations. We are talking about when the patients undergo all medical tests, and then a game of chase beings between them and the doctor. This happens because the doctor continuously moves between clinics, or even between different countries. This problem is serious in such cases because test results can be useless if expired, or maybe because the case requires immediate action. Moreover, patient may abandon the whole matter, because they might not appreciate the seriousness of the situation.

Indeed, reliability is important aspect that this work takes in consideration to guarantee communication between doctor, patient, and clinic. Or at least, patient be able to send his/her medical reports to the doctor so doctor can

inform him whether the matter requires coming again to clinic or just to reassure him that, the disease we were expecting had been ruled out.

Doctor-patient relationship has long been recognized as a fundamental aspect of healthcare [1]. One crucial element of this relationship is effective communication between doctors and patients, which plays a vital role in establishing a therapeutic relationship [2]. Particularly for individuals with chronic conditions, regular medical follow-up is very important [3].

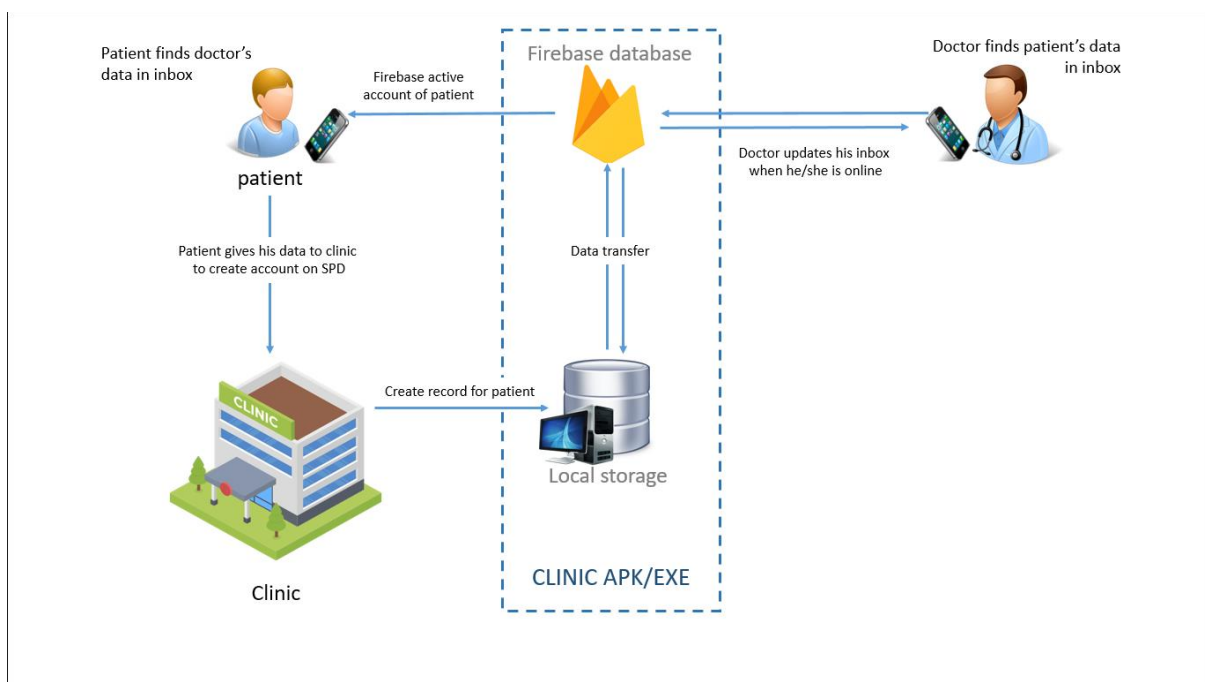
In recent years, with the advent of mobile health applications and other technological advancements, there is great potential to enhance the connection between patients and physicians [4]. While there are other applications available in this field [5], our aim is to develop more powerful and free accessible tools.

### Smart Doctor-Patient Application (SDPApp)

Android applications are widely used worldwide, with over 1.4 billion users and 2.8 million applications available on the Google Play Store [6]. This wide range of users makes it important to develop an Android application offering doctor-patients communication.

The Smart Doctor-Patient Application (SDPApp) has been developed by using web technologies such as HTML5, CSS3 and JavaScript. This type of applications called hybrid application which mean using of the web technologies to develop applications work on different platforms such as Android, IOS, or Windows.

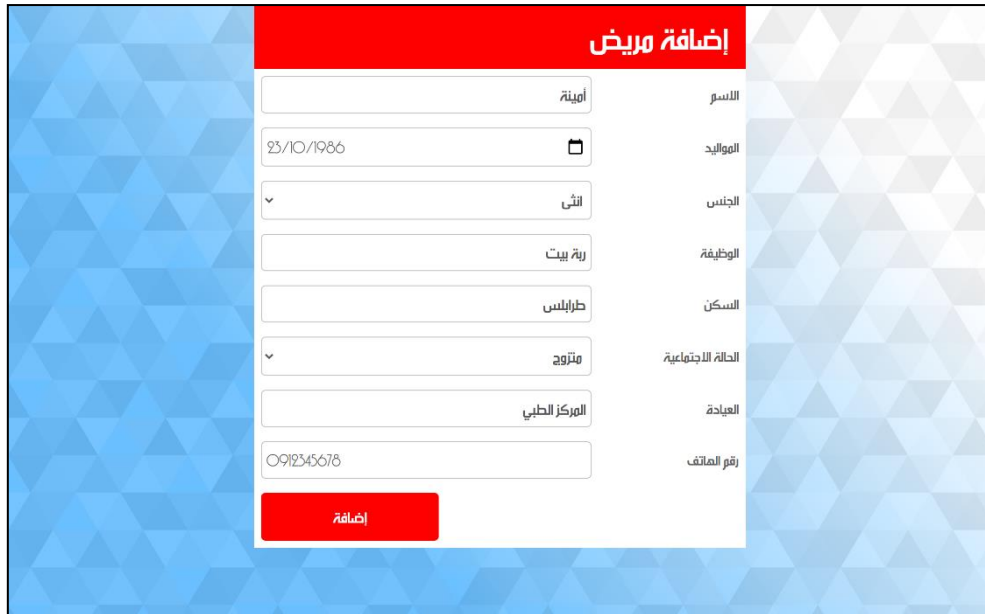
SPDApp has three sides namely CLINIC.APK, DOCTOR.APK, and PATIENT.APK. All these sides are connected to an online database called Firebase and hosted on Google Cloud. Figure 1 illustrates this manner. The following three sides are explained.



**Figure 1:** illustration of application data transfer.

#### 1. CLINIC.EXE or APK

This side of SPD app specialized in creating accounts for patients and doctors then link them together, this connection gives patient and doctor a permission to share the medical reports easily and securely. Figure 2 is a GUI screenshot of clinic device.



**Figure 2:** Clinic's GUI screenshot.

## 2. PATIENT.APK

Patients can download this application on his/her device and login via the account that the clinic had previously created it, or can create a new account and then give the clinic his/her ID to connect them with clinic as well as with doctor.

Patients can connect with multiple clinics and multiple doctors simply by sharing their ID with the clinics or doctors.

Once patient connected with doctor, he/she can chat and share documents with doctor to improve communication and relationships between them. Figure 3 is a GUI screenshot of patient device.



**Figure 3:** Patient's GUI screenshot.

### 3. DOCTOR.APK

Once login, doctor can connect with multiple clinics each one will give him permission to connect with number of patients, which gives ability to brows medical reports that patient had uploaded it. Figure 4 is a GUI screenshot of doctor device.



Figure 4: doctor's GUI screenshot.

### Conclusion

SDPApp is a hybrid application which means the ability to operate within a wide range of platforms. Simplicity, availability, and reliability are the main features that the application has. It substitutes leaks of services that commonly happen in such cases among patient, doctor and clinic relationships. In this work, we presented an application which is coded and tested to be used by any patient, doctor or clinic via their smart devices to guarantee accessibility under any circumstances.

### Future works

In addition to the main function of this project, which is to facilitate communication between doctors and patients for follow-up purposes, it can be further developed or utilized in various ways in the future. For example:

1. The stored data of patients and doctors can serve as a rich database that can be used for research purposes.
2. Having a large database encompassing a wide range of patients can be an appropriate method for conducting surveys that, in turn, can contribute to future research.
3. Furthermore, the application can be used in the future to provide a platform for medical consultations without the need for a physical clinic, incorporating additional features such as virtual meetings and voice conversations within the application.

### Further Materials

SDPApp files can be downloaded from the following link:

<https://drive.google.com/folderview?id=1jYUQkvh6m8B6ChMDx0QRH7IPuMlecIRo>

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