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Museifi Mobile Application for Emergency and Crisis Management

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Abstract:
The study aims to develop emergencies and crisis management process more efficient, accurate and reliable with providing the paramedic treatment for patients as soon as possible. This application required three applications included application for civil defense personnel, ambulance leader and ECA website application. The civil defense application had required username and password for authentication, detect current crisis location, allowed the users to enter crisis zone numbers and sent request to ECA for ambulances with current location and zones. Meanwhile, the ambulance had functions such as received request from ECA sent by web application, allowed navigation to crisis location, navigation to the hospital and the users to edit the zone number and database update. The ECA web application had received request from civil defense, viewed all request in one table, showed request information with nearby hospitals regarded to the crisis code, allowed ECA users to select hospital and available ambulance and sent the detail information of crisis situation to the ambulance. This application was helped in save many lives through minimized arrival time of ambulance with shared the location of crisis situation and improved pre-hospital treatment with corporation of civil defense which sent the request to the ECA.

Keywords:-*mobile application; ECA; ambulances; emergencies; crisis*

1. INTRODUCTION

Natural disaster occurrent has been increasing yearly especially in developing and undeveloped countries [1-3]. Saudi Arabia is become a typical region for natural disaster such as storms, earthquake, floods, Middle East Respiratory Syndrome (MERS) and landslides [4-7]. The impact of disaster included injury, disability, mortality and illness and contributes infrastructure, health system and service delivery [8].

There are more than 400 national disasters occurred every year affecting more than 230 million people and caused 75,000 death annually. The disasters and crisis have been part of human lives worldwide which considered to be major risk for the

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countries. In past years, Saudi Arabia had witnessed serious crisis that contributed major loss included flood in Jeddah and crane collapse in Mecca. However, disasters are real issues that cannot be neglected or ignored. Hence, a real preparation and management always done.

Technology also played important role in health care industry. Smartphones are most rapidly growing technology which a need for life. Meanwhile, there are many IT solutions, inventions and applications have been created and used to manage emergency situations such as robots, participatory Sensing Network and Alert me app.

Telemedicine is an expertise area which allows doctors to provide healthcare to people who lack in latest technology communication system. This treatment involves remote examination and automated report transfer to the physician. The surgeon had used robots to do surgeries remotely. This service was utilized in Saudi Arabia since vast area and villages located at far distance from hospital.

In crisis situation, response time, communication and good preparation are consideration factor in managing crisis. Therefore, technology is best solution that enhance managing and administration disaster and emergencies level. The accidents and crisis are becoming common, thus huge challenge for countries to provide need system that can manage these situations and help for patients at right times.

Emergency and Crisis Administration Jeddah is government entity under Ministry of Health which responsible for crisis and emergencies in Jeddah. The study aims to develop emergencies and crisis management process more efficient, accurate and reliable with providing the paramedic treatment for patients as soon as possible.

2. METHODOLOGY

This application required three applications included application for Civil Defence personnel, ambulance leader and ECA website application. The Civil defence application had required username and password for authentication, detect current crisis location, allowed the users to enter crisis zone numbers and sent request to ECA for ambulances with current location and zones. Meanwhile, the ambulance had functions such as received request from ECA sent by web application, allowed navigation to crisis location, navigation to the hospital and the users to edit the zone number and database update. The ECA web application had received request from Civil Defence, viewed all request in one table, showed request information with nearby hospitals regarded to the crisis code, allowed ECA users to select hospital and available ambulance and sent the detail information of crisis situation to the ambulance.

In additions, non-functional requirement were the requirements that specified mobile application based on specified criteria. Non-functional requirement were performance, availability of Museifi application, geographic availability and maintainability. Museifi application was fast and operated application in good response manner. Furthermore, availability of Museifi application among civil defence, ECA and ambulances. The application was available to operate only in Jeddah Saudi Arabia which had been tested as in Figure 1. Figure 2 and Figure 3 shows the coding used. Figure 4 shows the data flow for user application. Figure 5 shows the data flow for the ambulance. Figure 6 shows the system context diagram

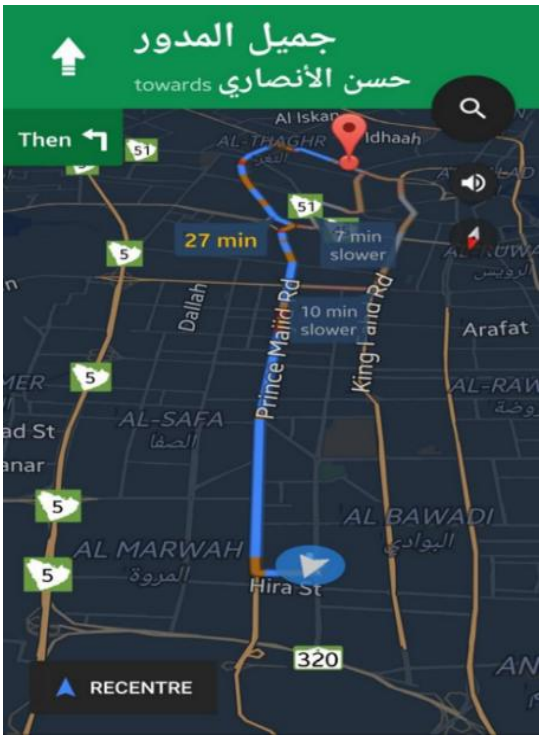

Figure 1. Geographic availability.

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```php
]<?php
]if($_SERVER['REQUEST_METHOD']=='POST'){
 $d_id = $_POST['d_id'];
 $password = $_POST['password'];
 $fullname = $_POST['fullname'];
 $nationalId = $_POST['nationalId'];
 $address = $_POST['address'];
 $mobile =  $_POST['mobile'];



]if($d_id == '' || $mobile == '' || $password == ''){
 echo 'Please fill all values!!';
 }else{
 require_once('dbConnect.php');

 $sql = "SELECT * FROM regDrivers WHERE d_id='$d_id'";

 $check = mysqli_fetch_array(mysqli_query($con,$sql));
```

Figure 2. Coding standard of Museifi application.

```php
        ?>
        </tbody>
    </table>
    <!-- Show Available ECA Ambulances-->
<?php
    require_once('dbConnect.php');

    //execute the SQL query and return records
    $sql3 = "SELECT * FROM eca_ambs
            WHERE e_status='AVAILABLE'";
    $result3 = mysqli_query($con,$sql3);
    ?>
    <table border="1" style= "background-color: #ffcccc; color: #000000; margin: 0 auto;" >
      <thead>
        <tr>
          <th> Ambulance ID </th>
          <th> Driver ID </th>
          <th> Driver Name </th>
          <th> Status </th>
        </tr>
      </thead>
      <tbody>
      <h3> ECA Available Ambulances </h3>

    <?php

        while( $row3 = mysqli_fetch_assoc( $result3 ) ){
          echo
```

Figure 3. Musiefi application coding standard (continued).

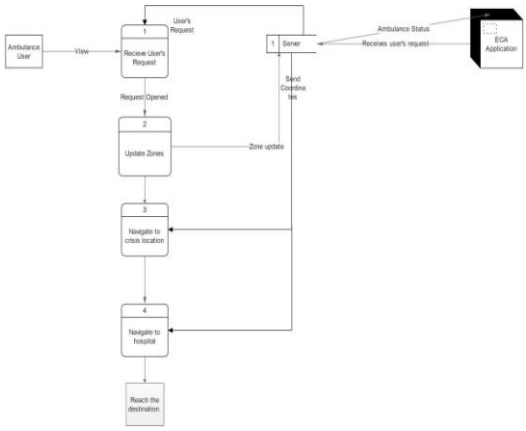

Figure 4. Data flow for user application.

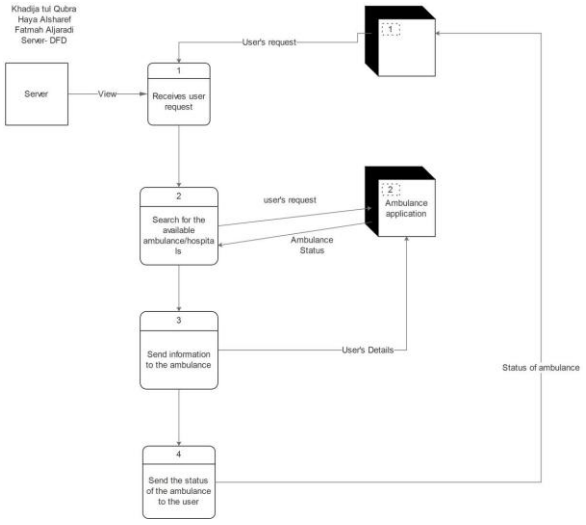

Figure 5. Data flow for ambulance.

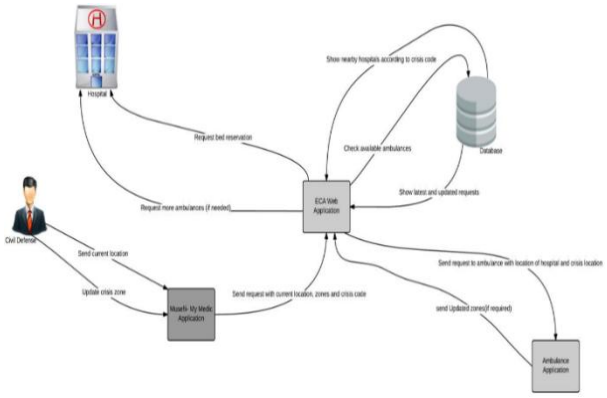

Figure 6. System context diagram.

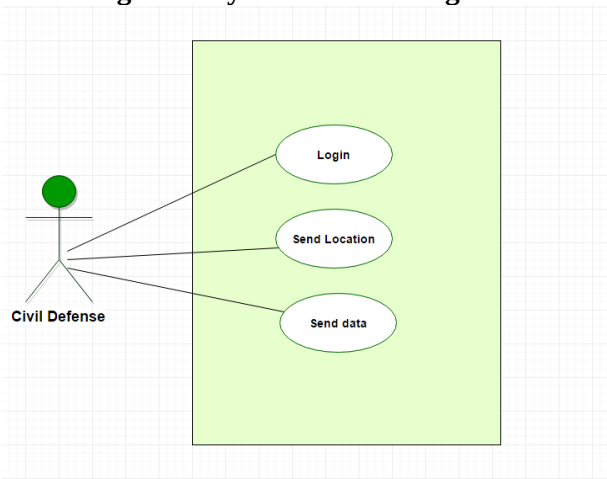

Figure 7. Civil defense- use case diagram.

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In Figure 7, civil defense user was allowed to login into their account for using application in case of emergencies, sent disaster location to the ECA and volunteers through used GPS and sent data about victim status and disaster location to the ECA.

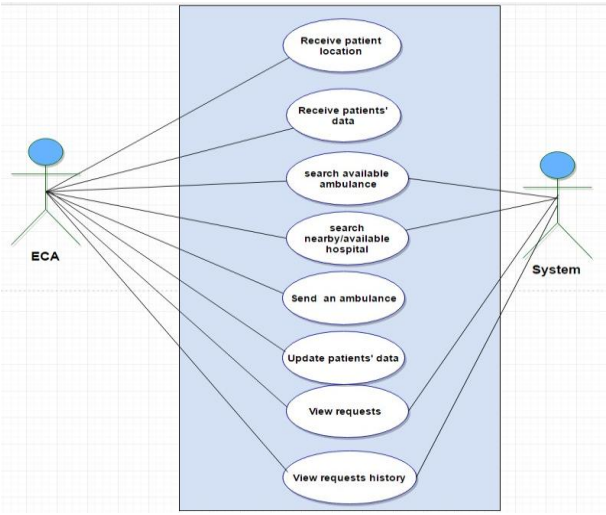

Figure 8. ECA- use case diagram.

In Figure 8, ECA user was received patient location from civil defence, received patient data and status, searched for available ambulance from ECA/hospitals databases, sent ambulances to the incident location, update the patient data, view all received requested and history with detailed information of request.

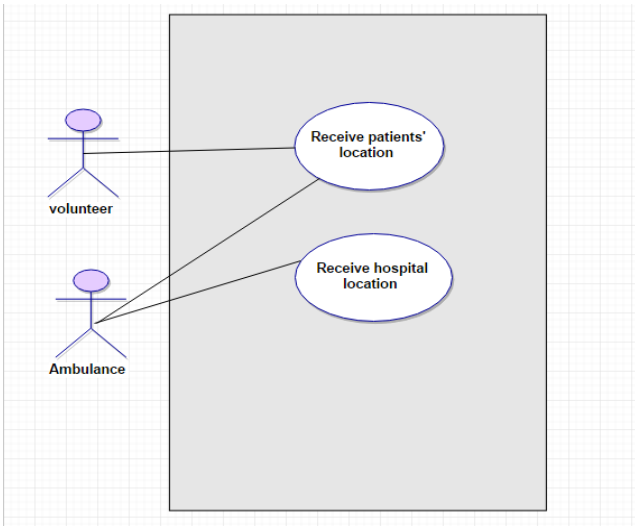

Figure 9. Ambulance and volunteer-use case diagram.

In Figure 9, ambulance driver had received all information about the incident location with a map and all information related to the hospital. Meanwhile, volunteers was only received the incident location with its data and map.

Figure 10 showed overall system flow. The process was completed with internet availability. The security server was software server (Firewall) to detect any malicious activity or any security risk and updated the application. In additions, the application server was managed communications and sent the requests to the application database.

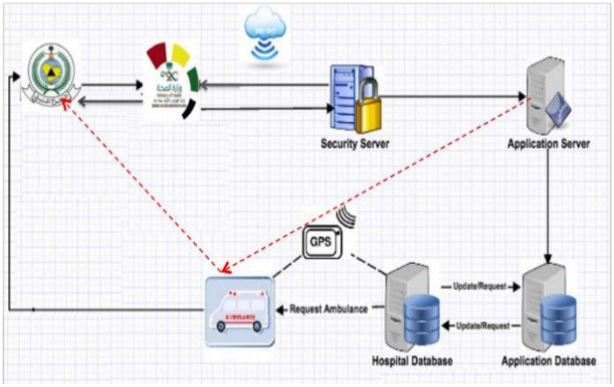

Figure 10. System flow architecture diagram for current scenario.

In Figure 11, rhe civil defence was contacted with ECA in the crisis situation to request ambulances. The ECA was approved the request from civil defence and ECA admin was searched in the hospital or ECA databases for available ambulances and nearby hospitals that could handle patients condition. After that, ECA admin was sent ambulances to crisis situation location through GPS use where civil defence. The request of ambulance was sent to the application server and saved in the application database. ECA was contacted nearest hospitals to prepare and allocate beds for the patients.

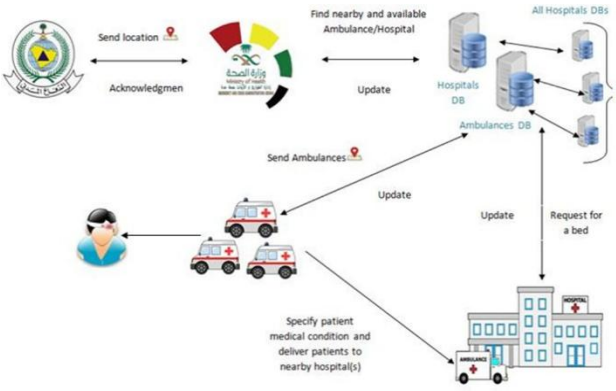

Figure 11. Current scenario-framework diagram.

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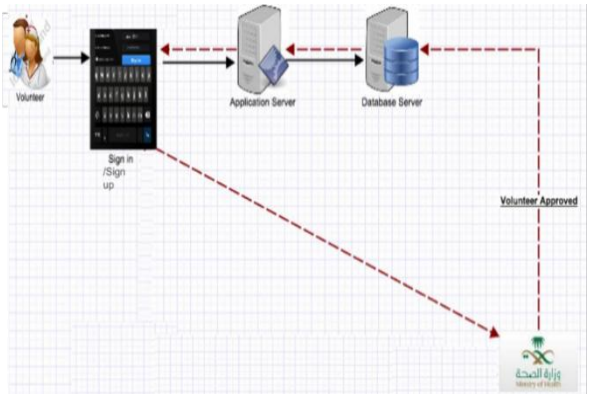

Figure 12. Future scenario for volunteer registration architecture diagram.

In Figure 12, the information was sent to the application server which acted as admin of application to manage the communication and sent the user request to the database to be stored. The application was sent the volunteer information and certificate to Ministry of Health and approved from them for legal volunteer.

3. RESULT AND DISCUSSION

The design was implemented and created working environment for ECA and patients. First step was created database and required tables for registered users, hospitals, ambulances and volunteers. The programming languages were used in the application such as Java for android, MySQL for databases, PHP 7.0 for server side scripting, XML, HTML and JavaScript. XAMPP served offer feature called "*phpMyAdmin"* which controlled the databases. The registered users table contained all login information about the users. The hospital table included information about hospitals and request table contained user requests for ambulances that shown to ECA in their interface as shown in Figure 13 and 14.

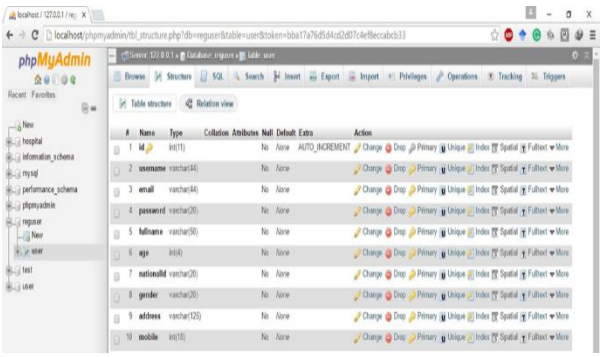

Figure 13. Registered user table.

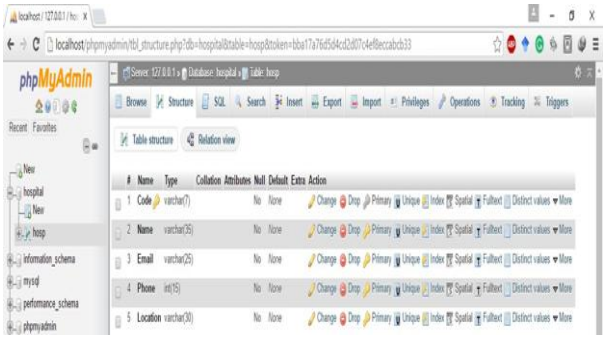

Figure 14. Hospitals table.

Figure 15 showed table structure for request table. The user sent request for an ambulance and table checked patients username and match with registered user table to fetch contact and other patient information.

Figure 15. Request table.

Main activity had log out button and other operations button to perform tasks. The android studio library was developed and updated and changed the data way and shared through internet. The Volley library was used and API module need to import in android studio to perform network task. Besides, all buttons and text fields was declared which were in the xml files.

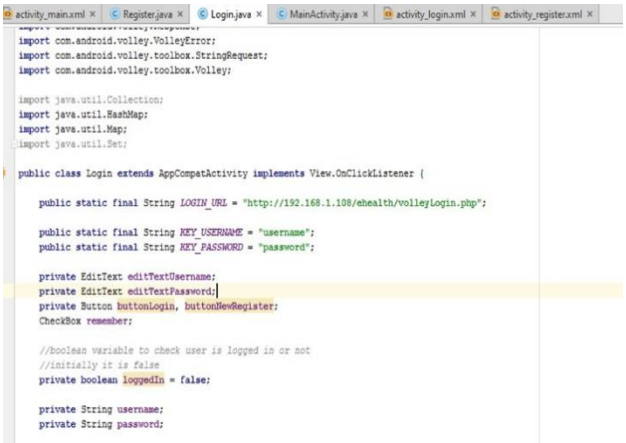

Figure 16. Login button declaration.

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In additions, the users had sent their current location with "Location Manager" function. The "request()" function was executed when the user requested for ambulance. This function was provided the coordinates and sent with username to the database in Figure 16. Figure 17 shows the mobile application

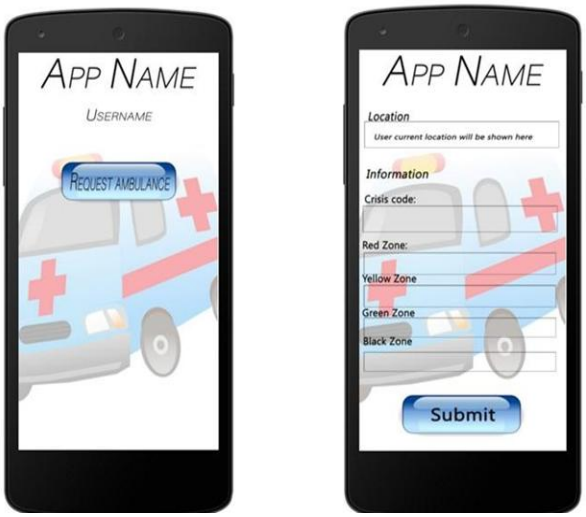

Figure 17. User interface for an Android mobile.

4. CONCLUSION

In conclusions, this application was helped in save many lives through minimized arrival time of ambulance with shared the location of crisis situation and improved pre-hospital treatment with corporation of civil defence which sent the request to the ECA. In future, two more features to this application which are involvement of volunteer in pre-treatment process until ambulance arrival. In additions, second features is involvement of RC for one user or patient than crisis situation that communicate with ECA to send patients to nearest available hospital through this application.

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