Tikrit Journal of Pure Science 22 (6) 2017 *ISSN: 1813 – 1662 (Print)*
E-ISSN: 2415 – 1726 (On Line)

Proposed Prototype for Multimedia Protocol in m-Health to Support a Communication between Patient and Hospital

Naktal Moaid Edan
Software Engineering Dep. , College of Computer Science and Mathematics, University of Mosul, Mosul, Iraq
nallhebee@yahoo.com

Abstract
Rapid advances in wireless communications and networking technologies, linked with advances in computing and medical technologies, facilitate the development and offering of emerging mobile systems and services in the healthcare sector. The objective of this paper is to identify the overview of the current multimedia communication protocols used in m-Health, such as SIP, RTCP, RTSP and RTP; and the challenges of mobile health systems, devices, and services. Also, propose a scenario to support communication between the patient and the hospital. m-Health systems will significantly affect the delivery of patient's data in an ambulance; however, their exploitation in daily practice remains to be achieved.

Keywords: Quality of service (QoS), Session Description Protocol (SDP), Session Initiation Protocol (SIP), Real-Time Transport Protocol (RTP), Real-Time Transport control Protocol (RTCP), Real Time Streaming Protocol (RTSP), Health Level 7 (HL7), Inter-Asterisk eXchange v2 (IAX2), Advanced Video Coding (H.246).

I. Introduction
Mobile health provides innovative abilities for outdoor monitoring, indoor monitoring, and emergency rescue for patient status, thus reducing the impact of major accidents and maintaining good quality welfare. Some of the mobile health devices, such as iPhones, iPads, tablets, and other suitable devices, can be utilised as a major part in the development of m-health systems, which was difficult to conduct in the past [1]. This research concentrates on some of the challenges that relate to mobile health, such as quality of service, communication protocol, the reliability of data, the distance between the patient and the physician, and transmitting patient data from the ambulance. Those challenges are varied from place to place and from application to application, such as cities, motorways or urban areas [2].

An m-Health system consists of three important types: personal health devices, personal health assistant, and back office [3].The later can be used in a variety of places such as at home, in the office, in the ambulance and general public places [4]. In [5] for example, many researchers have relied on multimedia communication protocols in m-health to transmit patient data. Some typical systems that have been used are the following:

- Multimedia Data Acquisition
- Multimedia Compression and Processing
- Multimedia Communication

Many multimedia protocols have been used in m-Health, such as Session Initiation Protocol (SIP), Real-Time Transport Protocol (RTP)/ Real-Time Transport control Protocol (RTCP), and Real Time Streaming Protocol (RTSP). But it has been emphasised that the SIP provided many features, such as security. On the other hand [6] SIP needs provision and enhancement in its signaling to be acceptable as a special protocol in m-Health.

This research focuses on utilising multimedia protocols and identification of an appropriate real-time signaling protocol, includes an m-health scenario to provide better (QoS) to be used in m-Health.

This paper is organized and outlined as follows; Section II discusses related works, Section III discusses Analysis. Section V concludes the paper, suggests and opens research topics.

II. Definitions
A. SIP (Session-Initiation Protocol):
Is an IETF standardized protocol used for maintaining and disconnecting media sessions. Many sectors in the communication industry adopted this protocol. IP Private Branch eXchanges (PBX'es) and SIP Session Border Controllers (SBCs) are used for Business VoIP phone services.[7]. SIP is used for initiating multimedia sessions of voice, video, instant messaging, and virtual reality. It can modify and terminate IP telephony calls or other media sessions over the internet. SIP works as a request and response protocol, dealing with requests from users and response from servers. SIP enables communication between PCs, Laptops, mobile phones and IP phones that are present in different networks [8].

B. SDP (Session Description Protocol):
It is the way details of a SIP session such as media type, codec, and sampling rate are described. A description of the session is contained in a SIP message; this information is encoded in an SDP format. The SIP message carries the SDP message in way similar to any attachment carried by an email message [9].

C. IAX2 (Inter-Asterisk eXchange) version 2:
Is a multimedia protocol, which facilitates VoIP connections among servers, and among servers and clients that also use the IAX protocol and its second version. Recently, Inter-Asterisk Exchange Protocol was introduced as a new signalling protocol to compete with the SIP protocol [10]. IAX was created by an open source community of Asterisk PBX (private branch exchange). IAX unlike SIP or H.323, it does not require the support of RTP protocol. It uses single UDP stream to transmit and receive both

signalling and media over static internal port number '4569'. Using single UDP static port IAX can bypass easily through firewalls and no other protocols are required to enable NAT with it [8].

D. RTP (Real Time Protocol):

This is a protocol that was developed by the IETF AVT working group. It transmits services for multimedia data such as voice, video, and fax in IP networks in an end-to-end real-time manner. It does not, however, guarantee the service quality. The service quality is rather provided by the RTCP [6].

E. RTCP (Real Time Control Protocol):

This is a key part of the RTP protocol. It mainly monitors and gives feedback on the service quality while the RTP packet is transmitting data [6].

F. RTSP (Real Time Session Protocol):

This protocol controls the services related to media streaming, data transmission on the network, and remote-controlling the capability for audio and video such as play, stop, fast forward, rewind, and so on [6].

III. RELATED WORK

Mobile Health uses SIP, which is a signal communication protocol and allows a transmission of a mixture of data, such as video conferencing, voice, and messages and so forth in m-Health. Moreover, it can make mobile health platforms flexible and support many different devices, and it is also able to support standard mobile communication services [11]. According to [12], a survey recommended the following:

- Wireless Application Protocol (WAP)-Which was based on telemedicine systems that have been developed for general inquiry and patient monitoring services.
- Dynamic Transmission Control Protocol (DTCP) based on an Additive Increase Multiplicative Decrease approach used in setting up parallel connections.
- Multiple Access Control (MAC) protocols for transmitting H.264 (Advanced Video Coding) videoconference streams, voice, SMS and IP data.
- To use 3G networks and advanced signaling protocols, such as Session Initiation Protocol (SIP) or session description protocol (SDP) which integrated real-time multimedia services over multiple access channels that support Pv4 and IPv6 internetworking.

Whereas, according to the framework on mobile health applications proposed by [13], for mobile healthcare applications, they adequately work in different networks using multimedia protocols, such as SIP and RTP over IP, achieving satisfactory results. However, this research aims to solve the usage of different networks and its effects on patient monitoring. In [14], for example, it was attempted to build a prototype for mobility services for hospital technicians in a telemedicine domain and health care sectors in order to improve the remote health services quality using SIP and via Internet LAN. Instead, this prototype could be established in a session between the patient and the hospital technician through the Internet. Other authors in [15] have also used the multimedia communication protocols, such as SIP and RTP despite making some changes to the design and the implementation of the portable medical information systems. Despite this, the protocols still need some adjusting to enhance the transferring of real time in particular. In [16] the design and implementation of the wireless healthcare application, which also acts as the server side of the healthcare application, was implemented as a SIP servlet and deployed in Service Development Studio (SDS) application server. On the other hand, they only concentrated on the remote invocation of sensors via the Internet. However, other important aspects were needed for their adoption (e.g. security). In addition, these results do not offer information modeling and processing capabilities. Also, [6] designed and implemented a video monitoring system based on SIP, RTP/RTCP, and RTSP; and this system can be extended to the wireless network environment to achieve the requirements of the mobile users. On the other hand, the function of target detection and alarm can be added to the video surveillance system. The authors in [17] investigated the potentials of the application of SIP as a multimedia communication tool for mobile health systems and discovered how SIP communication might facilitate the use of selected communication service such as video in m-Health system, so they recommended to extend the work specifically in mobility. In [18] a system was designed using the multimedia protocol to provide a solution for the physical distance between services and patients, so as to save time and reduce the cost, and to improve the communication channel with the patient via voice or video as well. Based on [19] a suggestion was made using an application that was developed for the purpose of a better Health care management system. The application used the Internet and the SIP multimedia protocol, but the application was available to use the Skype or Team Viewer that have already been built on SIP multimedia protocol. In addition, the authors did not design it as a SIP multimedia communication protocol. Furthermore, it can be extended to make it more efficient, reliable and faster.

Based on security suggestions, in [9] author's proposed extension, they instead used a remote control using a standard ISO/IEEE11073 (X73) and a layout in order to standardize a new branch called X73 for Personal Health Devices (X73PHD). Moreover, in [20] the author has designed a prototype of mobile emergency telemedicine system via 3G mobile telephony network and used a standard HL7 gateway and protocol TCP/UDP. According to [21], they proposed two solutions using the SIP multimedia protocol: the server that provides services/data and the client who requests services/data from the server. However, this proposal cannot provide the patient's data automatically; but the customers have to provide

the patient's data to the information records. In [22], authors have compared two telecommunication standards for plaintext transmission over SIP and concluded that (a) VoIP-SIP standard does not possess an adequate connected call rate, due to the low memory consumption, (b) its resalable to use RTP session for plaintext communication,(c) its only designed for the use of caller's voice, and (d) SIP MESSAGE content size needs to be verified.

From the above-published papers, several multimedia communication protocols could be considered in the investigation to be used in the m-Health application. SIP, RTP/RTCP, and RTSP are used in m-health. The literature shows that it is possible to rely on the SIP, which is used to m-Health communication paradigm. It enables the initiating, modifying, and terminating of sessions for personal health data. With several problems as mentioned above, it can be used as an initiator of mobile health sessions by using a standard Optimized Exchange Protocol or some proprietary counterpart. This allows parallel usage or choice of available transfer protocol and open migration path from existing m-Health systems towards interoperable systems [17] On the contrary, the IAX (Inter-Asterisk eXchange) as an alternative to SIP with the potential of being developed for the second version IAX2 (Inter-Asterisk eXchange) that could be available to be used as a protocol signalling in m-Health as well.

Based on the intensive comparison over existing devices and systems that are used in m-Health for audio, images, video, vital signs, instant messages, HD video, their disadvantages, and protocols as shown in the table (1). It can be noticed that a specific signaling protocol for general usage in m-Health is needed. The accomplished work below as seen in the table below lists some of the existing and currently available products which are using multimedia protocols and Internet network, to transmit patient data such as SIP over IP (TCP/UDP). DICOM and HL7, are standards in medical image exchanging, sharing, and retrieval of electronic health information systems. Additionally, the intensive comparison below, it can be seen that most of the current systems, devices and applications do not support video/ HD video, audio, vital signs. However, they support images and instant text. As well as, many manufactures have not mentioned how the quality of their devices when to be used via wireless networks, such as 4G. In order to answer and solve the wondering of the quality of service, reliability, quality of the video, etc. It can identify, an enhancement and specification of the best multimedia communication protocol to be used in m-Health and to avoid issues of devices, as shown in table (1).

Table (1) shows the weaknesses and disadvantages of the existing devices and platforms.

Device or System	Disadvantages	Support Audio	Support Images	Support Video	Vital Signs	Instant Text	HD Video	Kind of protocol
tactiQ Medical Device Electronics & Software Development **DEVICE**	. Costly . Using protocols, such as DICOM, HL7 IPSEC and SSL. Which are not achieve the best signaling for data transmission	N	N	N	N	Y	N	**DICOM**: Is standard use in medical image **HL7**: As for exchanging and sharing, and retrieval of electronic health information
A Framework for SIP-Based Wireless Medical Applications **SYSTEM**	. Used ZigBee, which is a specification used to create personal area networks built from small	N	N	N	N	Y	N	SIP protocol
NEC MD Series Diagnostic Displays **DEVICE**	. Costly . Using DICOM protocol Which is not achieved the best signaling for data transmission	N	Y	N	N	N	N	DICOM standard
CARESCAPE Gateway **DEVICE**	. Costly . Reliable . Security	N	N	N	Y	Y	N	HL7 standards
HEALTHIT Device **DEVICE**	. Costly	N	N	N	N	Y	N	Not indicated
CareMonX **DEVICE**	. Costly	N	Y	N	N	Y	N	Not indicated
SafetyPAD Mobile **DEVICE**	. Costly	Y	N	N	N	Y	N	Not indicated
INFINIUM **DEVICE**	. Costly	Y	Y	Y	N	Y	N	HL7 standard

Ortivus **DEVICE**	. Distance. . Not mention the kind of data	N	N	N	N	N	N	Not indicated
RT **DEVICE**	. Costly	N	N	N	Y	Y	N	HL7 standard
VS3 **DEVICE**	. Costly . Using Ethernet Only	N	Y	N	Y	N	N	HL7 standard
Mobile Based Healthcare Management using Artificial Intelligence	. The application was available to use the Skype or TeamViewer which has already been built on SIP multimedia protocol	Y	N	Y	N	Y	N	SIP Protocol
DICOM System **SYSTEM**	. Only for Interface Engine . Using only on images . Not reliable	N	Y	N	N	Y	N	DICOM and HL7 standards
Interactive telemedicine solution based on a secure mHealth application **SYSTEM**	. Cannot provide the patient data automatically; but the customers have to provide the patient data to the information record	N	Y	N	N	Y	N	SIP protocol
DICOM and referral portal **SYSTEM**	. Only a interface Engine . Using only on Images	N	Y	N	N	Y	N	DICOM and HL7 standards
Philips-IHE **DEVICE**	. Using only on images . Not Reliable	N	Y	N	N	N	N	DICOM and HL7 standards
Plaintext transmission over Session Initiation Protocol **SYSTEM**	. Only using for Instant Messaging	N	N	N	N	Y	N	SIP protocol
GE Healthcare **DEVICE**	. Costly	-	-	-	-	-	-	Unknown
Application of session initiation protocol in mobile health systems **SYSTEM**	. Working locally, so cannot be used in mobility	N	Y	N	N	Y	N	SIP protocol
Medopad Device & wearable **DEVICE**	. Costly . Using inside the hospital only for monitoring . Gather the existing data from hospital servers. . Cannot be used at different locations in m-Health	N	Y	N	N	Y	N	Not indicated
H2 wearable **DEVICE**	. Costly . Using to monitor and display the pressure only	N	N	N	N	Y	N	Not indicated
Medtronic CareLink **WEBSITE**	. Using Internet website . Specified for cardiac . Cannot monitor vital signs	N	Y	N	N	Y	N	Not indicated

IV. PROPOSED MODEL

Based on the investigation of an existing m-Health systems and protocols, there is a research gap of enhancing one of the multimedia communication technique to enable them to be more flexible and reliable in m-Health. Therefore, to identify a suitable signalling protocol and standard for the m-Health. It has suggested designing a prototype of the mobile unit based on m-Health software (Front and Back ends) under British Standard-Trustworthy (TS), health device communication standards, m-Health prototype system (software and hardware). To implement and evaluate the proposed prototype system and find out the optimum signaling protocol for the m-Health system. The system can be used at the ambulance, home, office, car, wearable and any mobile unit, in order to support the patients from the moment that a call is received until the patient is transferred to the hospital. The proposed system is designed to deliver the healthcare services to anywhere. It provides the teleconsultation function between the hospital and the patients. Take into account the mobility of the remote mobile sites. The 3G/4G is adopted as the communication medium for the remote sites. However, the network environment of the hospital is a broadband network, i.e. Internet. The data transmission over the heterogeneous networks is also considered in the proposed system. The objective of the mobile emergency m-health system is to provide the functionality of the video, voice, still images, and bio-signals transmission between the emergency site in the ambulance and the hospital site over the heterogeneous networks. It consists of two units: the mobile unit and the hospital unit.

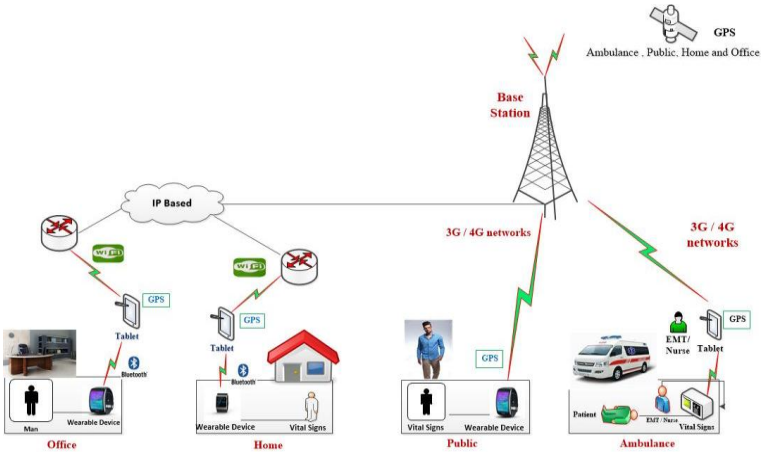
A. Mobile Unit:

The mobile unit is responsible for transmitting the bio-signals of the patient to the hospital, communicating with the physician, and accepting the

ISSN: 1813 – 1662 (Print)
E-ISSN: 2415 – 1726 (On Line)

orders from them too. There are three modules contained in the unit.

1. Signaling protocol: This module is used for sending the bio-signal, voice, video, still image from the patients in the ambulance, office, home, wearable and so on, over the internet, such as 3G/4G via the base station.
2. GPS: to locate the patient's location if will be in the ambulance or constant place
3. Tele-consultation module: This module will be installed in the device, such as PC, tablet, laptop, etc. Is responsible for communicating the people between the emergency site and the hospital site, also to gather a patient's data from the vital signs. This module will be used for providing the face-to-face conversation and image discussion.

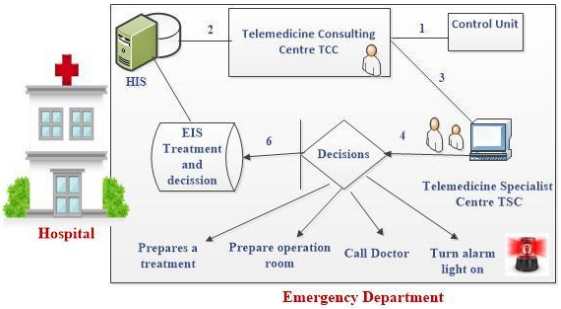


As shown in diagram (1), a mobile unite model, which can be utilised in Ambulance, Home, etc.

B. Hospital Unit:

The hospital unit has an emergency department (emergency site). It consists of three sub-systems including the hospital server and the physician client, such as Control Unite (CU), Telemedicine Consulting Centre (TCC), History Information System (HIS) and Telemedicine Specialist Centre (TSC):

- Control Unite (CU): is receive a patient's data from the source and resend it to the Telemedicine Consulting Centre (TCC)
- Telemedicine Consulting Centre (TCC): is discuss the status and save it in the History Information System (HIS) and then deliver it to the Telemedicine Specialist Centre (TSC)
- Telemedicine Specialist Centre (TSC): It will contact with the physicians when the patient status is dangerous, monitor patient's condition, save the case in the Emergency Information system (EIS) and contact the technicians or prepare operation room, prepares a treatment, etc.



Ddiagram (2), shows an emergency site in hospital unite model

Under the architecture, the system can support multiple emergency sites. The main operational features of the system are:

1. Use a prototype to transmit and support the patient data.
2. Monitoring the location of the mobile unit using GPS.
3. To exchange a data of mobile unit and control centre in the hospital based on SIP/SDP signalling protocols for example.
4. Each mobile unit will have the prototype in variety devices, such as an Android tablet, PC and laptop based British trustworthy standard. As well as, through the technicians or assistants who can get the patient data using the prototype then can send the information back to the control centre in the hospital using IEEE 1073 standard for health device communication.
5. Monitor of patients at while in transport through a telemedicine system unit. The unit can transmit vital bio signals, images, video and etc., from the system based m-Health.

All information using IP internet is available at First aid control centre and to the database for save. in addition, it will go to the (TSC) Telemedicine Specialist Centre, this is going to help in the decision in hospital or support the technicians for helping the patients specially at the golden time before arrive at the hospital and send the general advice to them as well . The communication between the mobile units and the hospital units is being done using IP over mobile RSU (3G/4G) networks. Data from the mobile unit to the server are exchanged as well. Through these are the initial steps in order to create an m-Health system that will support the mobile unit.

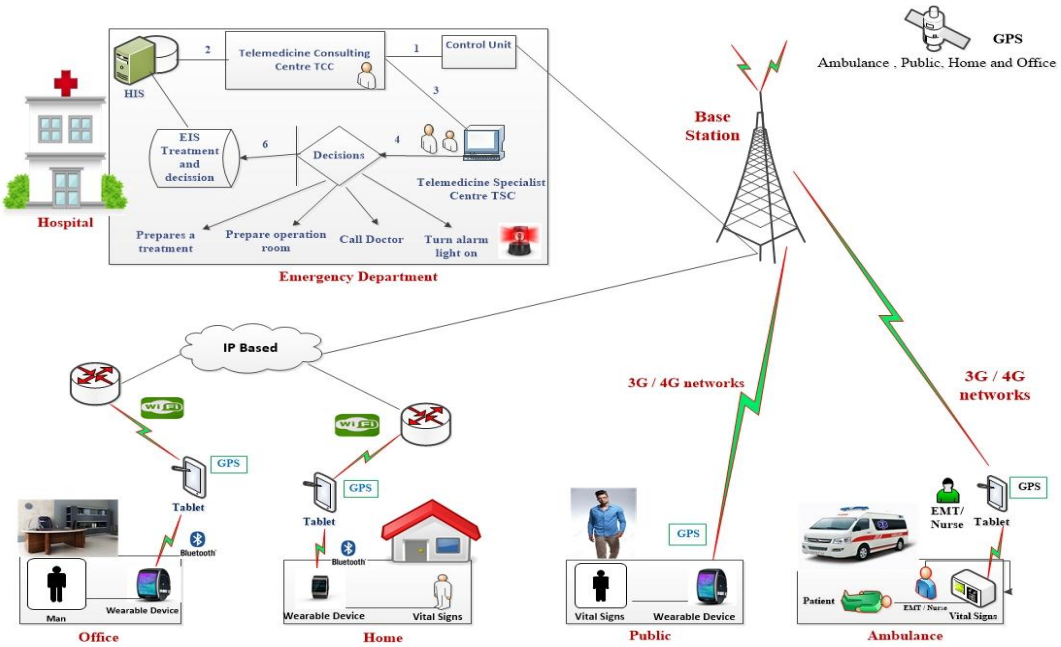


Diagram (3), shows a resilient m-Health model, which can be utilised in both of mobile unit and hospital unit.

V. CONCLUSION

Most companies have been using medical devices over Internet services, such as wire/wireless to save or transmit patient data, without taking into account the best protocol for transmission. It is important to ensure the accuracy and reliability of information, such as messages, voice, images and video of the patient and doctor in real time. Some devices do not meet patient's needs, and others are very costly if need to provide them to at least three ambulances or hospital units. Besides, manufacturers are only informed about the benefits of the general services and haven't addressed the transmission signalling issues regarding bandwidth, packet loss, speed, reliability, availability, resilient and also in different locations, such as motorway, city and urban to serve people in case of disasters. Therefore, it is important to identify and use the most efficient protocol. Thus, a proposed module will overcome on the high cost of the current devices in the market, which will be used the better signalling protocol for patient's data in m-Health. Also, provide a resilient system in ambulances to serve patients rather than expensive devices. Depend on the above issues and advices have proposed a module to implement and evaluate a multimedia communication protocol using one of the multimedia protocols to find out a better signalling and QoS via 4G network for m-Health.

Future Work:

1. Exploit the features of SIP, RTP\RTCP, and RTSP. To be used via 4G network to transmit patient data in real time.
2. Identify and confirm the best protocols, which can offer good quality of service in the transmission of m-Health data
3. Realize the importance of multimedia protocols to be used in m-Health, telemedicine, education, monitoring, etc.

ACKNOWLEDGEMENT

I WANT TO ACKNOWLEDGE THE EFFORT OF MR. HAKAM GHANIM FOR SUGGESTING SOME OF THE MEDICAL EQUIPMENTS AND DEVICES.

VI. REFERENCES

[1] B. Xu, L. Xu, H. Cai, and L. Jiang, "Architecture of M-health monitoring system based on cloud computing for elderly homes application," *Proc. - 2nd Int. Conf. Enterp. Syst. ES 2014*, pp. 45–50, 2014.

[2] S. Adibi, "Link technologies and BlackBerry mobile Health (mHealth) solutions: A review," *IEEE Trans. Inf. Technol. Biomed.*, vol. 16, no. 4, pp. 586–597, 2012.

[3] B. Kumar, S. Singh, and A. Mohan, "Emerging mobile communication technologies for health," *Comput. Commun. Technol. (ICCCT), 2010 Int. Conf.*, pp. 828–832, 2010.

[4] R. Makena and C. C. Hayes, "Flexible usage of space for telemedicine," *Conf. Proc. - IEEE Int. Conf. Syst. Man Cybern.*, pp. 1134–1139, 2011.

[5] T. Ma, M. Hempel, D. Peng, H. Sharif, and S. Member, "A Survey of Energy-Ef fi cient Compression and Communication Techniques for Multimedia in Resource Constrained Systems," vol. 15, no. 3, pp. 1–10, 2012.

[6] D. Chu, C. H. Jiang, Z. B. Hao, and W. Jiang, "The design and implementation of video surveillance system based on H.264, SIP, RTP/RTCP and RTSP," *Proc. - 6th Int. Symp. Comput. Intell. Des. Isc. 2013*, vol. 2, pp. 39–43, 2013.

[7] Y. Zhang, A. Clouet, O. S. Awotayo, C. Davids, and B. Laboratories, "Benchmarking the Session

Initiation Protocol (SIP),” 2015.
[8] M. S. Nasir and K. Saeed, “A Comparison of SIP with IAX an Efficient new IP Telephony Protocol A Comparison of SIP with IAX an Efficient new IP Telephony Protocol,” no. August, 2015.
[9] D. Lu and T. Liu, “A new system of electrocardiogram diagnose based on telemedicine,” *2011 IEEE 3rd Int. Conf. Commun. Softw. Networks, ICCSN 2011*, pp. 374–377, 2011.
[10] M. Hasanzadeh, H. Hamidi, and H. Asghari, “Plaintext transmission over Session Initiation Protocol,” *2014 7th Int. Symp. Telecommun. IST 2014*, pp. 629–634, 2014.
[11] J. W. Robinson, N. M. Zuviria, and P. E. Vinita, “Automated analysis of workflow cloud-based business process using map reduce algorithm,” *2012 3rd Int. Conf. Comput. Commun. Netw. Technol. ICCCNT 2012*, no. July, 2012.
[12] R. Gupta, R. S. Gamad , P. Bansod, and J. Zhongmin, “Telemedicine: A brief analysis,” *Cogent Eng.*, vol. 1, no. 1, p. 966459, 2014.
[13] A. Soomro and R. Schmitt, “A Framework for Mobile Healthcare Applications over Heterogeneous Networks,” pp. 70–73, 2011.
[14] A. Sadat, G. Sorwar, and M. U. Chowdhury, “Session Initiation Protocol (SIP) based event notification system architecture for telemedicine applications,” *Proc. - 5th IEEE/ACIS Int. Conf. Comput. Info. Sci., ICIS 2006. conjunction with 1st IEEE/ACIS, Int. Work. Component-Based Softw. Eng., Softw. Arch. Reuse, COMSAR 2006*, vol. 2006, pp. 214–218, 2006.
[15] Y. W. Bai and Y. S. Huang, “Design and implementation of a portable medical streaming media system,” *Proc. 7th Int. Work. Enterp. Netw. Comput. Healthc. Ind. Heal. 2005*, pp. 25–30, 2005.
[16] M. El Barachi and O. Alfandi, “The Design and Implementation of a Wireless Healthcare Application for WSN- enabled IMS Environments,” pp. 892–897, 2013.
[17] I. Cubic, I. Markota, and I. Benc, “Application of session initiation protocol in mobile health systems,” *MIPRO, 2010 Proc. 33rd Int. Conv.*, pp. 367–371, 2010.
[18] A. K. Tripathy, R. Carvalho, A. Puthenputhussery, N. Chhabhaiya, and B. Anthony, “MediAssistEdge – Simplifying diagnosis procedure & Improving patient doctor connectivity,” pp. 2–7, 2015.
[19] A. K. Tripathy, R. Carvalho, K. Pawaskar, S. Yadav, and V. Yadav, “Mobile Based Healthcare Management using Artificial Intelligence,” pp. 2–7, 2015.
[20] C. Lee and W. Lai, “Mobile emergency telemedicine system over heterogeneous networks,” vol. 6, no. 2, pp. 68–74, 2012.
[21] A. M. E.- Ieee and S. Member, “Interactive Telemedicine Solution Based on a Secure mHealth Application,” pp. 3699–3702, 2014.
[22] M. Hasanzadeh, H. Hamidi, and H. Asghari, “Plaintext transmission over Session Initiation Protocol,” in *2014 7th International Symposium on Telecommunications, IST*, pp. 629–634, 2014.

مقترح استخدام احد بروتوكولات الملتيميديا في الرعاية الصحية المتنقلة لدعم الاتصال بين المريض والمستشفى

نكتل مؤيد عيدان اللهيبي

قسم هندسة البرمجيات ، كلية علوم الحاسوب والرياضيات ، جامعة الموصل ، الموصل ، العراق

nallhebee@yahoo.com

الملخص

التقدم السريع الحاصل في مجال الاتصالات اللاسلكية وتقنيات الشبكات، مرتبطة مع التقدم في مجال الحاسوب والتقنيات الطبية وتسهيل التطوير وتقديم انظمة التنقل المنبثقة والخدمات في قطاع الرعاية الصحية. الهدف من هذا البحث هو القاء نظرة عامة لتميز بروتوكولات الاتصالات المستخدمة حاليا في الرعاية الصحية المتنقلة، مثل SIP، RTCP، RTSP و RTP. وتحديات الأنظمة الصحية المتنقلة والأجهزة والخدمات. بالاضافة الى ذلك ، تم اقتراح الية خاصة لدعم الاتصال ونقل البيانات بين المريض والمستشفى في مختلف الاماكن من خلال استخدام الالية في سيارة الاسعاف، البيت، المكتب او غيرها من الاماكن التي قد يتواجد فيها المريض. خصوصا ان الرعاية الصحية المتنقلة تؤثر تأثيرا مهما على نقل بيانات المريض في سيارة الإسعاف. ولكن، لا يزال استغلالها في الممارسة اليومية لم يحقق.

كلمات مفتاحية: جودة الخدمات (QoS)، بروتوكول وصف الجلسة (SDP)، بروتوكول انشاء الجلسة (SIP)، بروتوكول النقل في الوقت الحقيقي (RTP)، برتوكول ادارة النقل في الوقت الحقيقي (RTCP)، بروتوكول انبثاق البيانات في الوقت الحقيقي (RTSP)، ستاندرت الصحة (مستوى 7)، بروتوكول تبديل النجمة (IAX2)، بروتوكول تشفير الفيديو المتقدم (H.246).