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An Analysis of FPGA in Medical Internet of Things Application

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Abstract- The healthcare industry is in critical need of creativity due to the effects of the pandemic condition. People consistently hesitate to employ hospital services, which makes telemedicine increasingly prevalent. We must offer data analytics based on the patient data supplied through the IoT devices that consumers use if we want to help healthcare providers treat patients better. In the event of an emergency, the healthcare provider must have immediate access to the electronic health records in order to make judgments without waiting for the patient to arrive. Additionally, using modern FPGA-based devices, trend analysis can be used to comprehend the various disease outbreaks.

Keywords: Analytics, Electronic Health Record (EHR), FPGA,Processor

I. INTRODUCTION

The development in Information and Communication Technologies (ICT) has created a new opportunity in healthcare industries [1]. Moreover, COVID19 pandemic has increased the need for alternative way of treatment in healthcare sector much more than ever before. Hence, Telemedicine (TM) is very much important and the need of the hour[2].TM is a combination of telecommunication technology and informatics[3][4], patients are treated by doctors from the remote location via telecommunication technology[6].It helps the patient to avoid the direct visit to the hospital and doctor during the pandemic period and also provides a better and newchoice of treatment.It is not enough to replace the in-person treatment. There is a huge gap in service provided by in-person treatment and TM. As Healthcare IoT-Telemedicine (HIoT-TM) grows, it is not difficult to provide the treatment like the conventional method. HIoT-TM is used to measure, monitor, check, regularize and analyses [7] the data received from IoT devices and providing better treatment to the patients by using two-way teleconsultation.

II. HIoT

Big Data denotes the huge volume of data made from digitization and Internet of all varieties of information, including healthcare data[10].The big data in healthcare is initially characterized by three V's i.e., volume, variety and velocity.After that four more V's have been added to describe the incredible complex nature of big data. Now, it is described by ten different V's.

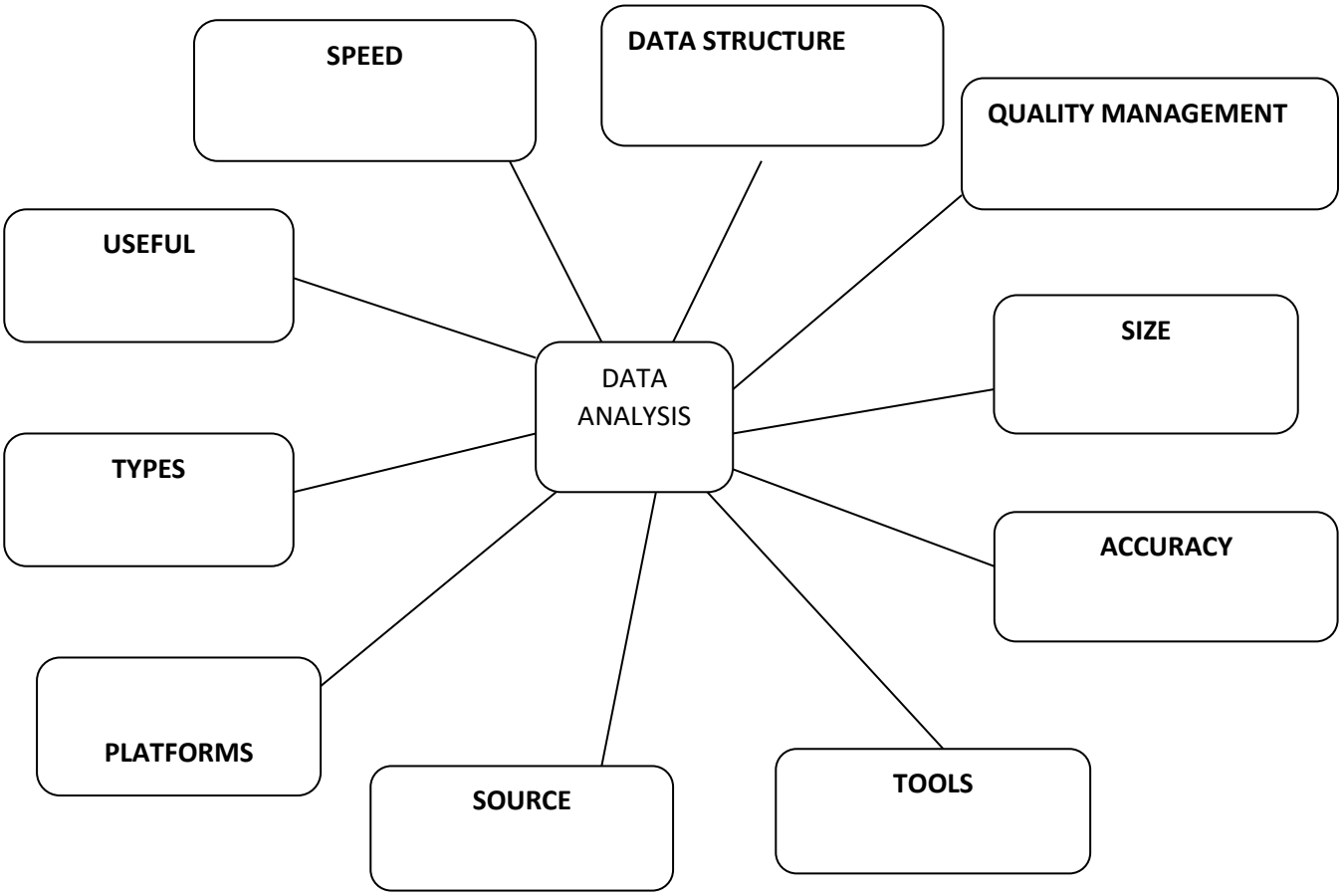

Figure 1:- uniqueness of HIoT

III FPGA Device

Field-programmable gate array (FPGA) and microcontroller (MC) circuitry are both used in control devices. These gadgets are capable of offering fully working Web services that adhere to the Service-Oriented Architecture paradigm. FPGA circuits may offer substantially greater processing capability even though they are more expensive than consumer-grade MCUs. Thus, they suggest a system design and software infrastructure that make it easier to exploit momentarily unused resources for carrying out a variety of tasks that can be made available as online services for a fee. In this work, they outline a technique for utilising unused FPGA resources more effectively by using them to carry out separate computational tasks.

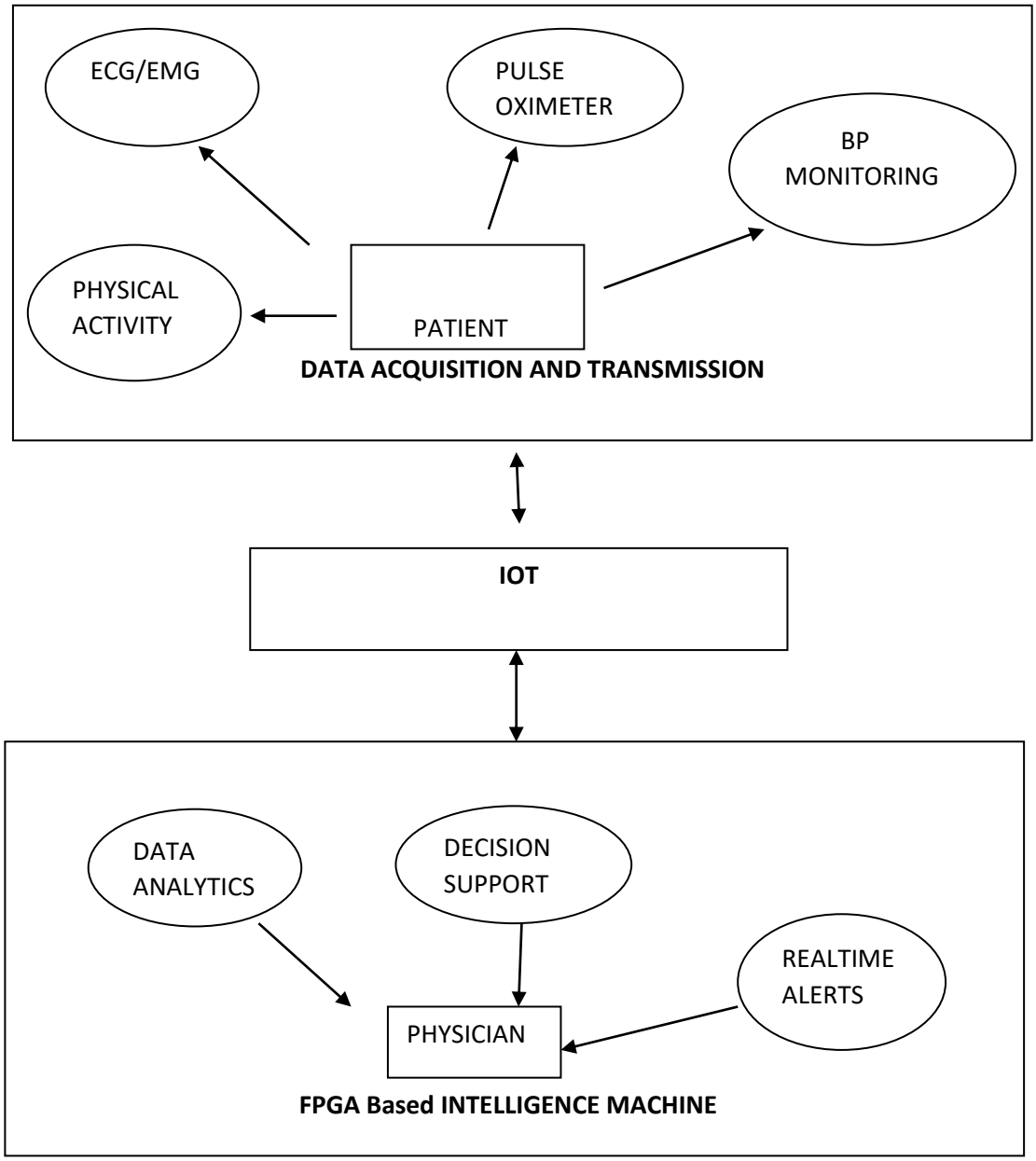

Figure 2:- FPGA based HIoT Analysis

IV CONCLUSION

The advantages of the massive rise of ICT are used by healthcare sector in full swing. This detailed study of this paper addresses the role of HIoT-TM to help the healthcare professionals for providing a better treatment and intervention. Fast growing HIoT devices can be integrated with the healthcare management to provide the support like in-person treatment. Thus the advanced and modern predictive and preventive analytics in association with HIoT-TM ensure the extraordinary medical service. The service can also be extended to the people living in rural and urban areas.

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