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Monitoring Pregnant Women Health Using Wireless Sensor Network and Greedy Algorithm

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ABSTRACT: ***This research work presents an incorporated observing structure for Pregnant Women Health care in the last three months with the help of a convenientcardiotocograph and using the body sensors. The strength of the staff have a valuable tool to noticeirregularities and checkedinopportune events in time. The given mobile cardiotocograph sends real time correct information to a Smart mobile phone thatconnects the information in a cloud storage. The real time data should be in safemanner torecommendadept algorithm for refining the lifetime of wireless sensor networks in the greedy algorithm approach. It is used to search the number of the active nodes in the network. The surgeon receive the data usingthe hospital Obg Gynappliance. The progress of using this system is that the pregnant woman can monitor her pregnancy status development from her home, and the surgeon receives alarms from the system. If the received data is abnormal range and has accessibledata about the current health status at anytime, anywhere and should be in ensure.***

Keywords: Pregnant Women Health care,Cardiotocography, Fetal Monitoring, Remote Consultation, Greedy Algorithm,Arduino.

1. INTRODUCTION:

The Intelligenceexpertise is progressivelyinflowing in a dangeroushealtharea as pre-pregnancy observing and post-pregnancy baby carriage. According tothe WHO (World HealthOrganization) data, aroundthe 287000 pregnant women worldwide die due to difficulties from pregnancy every year and twenty times that number are injured or contract an infection while giving baby birth [1]. The Home observing of pregnant ladies and foetusfor the completedevelopmentthroughout gestation may help avoiding difficulties and preclude early carriage. By eavesdropping to the baby's heartbeat, one can recognizefoetuses who are charming hypoxic and who may help from caesarean segment or contributory vaginal birth. Foetalobserving may be used in gestations from about 26 week's gestation right through labor and carriage by using two methods: Doppler ultrasound or foetal ECG [2]. Distinctivemicroelectronicfoetalobserving equipment used in hospitals is luxurious and

cannot be used on a daily basis by pregnant women living in remote areas. The sensors in routine use are secure on the upcoming mother abdomen using bindings that can leave observablescripts on the patient's skin and can cause irritations. Also, asignificantdifficult is that pregnant women are unable to modificationlocation or walk while foetalobserving is executed.

Agility can be discovered to recoveranalysis, to proliferation the network period and to grip energy control [1], mostly in military applications [3]. The most of the sensor networks have their lifespan or lifetimeenlarged if the insufficient energy. This is typicallysignificant if the sensor nodes batteries cannot be exchanged or re-energized. Lots of energies have previously been spent to elongate the generation of wireless sensor networks; see for example [4], [5],[6], [7], [8], [9] and situationswithin.Based on the solid procedures [10] for generationimprovement, existing greedy algorithm is proposed for adjusting the structures between the sink node and the sensor nodes. In greedy algorithm, the equilibrium between minimalizing the idleoutstanding energy at the network expirationsecond in the sensors nodes' batteries, and minimalizing the energy used up to explosion sensorevidence to the sink node is accomplished by choosing a sole sensor node at a time for interactive with the sink node, based on real-time channel state and outstanding energy evidence. This paper offeringsaadaptedthis algorithm that is relaxes on the presentnecessities of the original greedy algorithm. The main characteristics of the planned algorithm are instead of travellingpresentfrequency and outstanding energy evidence, the novelsystem uses previousevidence on predictableintakes of the sensor nodes, thus elastic a more practicable and less compositeapplication whenassociated with the original greedy algorithm. It conveyselasticity to the excellentamong (i) favoringsecure energy ingestions at the expenditure of summary periods, or (ii) favoring burst-like broadcasts in service of lengthierperiods. Levelledingestionsagree for more repeatedmessage with the sink node and make the sensor nodes die altogether. Burst-like broadcastspermits less repeatedmessage with the sink node, but is more energy-efficient.

STATE OF THE ART

The principaleveryday commercially offered fetal observer for scientific use was created by Hewlett-Packard and Hammacher. In 1968, they using the external tocography andphonocardiography, but since then scientificimprovementsconsumepermittedextraexpansion of many and more truthfulutensils of observing. According to theACOG(TheAmerican College of Obstetricians and Gynecologists), the electronic fetal heartspeedobserving is growing in use, example 62% of the pregnant women in year 1988, 74% in year 1992and 85% in year 2002 [3]. [4] Presents the use of electronic fetal observing in United
States in the 1980s helping to increase the live births.

In our current world there is a swellingconcentration for using wireless methodsfor data transfer. Budinger's work [5] offerings some outdatedmethodologies in installingwireless observing for determining body limitations. As it can be seen in [6], the needfor a low-cost wireless and mobile fetal observing system is accumulative, exclusively forpregnant mothers conscious in areas with inadequateadmission to healthcare.Forobserving the uterine contractions there are two major methodologies [7]. Of these, themarginal one comprises no enhancements into the uterus and thus is selected in our case. Abelt is enclosedabout the belly and committed to a mechanism called a tocodynamometer.To monitor the contractions at

home, the pregnant women must sit in a restful positionand place the band attached to the tocodynamometer around the abdomen. The machinerecords the contractions and the data is transmitted via a low poser wireless assemblyto the smart-phone and supplementary using the data joining to a central observingserver[8]. More and more aspects of the medical observingpractice are taken by automaticsimplanted systems containing of committed sensors (lab-on-chip) which are carryingdata in neighboringphysicalperiod to some kind of observing and investigationsubstructure/server. Inregard to this, there are a few slants of using the obligatory messagingsubstructureproviding by HL7 in order to conveydated series-like data. In [9], authorspresent a custom XML schema built on top of HL7, version 3.0 and provide anemployment of a modest C# application for replacing simulated real time datawith a HL7 compatible data store. They don't present actual hardware devicesmanipulating these new opportunities, but opportunities of analysis are left open for countlessannouncement protocols and ethics

SYSTEM SPECIFICATION AND DESCRIPTION

Throughout the preliminaryinvestigation at the Hospital of together the medicalspecialists in the field of Ob-Gyn care and beneficiaries of the attention (future mothers) oneof the desires we recognized is the fact mothers are keen to be involved intodetecting their babies, but in the same time need guaranteetouching any dangers fortheir yet to be born child and desire using lesser form-factor dealings that tolerate them toaccomplish other happenings and in the same time are not challenging to use while beingoutdoors[10]. Perceptive that their babies are in worthy health and the workevolutionas predictable, provides them an internal peace and approval that can additional affect completelythe enlargement of the fetus. Figure 1 pronounces the universal architecture of the solutionoffered in this paper. The structurecontains of 3 segments. The first section is theObstetrics-Gynecology Department Information System where the physician can adddifferentevidence about the patient [10]. The additionalsectioncontains of the mobilesolicitationfounded on Android with two centralprofessions: to display the pregnant women based on the data acknowledged from the sensors and the subsequent to help the pregnant withuniversalmaterial about the pregnancy. The third section is unruffled by the smartsensors, and delivers the probability to send the informationcomposed from the sensors.Announcement is gathered based on cloud multiplying. The system observers animperative vital sign, the breathing rate, as it affordsinitialrecognition of breathingconciliation and patient suffering. Pulse oximetryaffords a non-invasive andrelativelylow-cost method of unremittinglyobserving the meditation ofoxygenated hemoglobin in blood, based on the distinction light immersionpossessionsof oxygenated and deoxygenated hemoglobin [11][12][13][14][15][16]. This techniquedeliversaperfectquantity of both heart rate and oxygen inundation and is extensively used in coincidence andemergency departments to observer patients at deathtrap of hypoxia. Clinicians arecognizant with the manifestation of the groundswell form (Plethysmogram) twisted by the pulseoximeter[17][18][19]20], but only use it to regulate if the oximeter is occupiedacceptably[21][22][23][24][25]. Our resolutionusages the plethysmogram to tributarystandardize the breathing rate by using wavelet signal investigation[26][27][28].

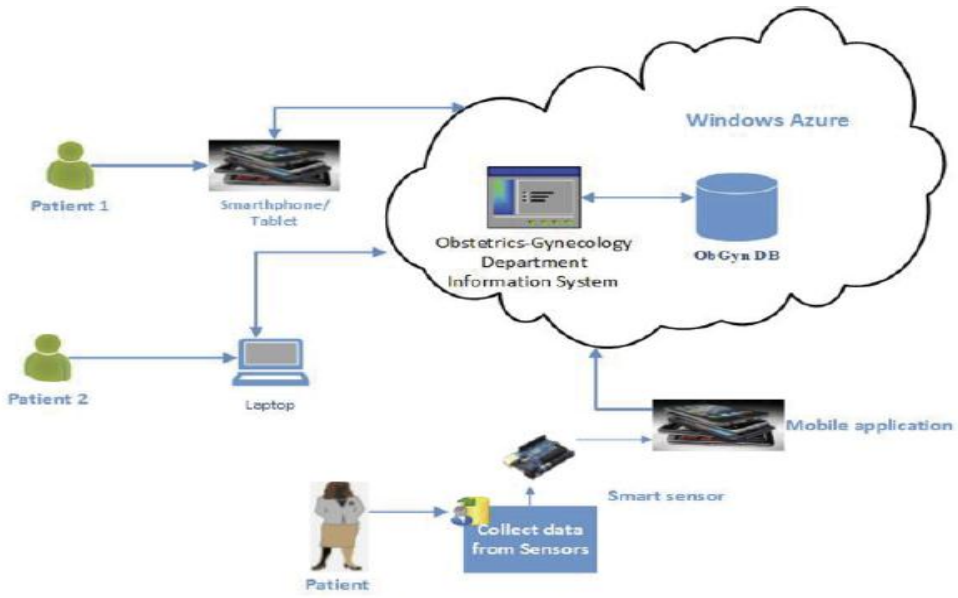

Figure 1. System architecture

The data self-possessed by the sensors is communicated to the smartphone, and an Arduinobased segment will maintenanceobserving the data from the sensors..Supplementary on the surgeon may observer the data in materialperiod or use the alertgeneratingcapability or the broadcastingsegment to get a more universalsynopsis of thepatient's circumstances. One of the therapeuticworkforcesupstretcheddispute is that presently thisobservingevidence isn't kept in amicroelectroniclayout[29][30]. It is essential for thesurgeon to survey the pregnant woman advancement and position and interpolatepromptly inhazardpositions.

Figure 2 contributions the procedure workflow for the unabridged system based on demonstratingusing Business Model and Notation supported by Bizagysoftware.

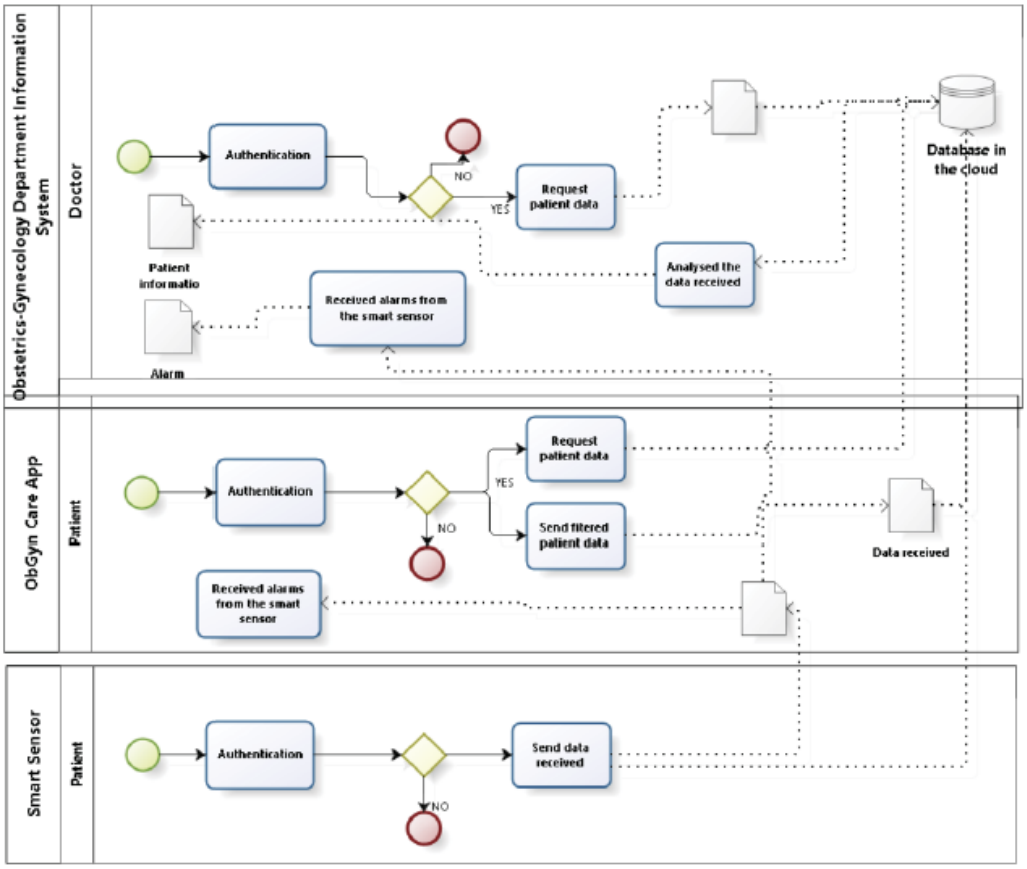

Figure 2. The system workflow

THE GREEDY ALGORITHM

The leadingadjustment with veneration to the unique greedyalgorithm is the calculation of the energy-efficiency index

In two dissimilar ways, as follows:
n = en-Er(cn); if y = 0;
n = en; if y = 1;

With y= 0 yielding anprocedureanalogous to the unique greedy algorithm, i.e. burst-like broadcastsshadowed by silent periods, and y= 1 yielding energy feedings more matched and, thus, sensor nodes more repeatedlyCommunicating and dying almost collected. When y= 0, the node permitted for broadcast by a central node is the one with determined energy-efficiency index, that is

$X_{n,}f(K) = 1$; n = arg max V_i
i

$X_{n,}f(K)= 0$; otherwise

When w = 1, uninterruptedly variable action levels are allocated by the central node according to

$X_{n,}f(K)= \frac{V_n - minV}{\sum_{i=1}^{n}(V_i - minV)}$

Where v is the vector with energy-efficiency catalogues. These movement levels are merely the energy-efficiency cataloguesV_n normalized in order be greater than or equal to zero, and to add-up to one. Thesupplementary most significantamendment with admiration to the original greedy algorithm is the use of outstanding and ingestingevidence from the historicalchunk of fedges to calculate the undertaking levels for the consequent one, which can be detected from the Algorithm 1. This will be logicallytalented inexercise, since it is practicallyintolerable that equivalence amongthe warehouseddynamismsgrasps[31].

2. CONCLUSION:

This paper offeringsandprospect to participateobserving systems as well as transfer the evidence into dissimilarcliniczones. The network of sensors purposes as awireless cardiotocographyscheme that screens the fetal heart rate and the uterinecontractions but contributes the mother mobility and flexibility. The future method is an amendment of a greedy algorithm at a stability among the decrease of unexploited the energy. This can preclude further difficulties by delivery alerts on threshold procedures and enlightening the doctors in realtime about the patient's health. The refugeexploration has shown that our methodology is reasonable for real presentations. At the time of this writing, we are forecasting to begin concerningcontributors from a cliniczone. This cliniczone has togetherfunctioningauditoriums and intensive care. The system is involving with previouslyprevailing systems, is a cheaper and more flexible solution than the one with a standardcardiotocograph, and it participates and observers more energeticciphers. Forthcominginvestigation after receiving test on pregnant women will improvepreclusioncomprising a smart alert segment.

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