

Wireless Feto-maternal Vital Sign Monitoring and Follow-up for Resource Limited Setting

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Signal Processing

Data Logging

InfluxDB

FHR → Band pass filter

UC → Band pass filter

better signal quality

• Ensures noise cancelation and

• All processed data will be stored

Data Analytics & Visualization

All data is sent to a Real-time Database ->

• Ensures a meaningful representation of

◆ Analytics & Visualization → Graphana

to SD card module with

timestamp before its sent.

Ensures data persistency

Introduction

- Maternal and neonatal mortality related to childbirth is one of the big challenges of the developing world and its reduction is a key international development goal.
- Fetal heart rate, uterine contraction, maternal blood pressure, body temp, heart-rate and oxygen concentration are crucial in determining the wellbeing of a laboring mother and the fetus.
- Many of the defacto feto-maternal monitoring instruments such as Cardiotocography (CTG) are expensive, grid dependent and hard to maintain.
- Our idea is to construct a wireless feto-maternal vital sign monitoring and alerting system for low-resource setting.
- In which sensors are attached to a laboring mother non-invasively, collects vital sign data in real-time.
- ❖ After the real-time data is being processed by the rechargeable battery powered microprocessor and later sent for visualization in a wireless manner for a health care professional or a central nurse station.
- The visualization is based on the WHO standard known as the partogram which is a composite graphical depiction of key data during labor, which can be viewed by mobile phones, tablets and computers in a wireless manner.

Method **Hardware & Software Components** Maternal Blood Pressure Maternal Body Temp Maternal Heart Rate & SpO2 Vital-sign collection FHR → piezo based contact microphone • UC \rightarrow surface electrode • MHR → MAX10302 optical biosensor MBT → Thermistor Fetal Heart Rate Rechargeable Power Source Data Transmission • All the logged data is sent to the 開 central system via wireless manner (wifi or 3G) • Ensures the data reached to the central system in real-time Uterine Contraction Real-time Data logger Real-time Dashboard Wireless Communication Medium Introduce a low cost, portable vital-sign monitoring device in Mobile Phone 65.0 × • The device will promote an automated, accurate, and efficient vital Sensors variety, cost and accuracy increased tremendously to attain Real-time Database and Data Processing Tablet **Future Directions** Integrate Cervical Dilatation optical measurement to the initial design.

Reference

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the collected data

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low cost device

low resource setting

sign collection.

Aims

3D printing became more available and cheap

Assist the health care process by:

- Automating the vital-sign collection and monitoring based on Internet of Things.
- Reducing health care professional burnout
- Active alerting upon occurrence of risky vital signs

Deliver optimal care by:

- Reducing errors in the vital-sign collection.
- Producing a real-time vital-sign data of the fetus and the mother to the health care professional at his/her vicinity.
- Minimizing cost of device ownership, and
- Improving patient outcomes

Integrate Artificial Intelligence for labor predication.

Produce final all in one prototype.

Large scale production of the device.

Finding a business strategy for its sustainability.