Use of inbuilt sensors in smart phone to develop Fetal Doptone.

Aim:

To develop a program to use the various sensors available in smart phone to develop fetal doptone to detect and measure fetal heart rate and plot it in graph to detect abnormalities and notify.

Objective:

- To use audio sensors to detect fetal heartbeat.
- To use inbuilt amplifier to amplify the sound.
- To use peitzo-electric sensors to plot the heart rate pattern in graph.
- To apply conditions to read the graph as normal and abnormal and ring an alarm in case of abnormal rate and pattern.
- To record the graph and send to concerned doctor.

Team:

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Introduction:

'The test of any civilization is based on the quality of care that it offers to the most vulnerable members of the society, especially the Pregnant mothers, new born and children below 5 years.'

But, unfortunately, even in this technologically advanced 21stCentury, when the science has enabled the man kind to explore the hidden world of Galaxy, we are not able to offer the quality health care services and complete assurance of their safety and life to all our pregnant mothers and children.

As, per the Niti Ayog data, the Maternal Mortality rate in India in 2016 is 130 deaths

per 100,000 live births. Region wise the MMR in Central and North – east region is as high as 300, whereas, instates of Southern India it is far below National average. Broadly, it is inversely proportional to the literacy rate and women empowerment.

i.e. those states where literacy rate, awareness, women empowerment and health services are high, the MMR is low, while the states which are low in these parameters have higher MMR.

The Neonatal, Infant and Children mortality rate also follow the same pattern. According to GOI date, the IMR in India in 2018 is 30 deaths per 1000 live births.

With higher rates above national average in Central states of India and lower rates in southern and western states.

According to one of the study published in International Journal of Pregnancy and Child birth, the incidence of IUFD in India is around 39 per 1000 live births (March 2017 by Jayshree V Kanavi et al). The major causes responsible for around 60% of IUFD, are cited as Severe pre-eclampsia, Maternal Anemia and late referral to tertiary health centers, all of which are preventable to large extent. To highlight, it is the failure of our health care services to prevent these otherwise preventable IUFDs.

Before IUFD, many mothers may experience reduced or loss of fetal movements. The surveillance of fetal wellbeing at basic level can be done by fetal doptone and fetal cardiography, by assessing the fetal heart rate and pattern.

The objective of present project is to use the ubiquitous availability of smart mobile phone sand its inbuilt sensors to develop a program to detect and record the fetal heart rate and pattern and empower all the mothers ensure their fetal wellbeing.

The mothers shall be able to share the recorded graph with their concerned Doctor or on the Happy Sansaar Forum, where the team of Obstetrician can guide them for the further course of action.

The limitations that are expected are -

1-The heartbeat of mother and baby should not be confused.

The solution can be, to check the heart rate of mother by finger-print sensors using infra-red technology and calculating the difference of heart rate. If the difference in two recorded heart rate is more than 20 beats per minutes, they are two different sounds. Else, it can be mother's sound only.

2-The heart beat can only be recorded after 24 weeks of gestation when the gravid uterus has grown up to umbilicus.

3-There liability of Cardiography before 32 weeks in deciding the fetal distress and deciding the need to expedite delivery is not clinically established. However, it can still be used as tool to confirm the fetal viability.

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The Happy Sansaar Pvt Ltd has agreed to sponsor and provide required support for this study under CSR.