

KICK! REMOTE PREGNANCY MONITOR

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Why is prenatal care crucial in pregnant women monitoring? What are the barriers in accessing prenatal care?

Problem Statement

According to the US Department of Health and Human Services, routine visits to the doctor are very important in monitoring woman's health and are necessary for the supervision of the development of the child.

However, not all women have access to prenatal care. Some live in rural areas, and it makes it complicated to see a doctor. Others have conflicting priorities such as work transportation, or family errands.

Technology can help the women who cannot regularly visit their doctors to monitor their health while giving access to providers about woman's health status.

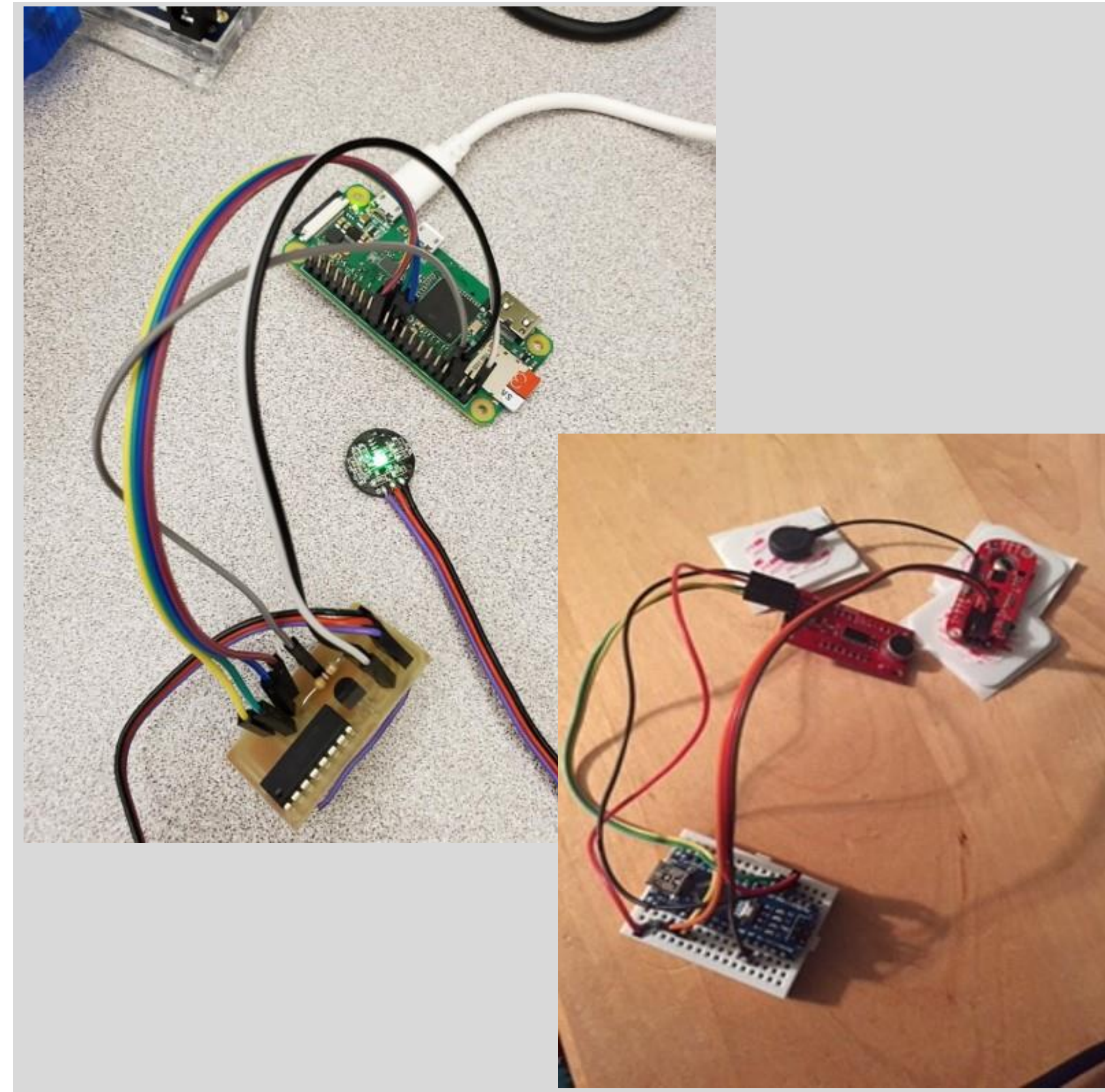
Approach

A device that is attached to a woman's abdomen will be able to monitor the fetal heart rate and the contractions. This device will be used only at certain times.

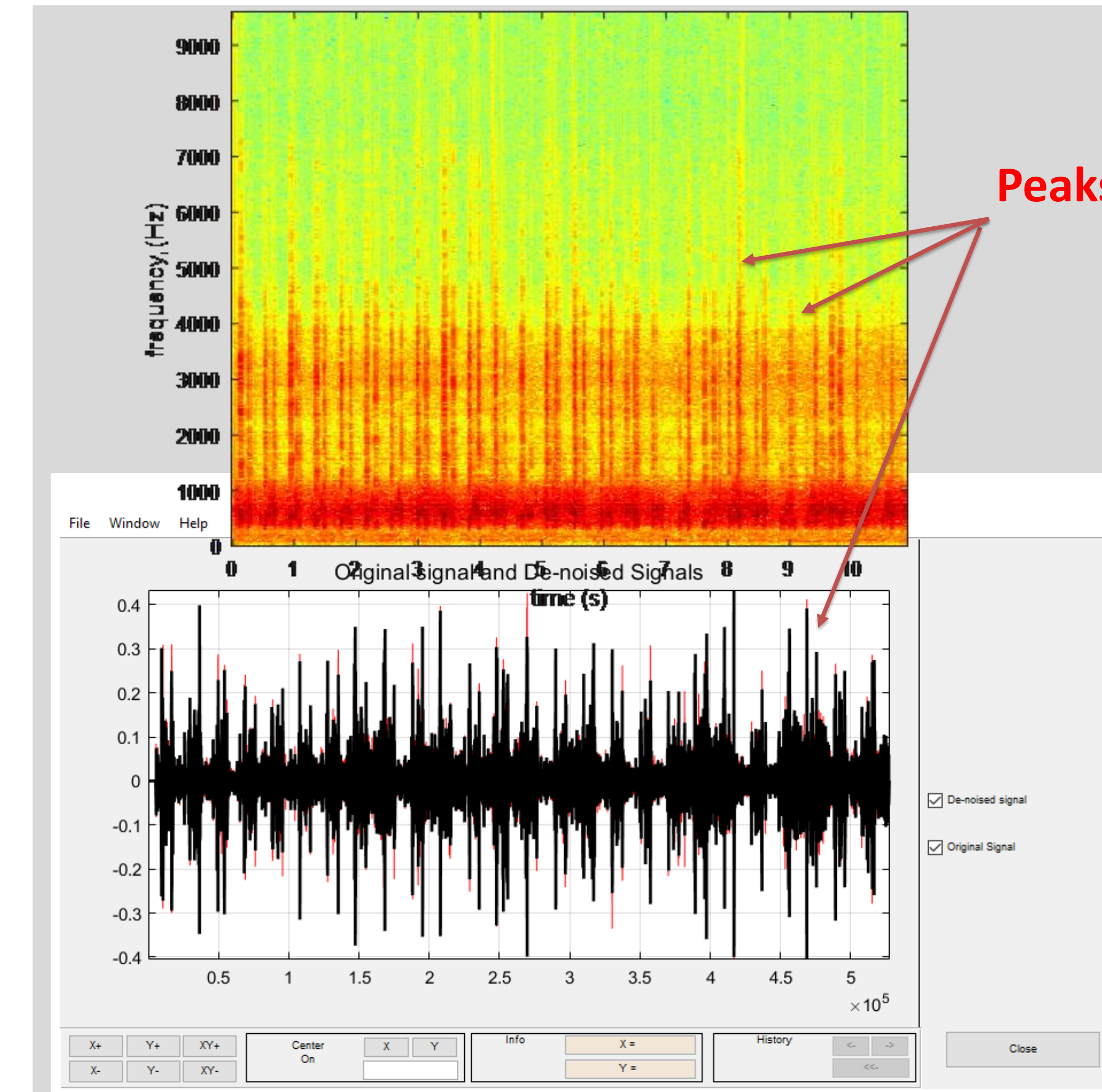
Also, a bracelet to record a woman's heart rate, body temperature, and the stress levels will be worn at all times.

The information from the devices will be transmitted via Wi-Fi to the cloud, which means that the provider will be able to access it and evaluate woman's condition.

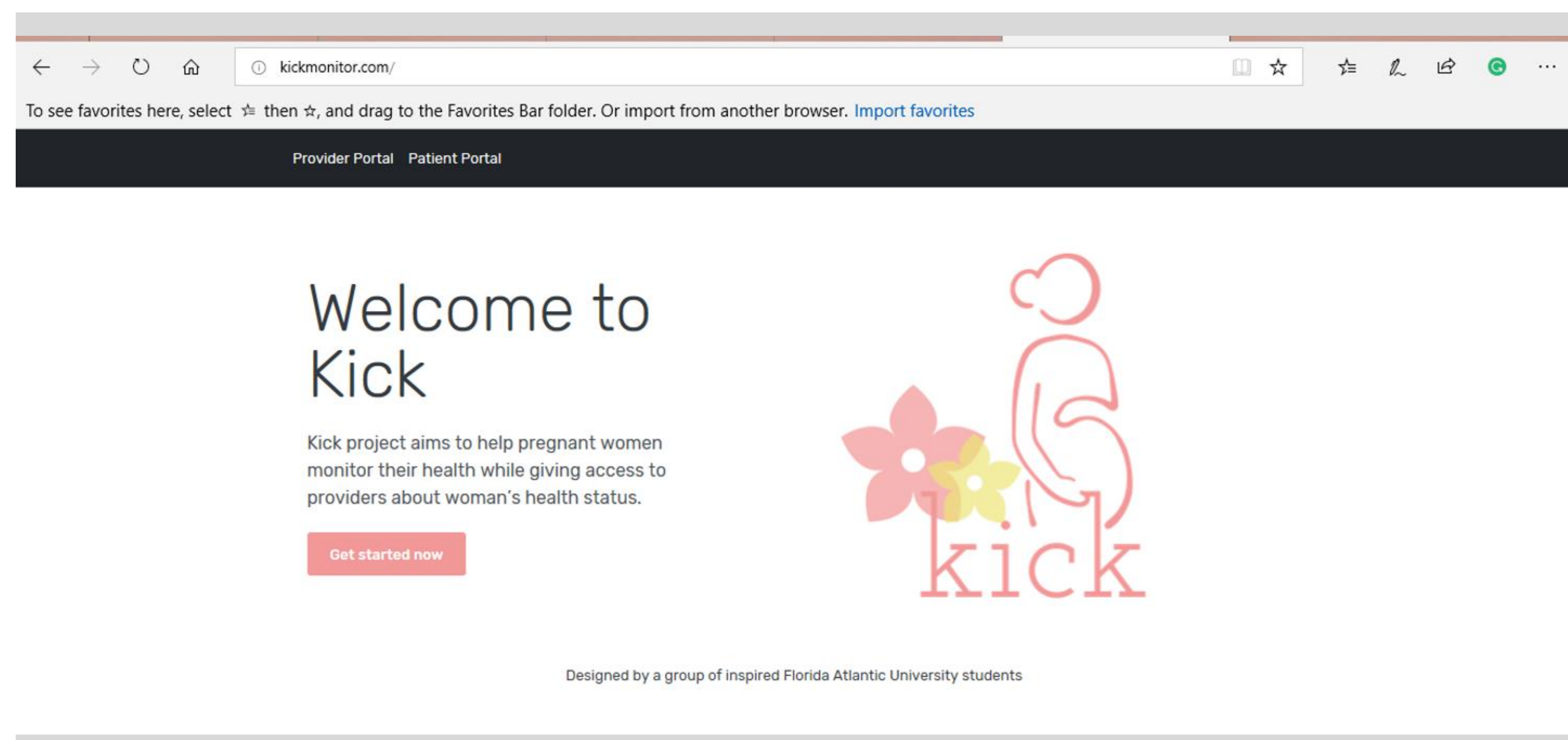
If the measured levels of heart rates or temperature appear out-of-range, the software will send an alert to the woman and the health provider.



Mother Monitor (top left) and Baby Monitor (bottom right)



Spectrogram of baby's heartbeat with peaks (top) and denoised signal processed by Arduino (bottom)



Website Interface

Relevance

Having a healthy pregnancy is one of the best ways to promote a healthy birth. Therefore, it is important to get the proper prenatal care since it greatly improves the chances of a healthy pregnancy. Prenatal care may also inform women about important steps they can take to ensure a healthy pregnancy.

Technical Details

For the Mother's device, we used a Pulse sensor Amped and a Digital Temperature Sensor (DS18B20) to measure the Mother's pulse and temperature. Then we used our research to create a function to indicate the mothers stress level. To process all the data we used the Raspberry Pi Zero W because it has a built-in Wi-Fi module that we use to connect to our MySQL Database and display on our website and app. Our device will be fixed to the Mother's wrist. For the baby's device we used the MyoWare Muscle Sensor to monitor Fetal contractions. We decided to find online videos of fetal heartbeats so we used wavelet denoising to reduce any noise in the signal. Then used research to calculate what the fetal heartbeat is. To ensure that our results were correct we verified it with what we researched.

Conclusion

Therefore, a proposed products aims to remove barriers to quality care and improving communications among patients and healthcare providers. Also, such a device may:

- Reduce the risk of pregnancy complications.
- Reduce the fetus' and infant's risk for complications.
- Help ensure that the medications women take are safe.

References

1. What is prenatal care and why is it important? (n.d.). Retrieved from <https://www.nichd.nih.gov/health/topics/pregnancy/conditioninfo/prenatal-care>