MATERNAL ECG ANALYSIS

COMPARISON BETWEEN NORMAL AND CONTRACTION CONDITIONS

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ABSTRACT

- Pregnancy causes different physiological changes to occur
- Maternal cardiovascular system is affected by uterine contractions
- ECG monitoring is used to study these changes

- This study aims to analyse the contrast between maternal ECG at normal condition and uterine contraction

BACKGROUND

ECG SIGNAL MONITORING

- Is used to study physiological and pathological conditions of the heart
- Is used for maternal ECG monitoring during pregancies
- Allows the study of physiological changes in cardiovascular system of pregnant mothers

PREGNANCY

- Influences all activities in a maternal body
- Causes numerous physiological changes
- Particularly changes the cardiovascular system's physiology

UTERINE CONTRACTION

- Affects maternal cardiovascular system
- Is associated with heart rate deceleration

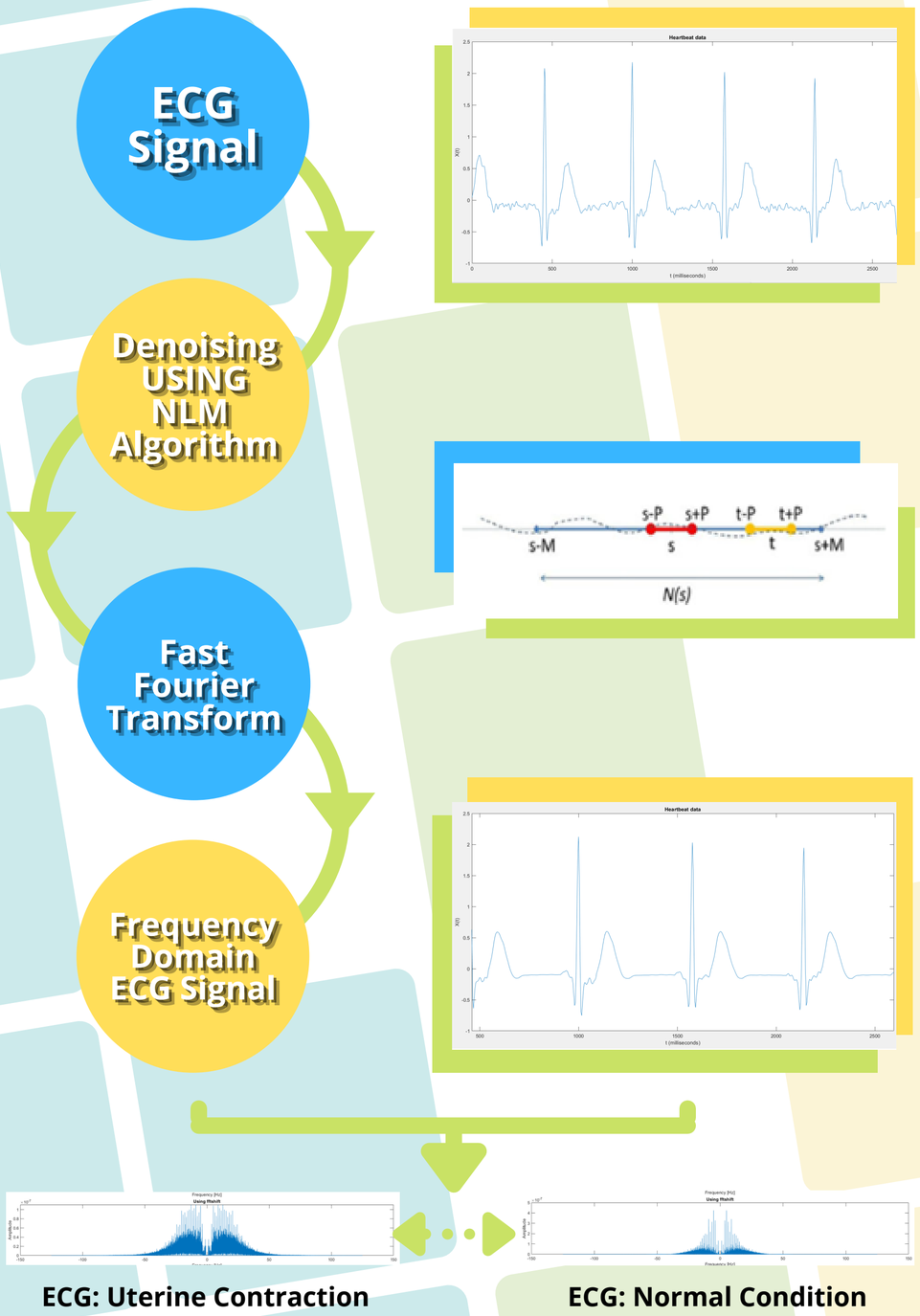
PROBLEM STATEMENT

Heart Rate is always fluctuating as the uterus contracts, sporadically at first and increases from time to time. There might be time where the contractions are rhythmic and low in intensity or irregular. It is important to determine normal maternal condition and during contraction.

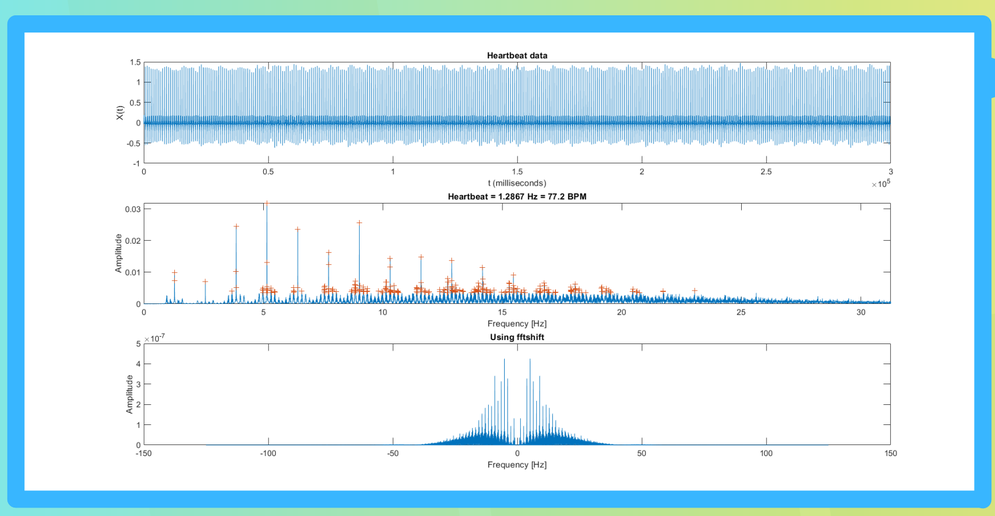
OBJECTIVE

Identify the differences of ECG between normal maternal condition and maternal uterine contraction condition by using statistical test

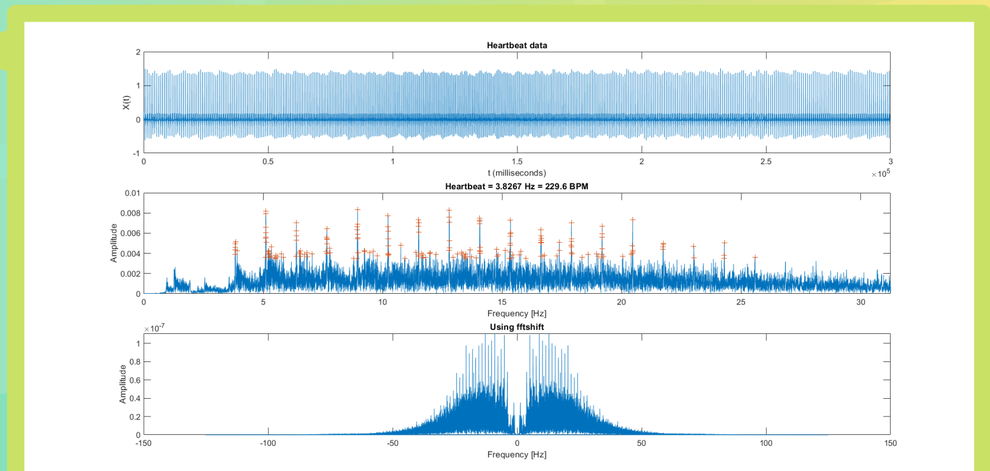
METHODOLOGY



RESULTS



FFT on Normal Maternal Condition



FFT on Maternal Uterine Contraction Condition

T-test Statistical Result

SUB	VARIANCE		MEAN		P-VALUE
	CASE 0	CASE 1	CASE 0	CASE 1	
01	1.50596 E-06	1.15379 E-06	0.00045 3272	0.00071 5545	0.00E+00
02	3.90184 E-07	2.84982 E-07	0.00048 7938	0.00059 004	7.8551E-253
03	5.15404 E-07	4.8266E -07	0.00028 1878	0.00037 702	1.3015E-149
04	2.44943 E-07	1.9311E -07	0.00019 7844	0.00029 1526	0.00E+00
05	5.70208 E-07	4.65468 E-07	0.00026 5834	0.00041 5181	0.00E+00
06	4.18786 E-07	3.78646 E-07	0.00024 8466	0.00029 9568	2.62E-55

SUB : Subject

CASE 0 : Normal Condition

CASE 1 : Uterine Contraction

CONCLUSION

- MATLAB computational analysis is an effective tool to analyse ECG.
- NLM (Non-Linear Mean) algorithm can be used to denoise signal without removing main signal characteristic.
- Signal transformed into frequency domain for statistical analysis (T-test).
- Result showed that there is significant difference between baseline ECG and maternal uterine contraction ECG.
- Result indicates that mean can be declared as a feature that identifies the variation between baseline ECG and maternal contraction ECG.

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