CLAIMS

1. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

an optical scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω_1, ω_2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

2. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

an ultrasound scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω_1, ω_2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

3. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

a tonomeric scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω_1, ω_2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

4. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

a microwave scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω_1, ω_2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

5. The system of any of claims 1-4, wherein the processor is further adapted to calculate an instantaneous frequency curve for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the instantaneous frequency curve.

6 The system of any of claims 1-4, wherein the processor is further adapted to calculate a second derivative waveform for the hemodynamic waveform, and determine the Dicrotic Notch is from the second derivative waveform.

7. The system of any of claims 1-4 wherein the result comprises ω_1, ω_2 and $\Delta\omega$.

8. The system of any of claims 1-4, wherein the result comprises an indication of health status of the subject.

9. The system of any of claims 8, wherein the indication is an alert for hospitalization.

10. A computer readable medium having stored thereon instructions, which when executed cause one or more processors to:

receive an input signal corresponding to a hemodynamic waveform;

determine a Dicrotic Notch using the input signal,

calculate first and second intrinsic frequencies on each side of the Dicrotic Notch for the waveform; and

output a signal corresponding to the intrinsic frequencies.

11. A computer-implemented method of analyzing a signal, comprising:

inputting a hemodynamic waveform data for a subject, the waveform including a Dicrotic Notch;

determining a position of the Dicrotic Notch in the waveform for dividing the signal into first and second sections for analysis;

analyzing each of the first and second sections of the waves by to determine first and second intrinsic frequencies (ω_1, ω_2) where each intrinsic frequency is at or about a frequency that carries the highest energy for all frequencies of an instantaneous frequency curve; and

outputting a result of the analyzing.

12. The computer-implemented method of claim 11, wherein the result comprises ω_1, ω_2 and $\Delta\omega$.

13. The computer-implemented method of claim 11, wherein the result comprises an indication of health status of the subject.

14. The computer-implemented method of claim 13, wherein the subject is a human subject.

15. The computer-implemented method of claim 14, wherein the indication is a diagnosis of atrial fibrillation.

16. The computer-implemented method of claim 14, wherein the indication is a diagnosis of heart failure.

17. The computer-implemented method of claim 14, wherein the indication is a diagnosis of aortic valve dysfunction.

18. The computer-implemented method of claim 14, wherein the indication is a diagnosis of arterial disease.

19. The computer-implemented method of claim 18, wherein the arterial disease is selected from aneurysm, stenosis and hypertension.

20. The computer-implemented method of claim 14, wherein the indication is a diagnosis of arrhythmia

21. The computer-implemented method of claim 14, wherein the indication is an alert for hospitalization.

22. The computer-implemented method of claim 11, wherein the waveform is selected from an arterial pressure wave, a wall displacement wave and a flow or velocity wave.

23. The computer-implemented method of claim 11, repeated in a periodic fashion for monitoring the subject.

24. The computer-implemented method of claim 23, further comprising comparing at least one of ω_1, ω_2 and $\Delta\omega$ for the subject with historical results of at least one of ω_1, ω_2 and $\Delta\omega$ for the subject.

25. The computer-implemented method of claim 11, further comprising comparing at least one of ω_1, ω_2 and $\Delta\omega$ for the subject with non-subject values of ω_1, ω_2 and $\Delta\omega$.

26. The computer-implemented method of claim 11, wherein the results for the subject are logged.

27. The computer-implemented method of claim 11, wherein the waveform data is input from a sensor and the method comprises scanning the subject.

28. The computer-implemented method of claim 26, wherein the sensor is of a type selected from ultrasound, microwave, optical and tonomeric sensors.

29. The computer-implemented method of claim 11, further comprising calculating an instantaneous frequency curve for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the instantaneous frequency curve.

30. The computer-implemented method of claim 11, further comprising calculating a second derivative waveform for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the second derivative waveform.

CLAIMS

1. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

an optical scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω1, ω2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

2. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

an ultrasound scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω1, ω2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

3. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

a tonomeric scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω1, ω2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

4. A system for acquiring and analyzing a hemodynamic waveform of a subject, the system comprising:

a microwave scanner, the scanner adapted to capture a signal corresponding to a hemodynamic waveform; and

at least one computer processor connected to the scanner by a wired or wireless connection, wherein the computer processor is adapted to receive the signal for the hemodynamic waveform, determine a Dicrotic Notch using the signal, calculate first and second intrinsic frequencies (ω1, ω2) on each side of the Dicrotic Notch for the waveform, and output a signal corresponding to intrinsic frequencies results.

5. The system of any of claims 1-4, wherein the processor is further adapted to calculate an instantaneous frequency curve for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the instantaneous frequency curve.

6. The system of any of claims 1-4, wherein the processor is further adapted to calculate a second derivative waveform for the hemodynamic waveform, and determine the Dicrotic Notch is from the second derivative waveform.

7. The system of any of claims 1-4 wherein the result comprises ω1, ω2 and Δω.

8. The system of any of claims 1-4, wherein the result comprises an indication of health status of the subject.

9. The system of claim 8, wherein the indication is an alert for hospitalization.

10. A non-transitory computer readable medium having stored thereon instructions, which when executed cause one or more processors to:

receive an input signal corresponding to a hemodynamic waveform;

determine a Dicrotic Notch using the input signal,

calculate first and second intrinsic frequencies on each side of the Dicrotic Notch for the waveform; and

output a signal corresponding to the intrinsic frequencies.

11. A computer-implemented method of analyzing a signal, comprising:

inputting a hemodynamic waveform data for a subject, the waveform including a Dicrotic Notch;

determining a position of the Dicrotic Notch in the waveform for dividing the signal into first and second sections for analysis;

analyzing each of the first and second sections of the waves by to determine first and second intrinsic frequencies ($\omega 1$, $\omega 2$) where each intrinsic frequency is at or about a frequency that carries the highest energy for all frequencies of an instantaneous frequency curve; and

outputting a result of the analyzing.

12. The computer-implemented method of claim 11, wherein the result comprises $\omega 1$, $\omega 2$ and $\Delta\omega$.

13. The computer-implemented method of claim 11, wherein the result comprises an indication of health status of the subject.

14. The computer-implemented method of claim 13, wherein the subject is a human subject.

15. The computer-implemented method of claim 14, wherein the indication is a diagnosis of atrial fibrillation.

16. The computer-implemented method of claim 14, wherein the indication is a diagnosis of heart failure.

17. The computer-implemented method of claim 14, wherein the indication is a diagnosis of aortic valve dysfunction.

18. The computer-implemented method of claim 14, wherein the indication is a diagnosis of arterial disease.

19. The computer-implemented method of claim 18, wherein the arterial disease is selected from aneurysm, stenosis and hypertension.

20. The computer-implemented method of claim 14, wherein the indication is a diagnosis of arrhythmia.

21. The computer-implemented method of claim 14, wherein the indication is an alert for hospitalization.

22. The computer-implemented method of claim 11, wherein the waveform is selected from an arterial pressure wave, a wall displacement wave and a flow or velocity wave.

23. The computer-implemented method of claim 11, repeated in a periodic fashion for monitoring the subject.

24. The computer-implemented method of claim 23, further comprising comparing at least one of $\omega 1$, $\omega 2$ and $\Delta\omega$ for the subject with historical results of at least one of $\omega 1$, $\omega 2$ and $\Delta\omega$ for the subject.

25. The computer-implemented method of claim 11, further comprising comparing at least one of $\omega 1$, $\omega 2$ and $\Delta\omega$ for the subject with non-subject values of $\omega 1$, $\omega 2$ and $\Delta\omega$.

26. The computer-implemented method of claim 11, wherein the results for the subject are logged.

27. The computer-implemented method of claim 11, wherein the waveform data is input from a sensor and the method comprises scanning the subject.

28. The computer-implemented method of claim 26, wherein the sensor is of a type selected from ultrasound, microwave, optical and tonomeric sensors.

29. The computer-implemented method of claim 11, further comprising calculating an instantaneous frequency curve for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the instantaneous frequency curve.

30. The computer-implemented method of claim 11, further comprising calculating a second derivative waveform for the hemodynamic waveform, and wherein the Dicrotic Notch is determined from the second derivative waveform.