Accurate Fast Heartrate Detection Based on

Fourier Bessel Series Expansion During Radar-based Sleep Monitoring

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STATUS

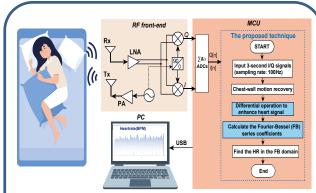
NEW INSIGHTS

Connecting Minds. Exchanging Ideas.

Sleep Monitoring

- Continuous fast heart rate (HR) detection: accurate short-time (less than 5s) HR estimation
- Sleep staging indicator validation: clinical validation through over-night experiment
- Portable contactless sensor design



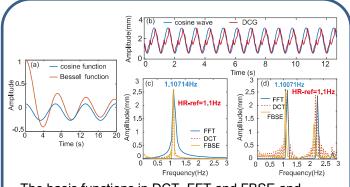


Sleep monitor system using proposed technique with Doppler radar:

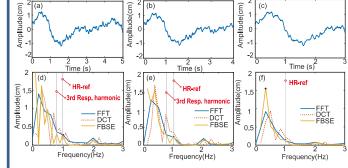
- √ High-linearity Doppler radar sensor design
- √ Fourier Bessel series expansion (FBSE)based fast HR estimation
- ✓ Sleep staging indicator calculation and clinical validation

SCRIPTION

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The basis functions in DCT. FFT and FBSE and comparison of the spectrum representation in different heart motion simulation.

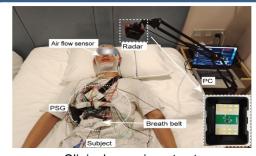


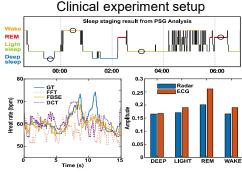
Simulated chest-wall motion signals in time domain with different window length:

- ✓ FBSE-based technique has the best estimation performance
- Capacity of less than 5 seconds time window HR estimation

QUANTITATIVE IMPACT

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Sleep staging indicator calculation with respect to the PSG staging results

Doppler Radar System in sleep staging:

- ✓ Portable, comfortable, accurate
- ✓ Accurate fast HR detection with FBSE technique
- ✓ Capacity of HRV detection enabling accurate sleep staging



