

DIGITAL TECHNOLOGY : Consumer Health Platform



DESCRIPTION

For more than 20 years CSEM has been active in the domain of human vital signs monitoring technologies integrated into mobile health solutions to track the health status of its users. Several of these technology platforms are located around the wrist, which monitor continuously the users' cardio-vascular activity by means of PPG and inertial sensors. These technology platforms are configurable and can be integrated as sub-modules within connected watches and watch straps with or without display (see figure). The sub-modules dispose of a BTLE chipset to transfer the processed vital signs to a dedicated smartphone App (Android and iOS) and then to the cloud, enabling the creation of health database of the users.

FUNCTIONALITIES & CHARACTERISTICS:

CSEM puts a broad and product validated algorithm library for licensing at disposal as follows:

Parameter	Description	TRL
Activity classification	Automatic classification of user's activity among [sleep, rest, walk, run, bike, swim].	9
Step count	Steps executed during each activity class.	9
Cadence	Instantaneous cadence estimation during walk, run, bike, and swim activities.	9
Speed	Speed estimation during walking and running.	9
Swim: Stroke count	Number of swim strokes per lap. Stroke means the number of hand entries, left and right combined.	9
Swim: Lap count	Number of swim laps (full pool lengths).	9
Swim style classification	Automatic classification of swim style: butterfly/crawl, backstroke, and breast stroke.	9
Swim efficiency	Indirect measure of swim efficiency called SWOLF.	9
Fall detection	Automatic detection of fall events.	7
Energy expenditure	Total amount of energy burned by the user (kcal).	9
RR intervals	Estimation of the interval of time between successive R waves.	9
Heart rate	Average number of heart beats per minute.	9
Heart rate variability	Measure of the variation in the time interval between heartbeats (RR intervals).	9
Breathing rate	Number of respiration events per minute.	9
Stress level	Autonomous nervous system balance (sympathetic vs parasympathetic).	8
Drowsiness	Detector of sleepiness or feeling lethargic.	5
Total sleep time	Amount of actually sleep time in a sleep episode.	9
Sleep stage scoring	Classification of sleep (actigraphy-based) among [wake, deep, light].	9
Sleep stage scoring	Classification of sleep (HRV-based) among [wake, REM, NREM].	9

EXAMPLE OF APPLICATIONS

- Mobile consumer health
- Smartwatch and smart straps
- Digital health

UNIQUENESS

- Configurable platform, extensible to additional vital signs monitoring;
- Optimised power consumption in order to extend autonomy;