ALGORITHM PORTFOLIO

Movement analysis

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HUMAN KINETICS MONITORING

Parameter	Description	Body location*
Activity	Automatic classification of sleep, rest, walk, run, cycle, and swim	
Posture	Automatic classification right/left lateral decubitus, ventral/dorsal decubitus, and standing	
Step count	# steps during walking and running	
Cadence	Instantaneous steps/min (walking, running, and cycling)	
Stride length	Length of single step from each gait cycle	
Traveled distance	Total distance (walking, running, and swimming)	
Speed	For walking and running	
Swim: Stroke count	Total number of left and right hand strokes in a lap	
Swim: Lap count	Number of pool lengths covered	
Swim style	Automatic classification of butterfly/crawl, backstroke and breast stroke	
Swim efficiency	SWOLF (stroke count + lap time)	
Workout	Duration of vigorous physical exercise or training session	
Fall event	Automatic detection of falls in daily life	
Energy Expenditure	Instantaneous MET or cumulated kcal of burned energy	

*Technology Readiness Levels (TRL) are indicated in the top-right corner of body location images.

Parameter	Description	Body location
Foot impact strength	Maximum vertical impact absorbed by the foot when landing	
Foot impact zone	Distribution of the impact strength between heel, midfoot, and toes	
GCT	Ground contact time (in ms and %). Time a foot stays on the floor during a running gait cycle	
Right/left GCT balance	Distribution of the ground contact time between right and left feet	
Running efficiency	Overall performance and quality factor	
Jump counter	Detection of forward and vertical jumps	
Impact counter	Detection of individual large amplitude shocks	

CSEM delivers tailored, embedded solutions for wellness & fitness applications. Our algorithms have undergone stringent validation processes to ensure they are ready for tomorrow's wearables.

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