Algorithm portfolio • Fitness and wellness applications

Human kinetics monitoring

Running efficiency

GCT

Speed
Cadence
Step count
Workout
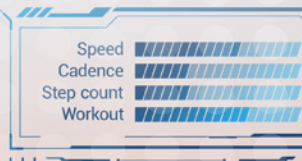
Stride length
Foot impact strength
Foot impact zone

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Parameter / feature	Description	Fingertip[1]	Head[1]	Thorax[1]	Watch[1]
Activity	Classification of user's activity [rest, walk, run, other, other rhythmic]	9	8	9	9
Cadence	Cadence during walking and running	9	8	9	9
Energy expenditure	Amount of energy burned by the user expressed as Metabolic Equivalent of Task (MET)	9	7	9	9
EPOC	Excess post-exercise oxygen consumption after exercise	-	4	4	4
Fall detection	Detection of fall events	-	8	7	7
Fall risk	Indicator of fall risk based on activity and other meta-parameters	-	5	5	5
Foot impact strength	Maximum vertical impact absorbed by the foot during landing	9	-	-	-
Foot impact zone	Distribution of vertical impact absorbed by the foot during landing [heels, mid, toes]	9	-	-	-
Gesture	Detection of gesture events [double wrist roll, wearing/taking off, tapping]	-	-	-	9
Ground contact time (GCT)	Time the foot stays on the floor within the running gait (in milliseconds and %)	9	-	3	-
Impact counter	Count of individual shocks greater than a certain acceleration		-	9	-
Jump counter	Count of forward and vertical jumps		-	8	-
Posture	Classification of the user's posture (prone [right, left, ventral, dorsal] or upright)	-	9	9	-
Right/left GCT balance	Distribution of the ground contact time between right and left feet	9	-	3	-
Running efficiency	Overall performance factor for running quality	4	-	-	-
Speed	Speed during walking and running	9	5	9	9
Steps	Steps taken during each activity class	9	8	9	9
Stride length	Length of a single step	9	-	-	-
Swim	Classification of swim style [butterfly, crawl, backstroke, and breaststroke] as well as lap count [whole pool lengths], stroke count and an SWOLF (indirect measure of swim efficiency)	-	-	-	9
Traveled distance	Distance traveled while walking or running	9	5	9	9
VO$_2$ and VO$_2$max	Oxygen consumption and maximum oxygen consumption attainable during physical exertion	-	8	8	8
Workout	Duration of a strenuous physical activity or workout	-	-	-	9

[1]Numbers in the table indicate the Technology Readiness Level (TRL) according to ISO 16290:2013

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