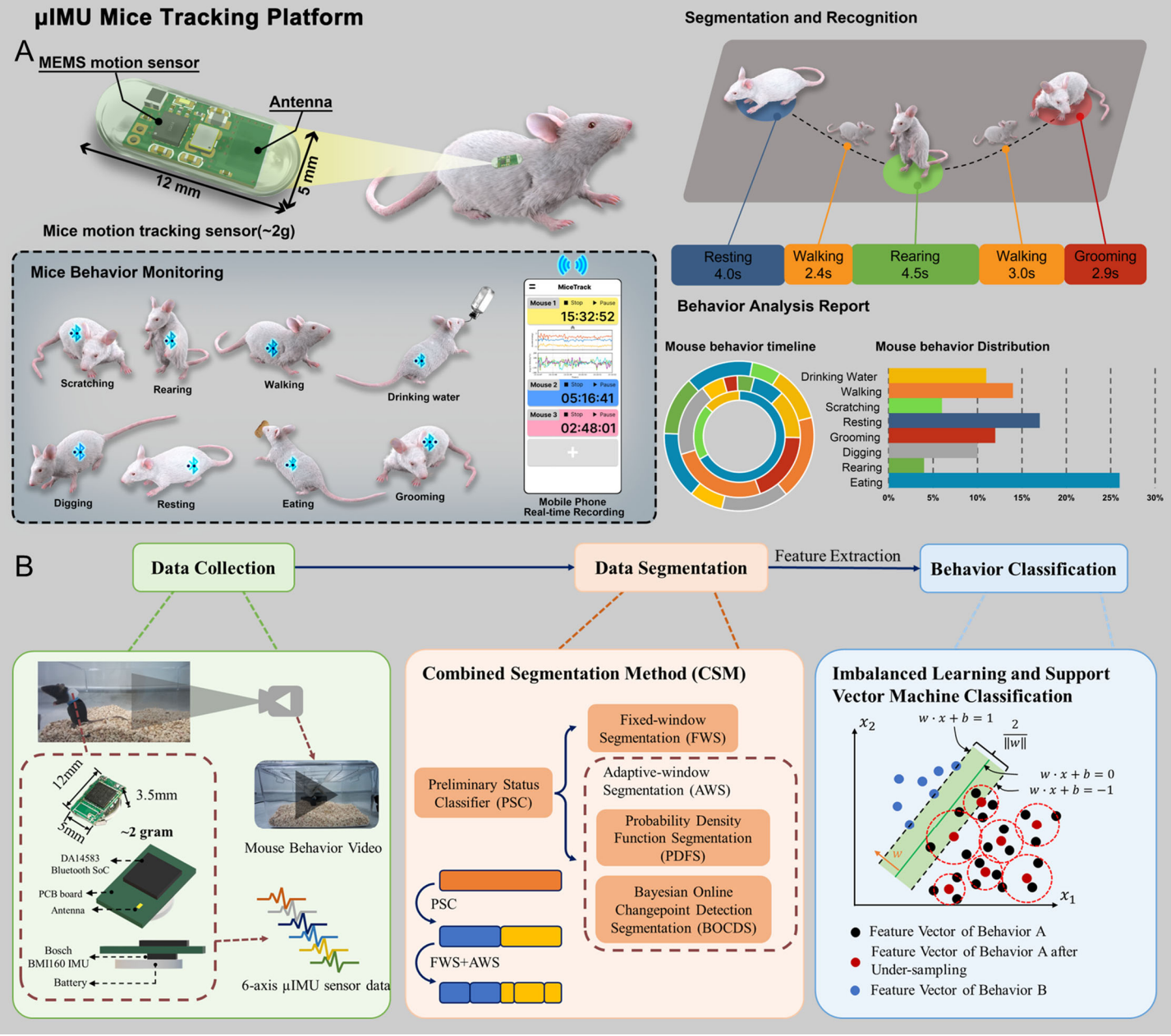
μIMU Mice Tracking Platform
A
MEMS motion sensor
Antenna
12 mm
5 mm
Mice motion tracking sensor(~2g)
Mice Behavior Monitoring
Scratching
Rearing
Walking
Drinking water
Digging
Resting
Eating
Grooming
MiceTrack
Mouse 1
15:32:52
Mouse 2
05:16:41
Mouse 3
02:48:01
Mobile Phone
Real-time Recording
Segmentation and Recognition
Resting 4.0s
Walking 2.4s
Rearing 4.5s
Walking 3.0s
Grooming 2.9s
Behavior Analysis Report
Mouse behavior timeline
Mouse behavior Distribution
Drinking Water
Walking
Scratching
Resting
Grooming
Digging
Rearing
Eating
0%
5%
10%
15%
20%
25%
30%
B
Data Collection
Data Segmentation
Feature Extraction
Behavior Classification
12mm
3.5mm
5mm
~2 gram
DA14583
Bluetooth SoC
PCB board
Antenna
Bosch
BMI160 IMU
Battery
Mouse Behavior Video
6-axis μIMU sensor data
Combined Segmentation Method (CSM)
Preliminary Status Classifier (PSC)
Fixed-window Segmentation (FWS)
Adaptive-window Segmentation (AWS)
Probability Density Function Segmentation (PDFS)
Bayesian Online Changepoint Detection Segmentation (BOCDS)
PSC
FWS+AWS
Imbalanced Learning and Support Vector Machine Classification
x_2
$w \cdot x + b = 1$
$\frac{2}{\|w\|}$
$w \cdot x + b = 0$
$w \cdot x + b = -1$
w
x_1
Feature Vector of Behavior A
Feature Vector of Behavior A after Under-sampling
Feature Vector of Behavior B