

acuity

horizontal and vertical jumping digital laboratory

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2026-01-22, Nantes, France

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1. objectives

2. foreground / background

3. challenges

objectives

research project

- submitted
- regional fundings

topics

- sport & health
- biomechanics
- computer science

partners

1. ICAM de Nantes
2. MIP, laboratoire CNRS au Mans
3. *Neptunes de Nantes Volleyball*
4. *CREPS des Pays de la Loire*

sensor fusion platform

- force sensors
- inertial sensors
- vision sensors

for biomechanical analysis

- performance monitoring
- injury prevention
- training load customization

dual platform

- state-of-the-art
- vertical jump
- single subject

multiple platform

- vertical & horizontal jump
- multiple subjects

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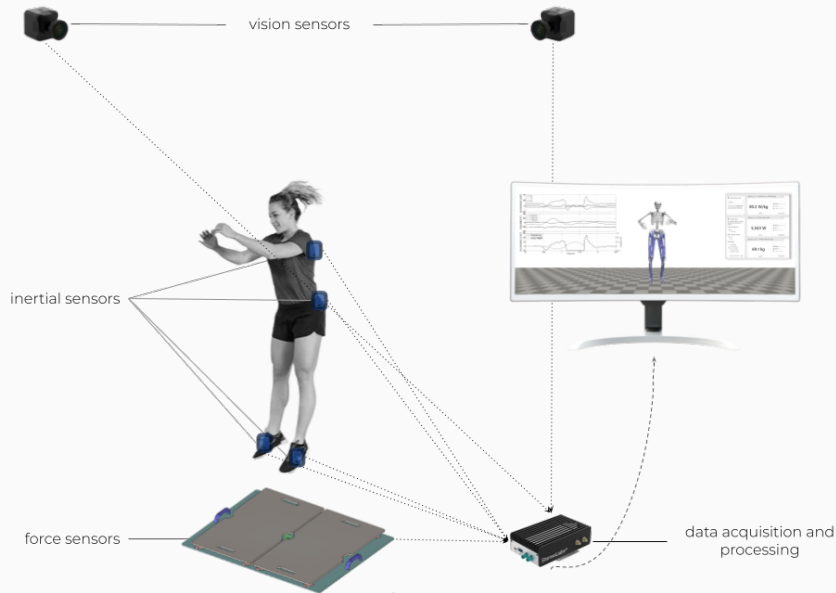
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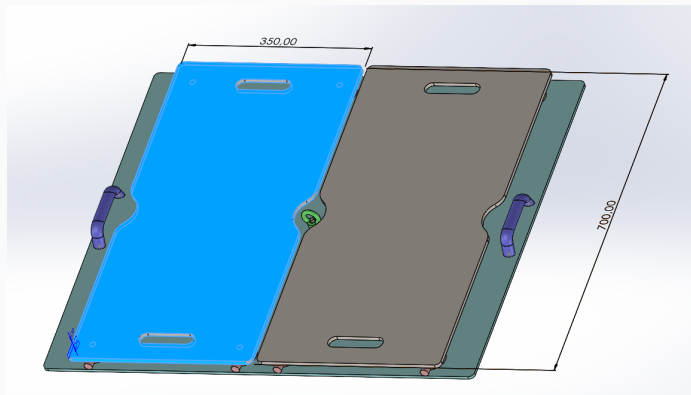
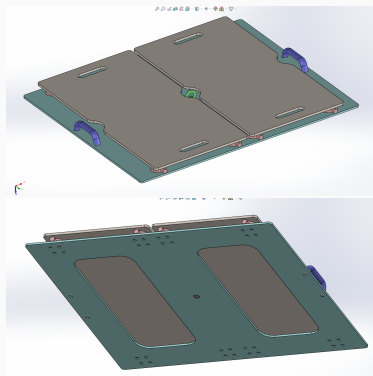
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dual fusion platform



foreground / background

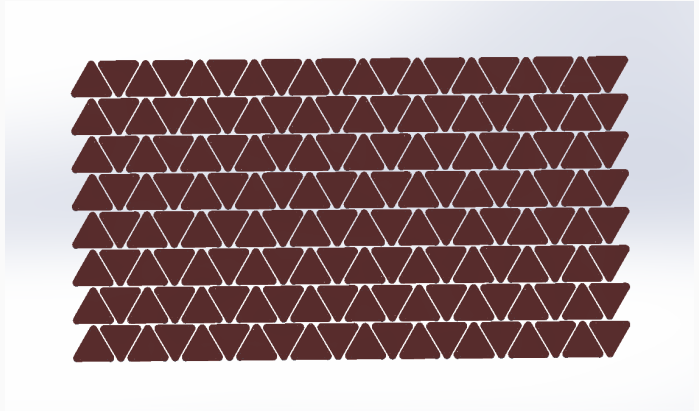
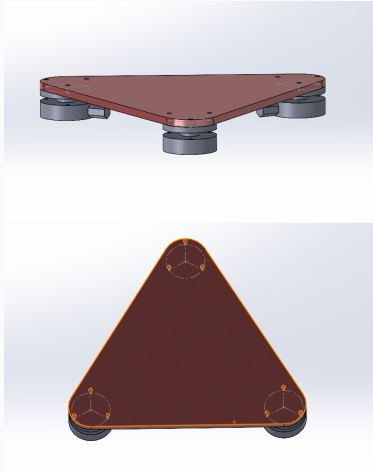
dual force platform



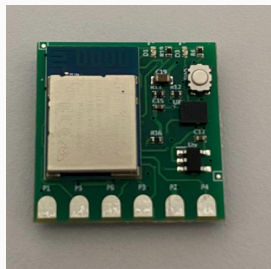
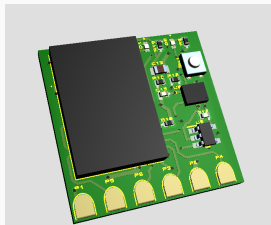
dual force platform



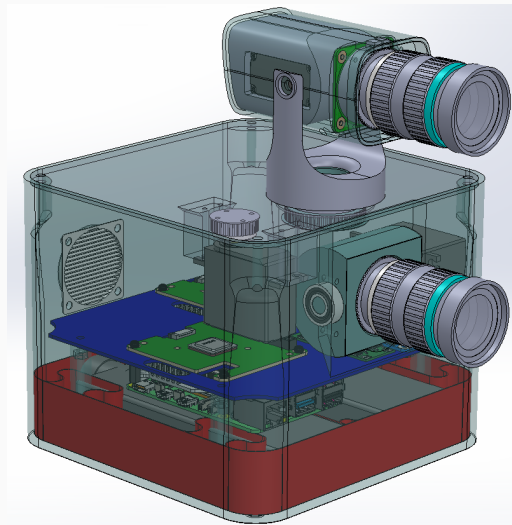
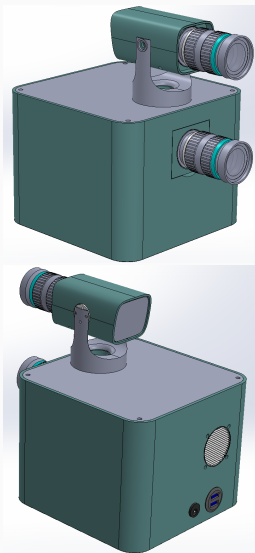
multiple force platform



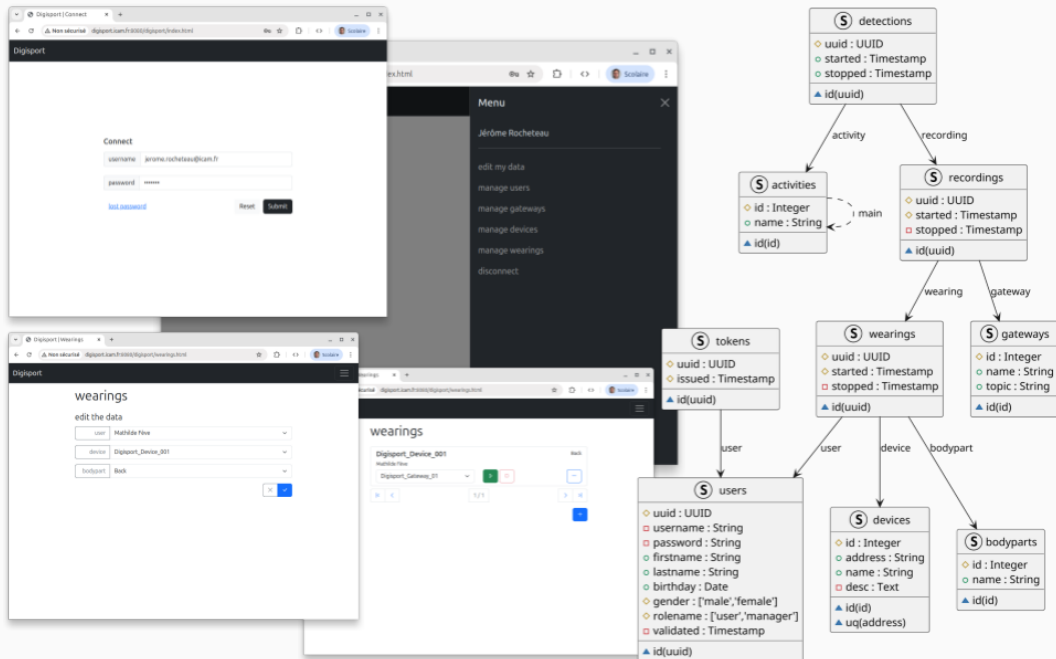
inertial sensors



vision sensors



data analysis platform

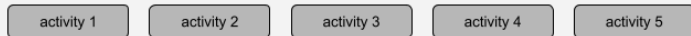


the ACUITY platform

inertial and force sensor measurement visualization



activity annotation



timeline navigation



vision sensor measurement visualization



challenges

version 1 – sport

- dual force platform
- 8 1-axis force sensors at 1kHz
- 1 9-axis inertial sensor at 120Hz
- 2 stationary vision sensors at 60Hz
- 2 disjoint simulation models

version 2 – health

- dual force platform
- 8 3-axis force sensors at 1kHz
- 17 9-axis inertial sensors at 120Hz
- 4 stationary vision sensors at 60Hz
- 1 joint simulation model

version 3

- multiple force platform
- $3p$ 1-axis force sensors at 1kHz
- q 9-axis inertial sensors at 120Hz
- u stationary vision sensors at 60Hz
- v motorized vision sensors at 60Hz
- w joint simulation models (1 per subject)

challenges

- real-time data processing
- data fusion for joint simulation modeling
- subject location and identification
- open-source, lower-cost, extensible

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