

#### Abstract

It is crucial for team plays in sports that the players synchronize their actions, but objectively assessing player coordination is not easy. We propose a **convenient measurement method to immediately evaluate and feed back some aspects of player coordination** by attaching compact inertial measurement units (IMUs) to each player; we use the example of scrumming in rugby. In a scrum, a pack of eight forwards (players) are required to coordinate their forward drives, timing and direction, to maximize forward pressure. The IMU data allows us to calculate the acceleration vectors and its peak time structures for the group of players involved. Constant storage of these values can yield a useful database for **understanding each player's characteristics and developing suitable combinations of players** to improve scrumming performance. This measurement system also makes it easy to **visualize, as well as sonify, player coordination during various joint activities** other than rugby.

#### Convenient wearable sensor



#### Feedback of player coordination

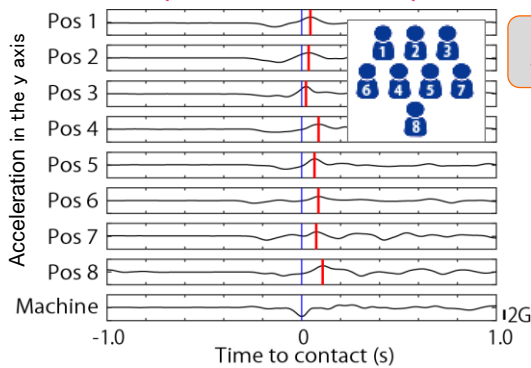
Analysis, Database



Daily training



#### Example of acceleration profiles



#### Example of feedback screen

Large amplitude in forward direction?

Acceleration vectors

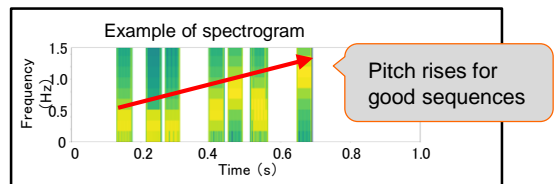
Movie

Peak acceleration time

Sequential order from front to back?

- Easy acquisition via wearable sensors
- Rapid visualization of player coordination
- Developing suitable combinations of players
- Potential of application to various activities

#### Sonifying the peak time sequence of players



\* This research is in collaboration with NTT Communications Shinning Arks.

#### References

[1] T. Kimura, N. Saito, H. Okamoto, K. Ohta, "Evaluation of cooperation between players in the rugby scrum using IMU," *Proc. Sports Engineering and Human Dynamics 2019*, 2019.

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