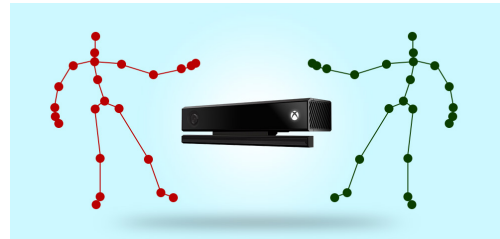




Inferring Motion from Inertial Data

In recent years, the introduction of smart wearable devices has created many new ways of tracking, analyzing and even performing our everyday activities. However, using the sensor data of customer-grade hardware, even software that is tailored to very specific use cases falls short of providing the required accuracy in many activity recognition and analysis tasks.

Our group has already completed projects using smartwatches to recognize movements and count repetitions, for example, for swimming and cross-fit. While these perform reasonably well, they fall under the category mentioned above as they are tailored to a specific usage scenario. In contrast, with this project we aim to investigate more generally what information can be deduced from the available sensory data.



More specifically, we want to use inertial data (i.e. accelerometer data) to infer an absolute motion representation of the user. To that end, we will setup and conduct multi-sensor experiments and apply deep learning techniques to exploit further ways of tracking or analyzing our bodies' movements.

Requirements: You should be familiar with the basics of deep learning; having built an application/project involving deep learning is an advantage. Specifically, you should be able to read and understand the first 12 chapters of the “Deep Learning Book”.¹ If you are very motivated for this topic but new to deep learning, we expect you to complete an introductory deep learning course before applying for the thesis, for example, Andrew Ng’s coursera course² (free trial!) or this Udacity course³.

Interested? Please contact us for more details and links to interesting papers!

Contacts

- Gino Brunner: brunnegi@ethz.ch, ETZ G63
- Roland Schmid: roschmi@ethz.ch, ETZ G94

¹Goodfellow et al., 2016, available online (for free) from MIT press

²<https://www.coursera.org/specializations/deep-learning>

³<https://classroom.udacity.com/courses/ud730>