



Serious gaming and sensor systems for balance training of elderly

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Introduction

Exergaming has serious advantages compared to conventional balance training programs

- Extramural —————> Monitor the user (progression)
- Manipulate information ———> Input user
- Assess balance
- Provide feedback —————> Data fusion



Introduction

Exergaming has serious advantages compared to conventional balance training programs

- Extramural
- Manipulate information
- Assess balance
- Provide feedback

- Which parameters/outcome measures?
- How to measure them?
- Which data to use for balance assessment? (sensor output, context, user characteristics, norm data?)
- How to generate and provide feedback?



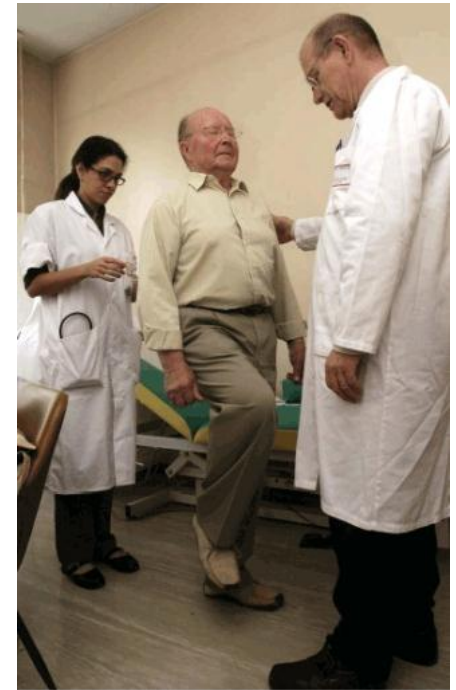
→ Which outcome measures are being used in exergaming today?

Outcome Measures (1)

Exergames today.

Williams *et al* (2010):

- Healthy elderly age 70+ (n=15, c=6)
- WiiFit (2x/week, 12 weeks)
- Outcome parameters:
 - BBS (Berg Balance Scale) →increase
 - TBAT (Tinetti Balance Assessment Tool)
 - FES-I (Falls Efficacy Scale – International)
 - WiiAge... →decrease 72.8 (8.2)→57.3 (18.7)

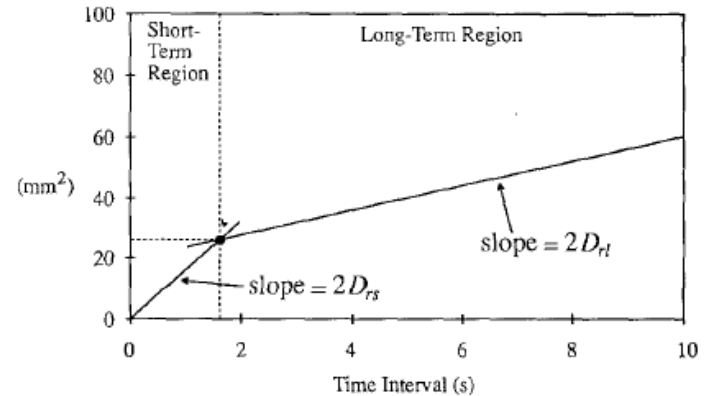
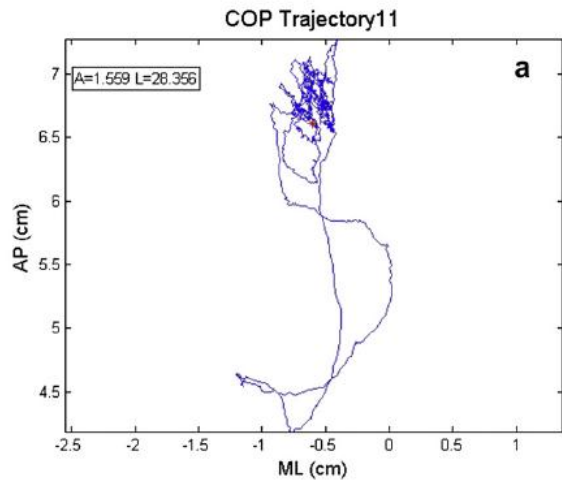


Outcome measures (2)

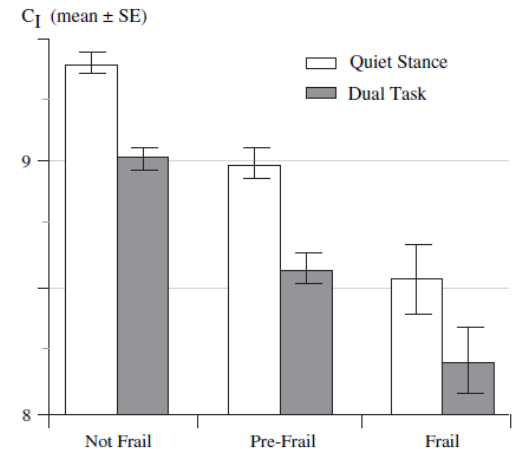
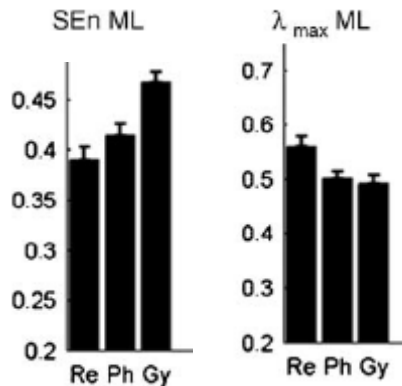
We know that there is a broad variety of sensors available already that could be used for measuring postural control



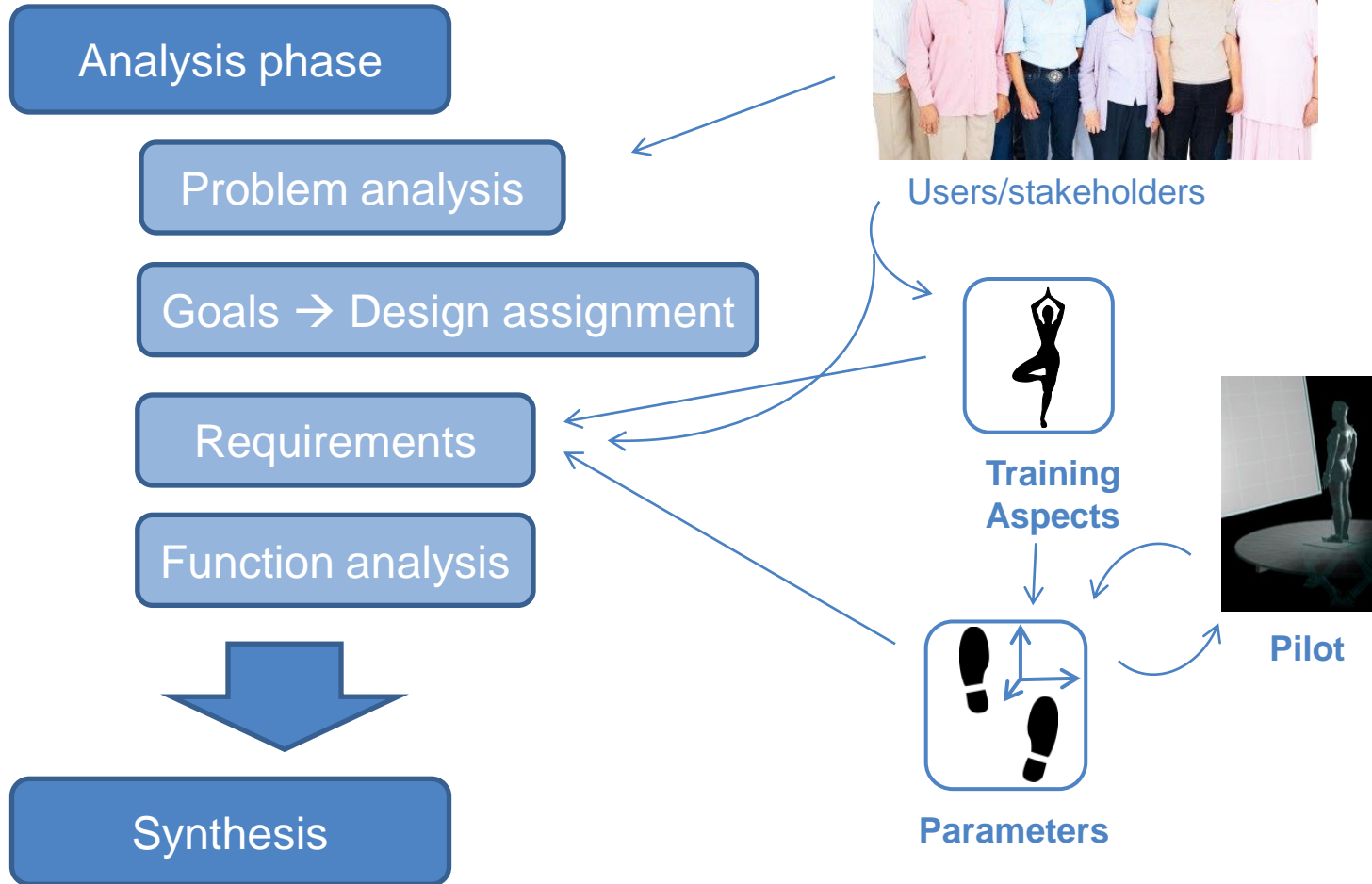
Outcome measures (3)



“At present, there is growing recognition that the intrinsic variability of motor behavior contains important information about both healthy and pathological motor control”
 (Daffertshofer 2004, Lamoth 2010, 2011)



Methodical Design (1)

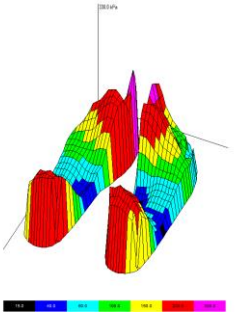
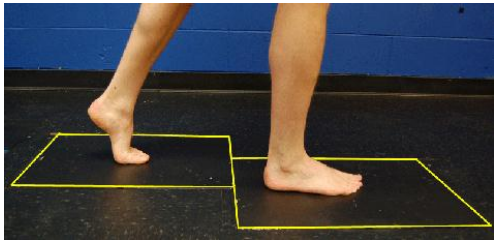
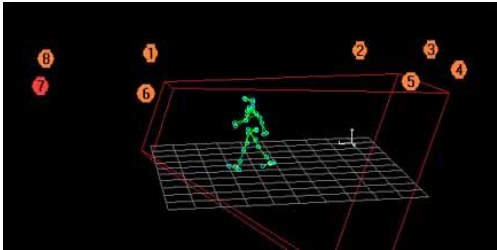


Methodical Design (2)

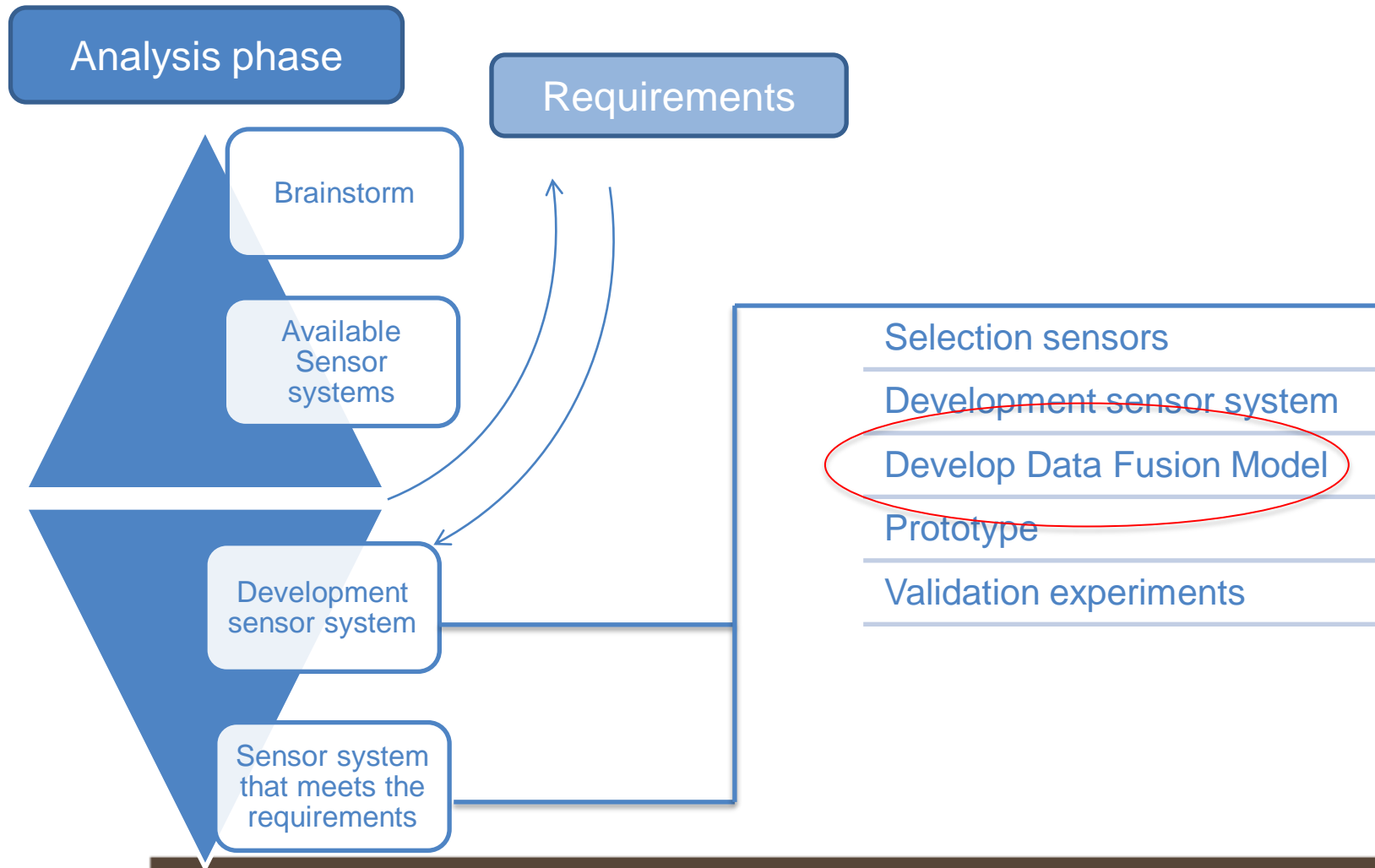
Analysis phase

Brainstorm

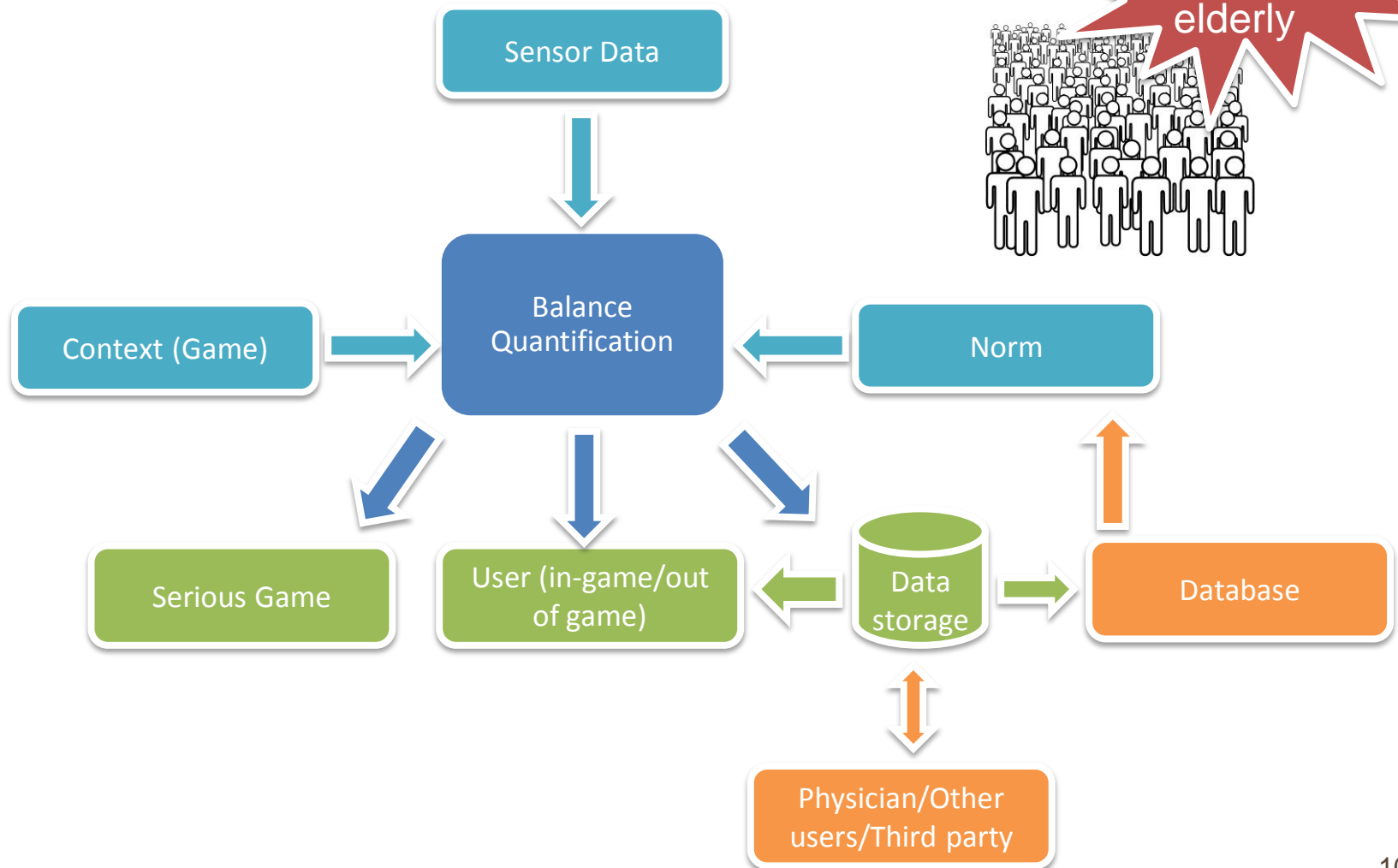
Available Sensor systems



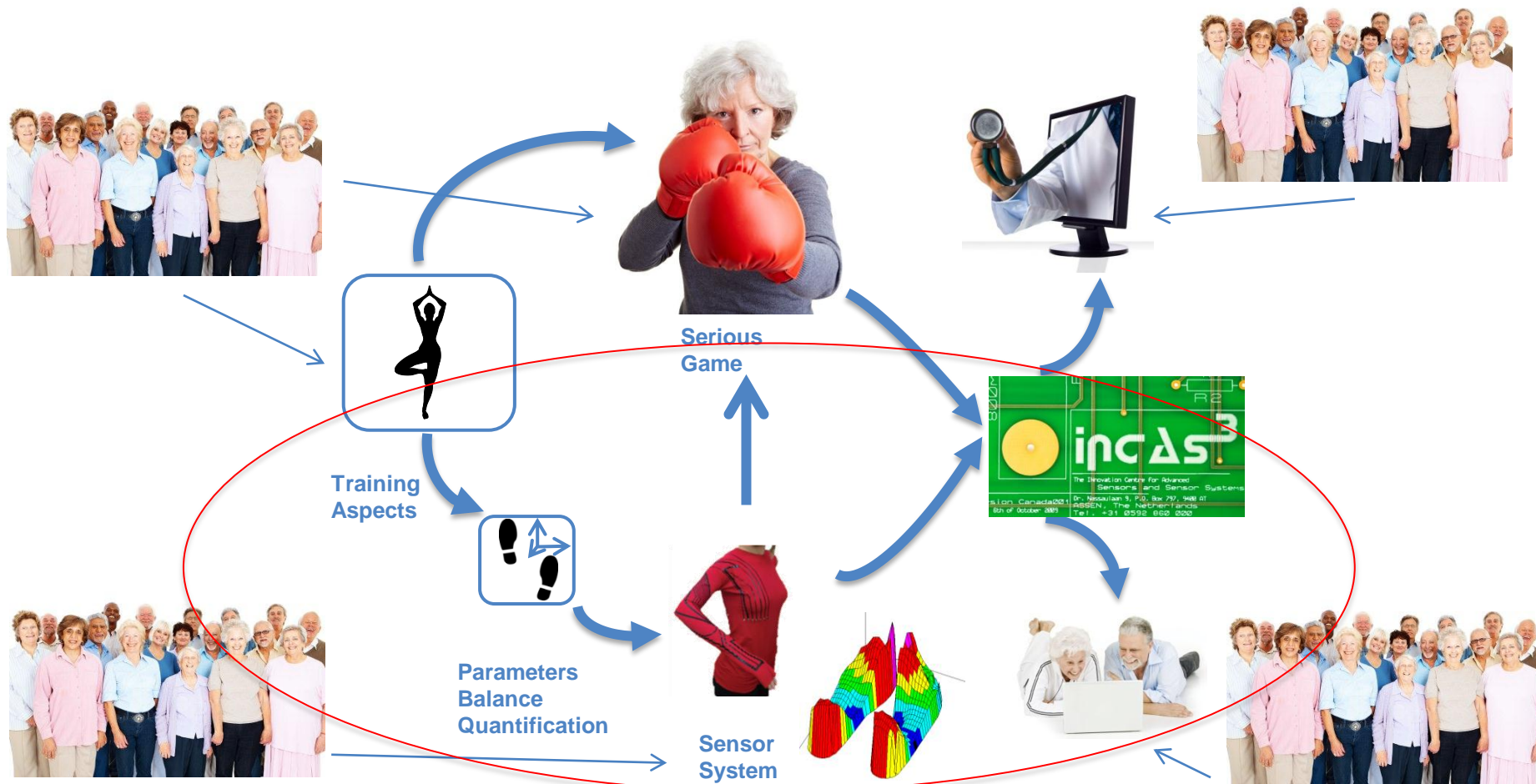
Methodical Design (2)



Sensor System: Data fusion



Summary



Thank you



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Ministerie van Economische Zaken



provincie Drenthe



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