Sensors-based Virtual coaching systems: a university research perspective

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STAVANGER CHAMBER OF COMMERCE

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About Me

1991

2005

Enrollment in the three-year degree in Computer Science

2010

2014

B.Sc. in Computer Science

UNIVERSITÀ di VERONA
Dipartimento di INFORMATICA

2016

M.Sc. in Computer Science and Engineering

ESD Electronic Systems Design

2019

UF UNIVERSITY of FLORIDA

Visiting Scholar
Department of Biomedical Engineering (BME), i-Heal Lab

2020

Ph.D. in Computer Science

UNIVERSITÀ di VERONA
PHD School in NATURAL SCIENCES AND ENGINEERING

2021

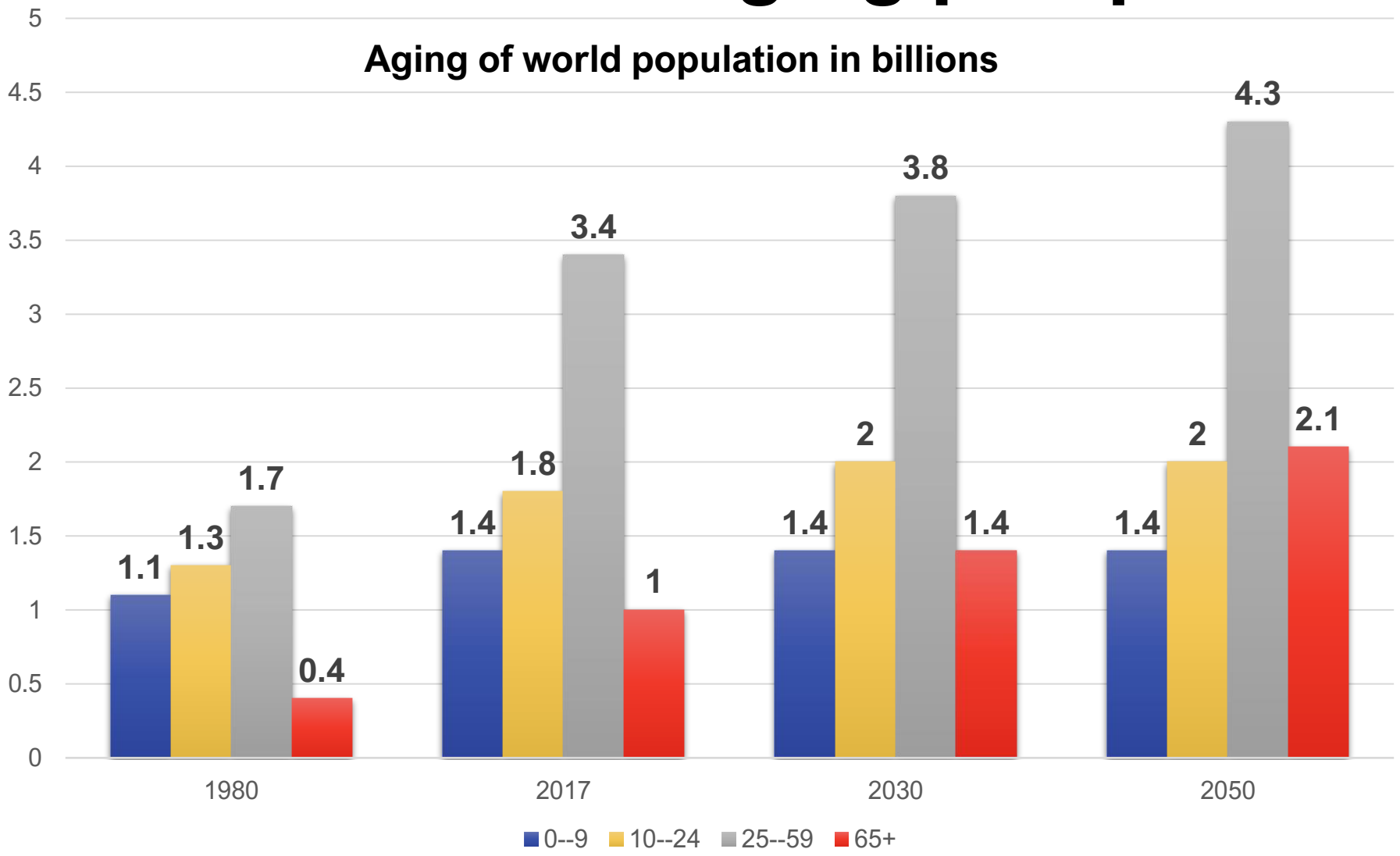
TECHNISCHE UNIVERSITÄT CHEMNITZ

2022

Universitetet i Stavanger

An IoT based Virtual Coaching System (VSC) for Assisting Activities of Daily Life

World aging prospectus



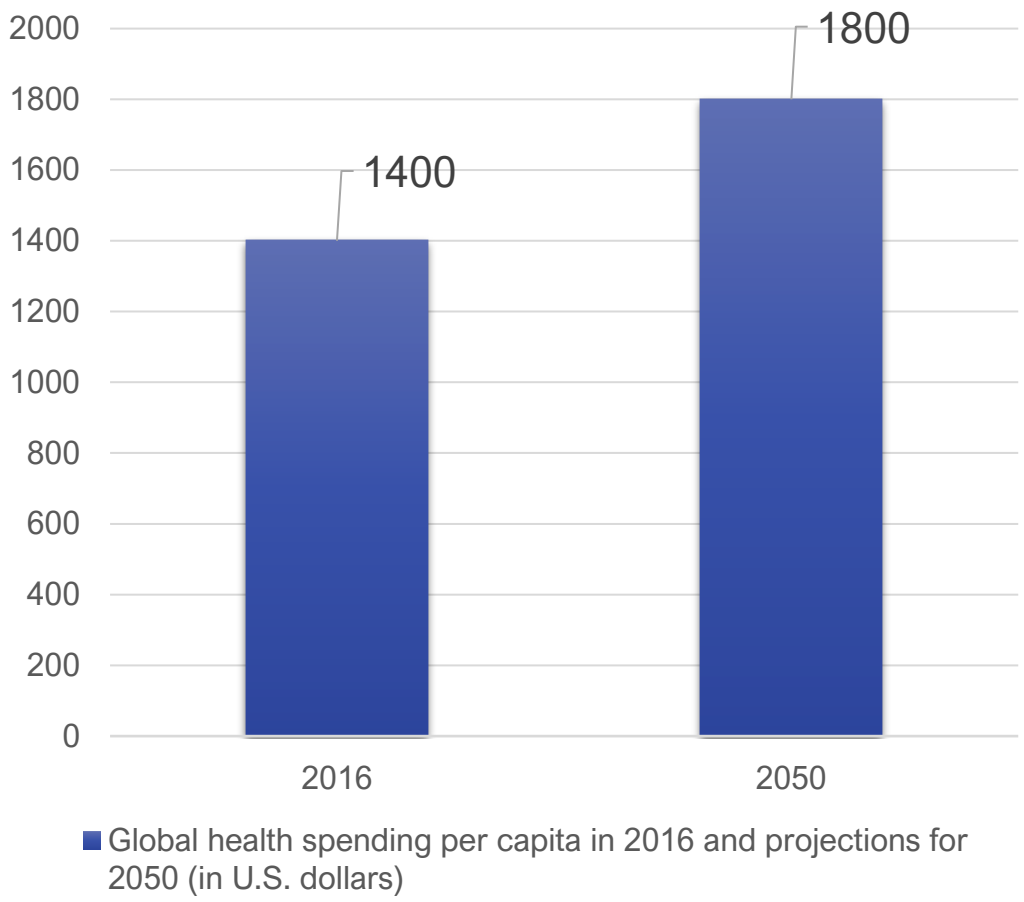
Population over 65 years old

1.Japan - 27 %
2.Italy - 23 %
3.Germany - 21.5 %

[1] United Nations (2017), World Population Prospects: the 2017 Revision

Main implications

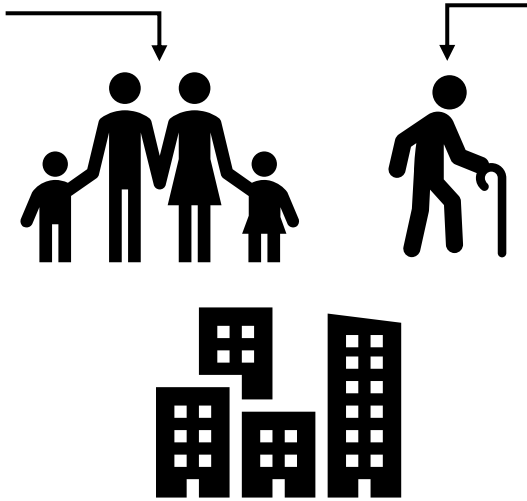
Health-Care System Cost[2]



Social System

Family members of elder people

Elderly needs are going to double in the next 20 years



Dedicated health-care structures

[2] Per person health spending statista.com

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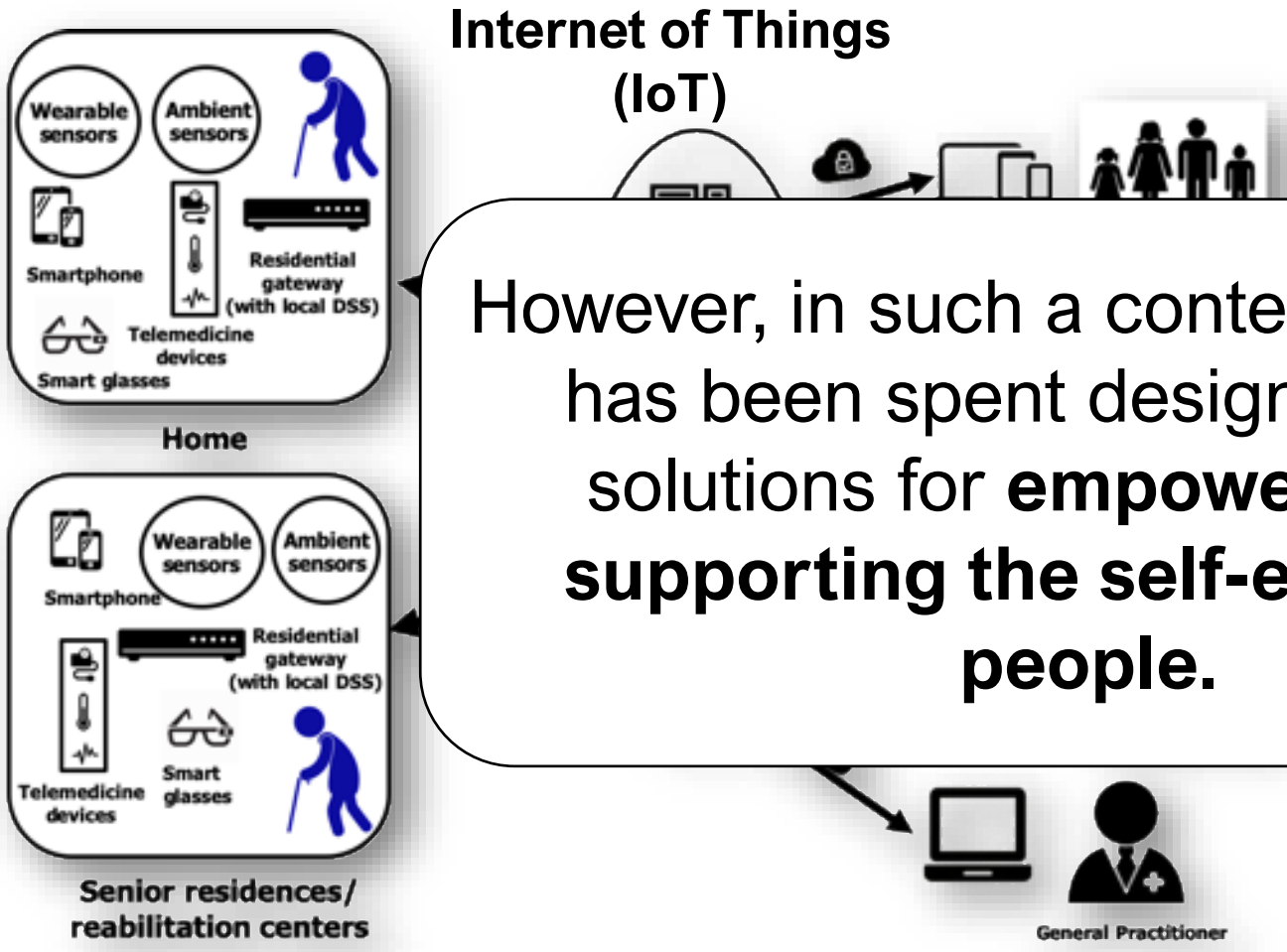
Technological progress can help us!



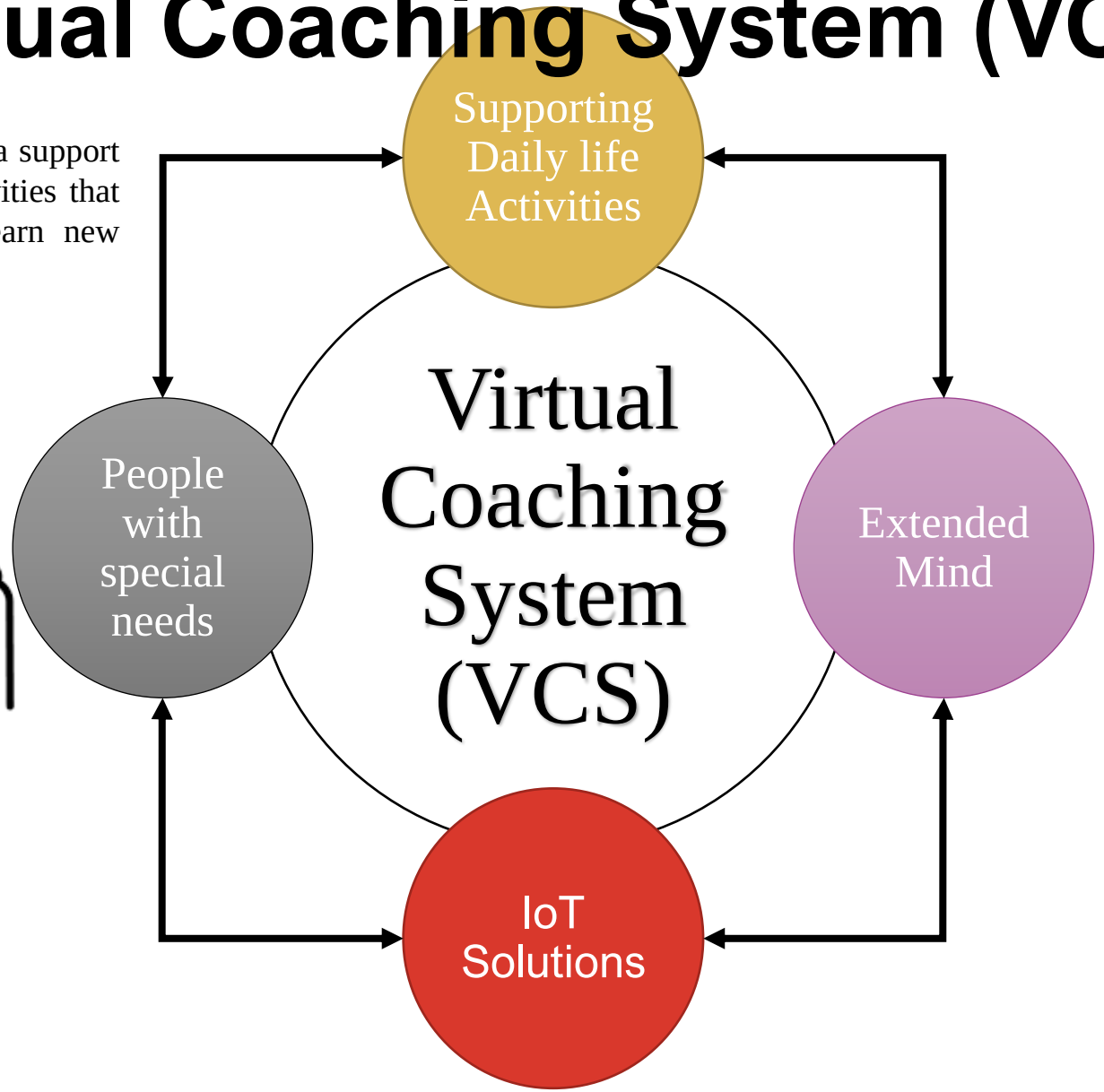
However, in such a context, less effort has been spent designing smart solutions for **empowering and supporting the self-efficacy of people.**

75 billion of connected devices by 2025

AAL is co-financed by the European Commission (through Horizon 2020) and 17 countries until 2020 for an approximate budget of €700 million.

Virtual Coaching System (VCS)

Virtual Coaching System (VCS) is a support system for people in daily life activities that aims to help and make people learn new behaviors and avoid unwanted ones.



The Extended Mind [6] by Andy Clark and David Chalmers (1998) present the idea of *active externalism*, in which objects within the environment function as a part of the mind.

[6] Clark, Andy, and David Chalmers. "The extended mind." *analysis* 58.1 (1998): 7-19.

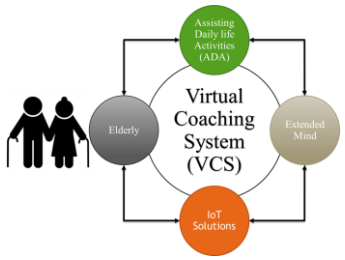
What do we have?/What do we need?

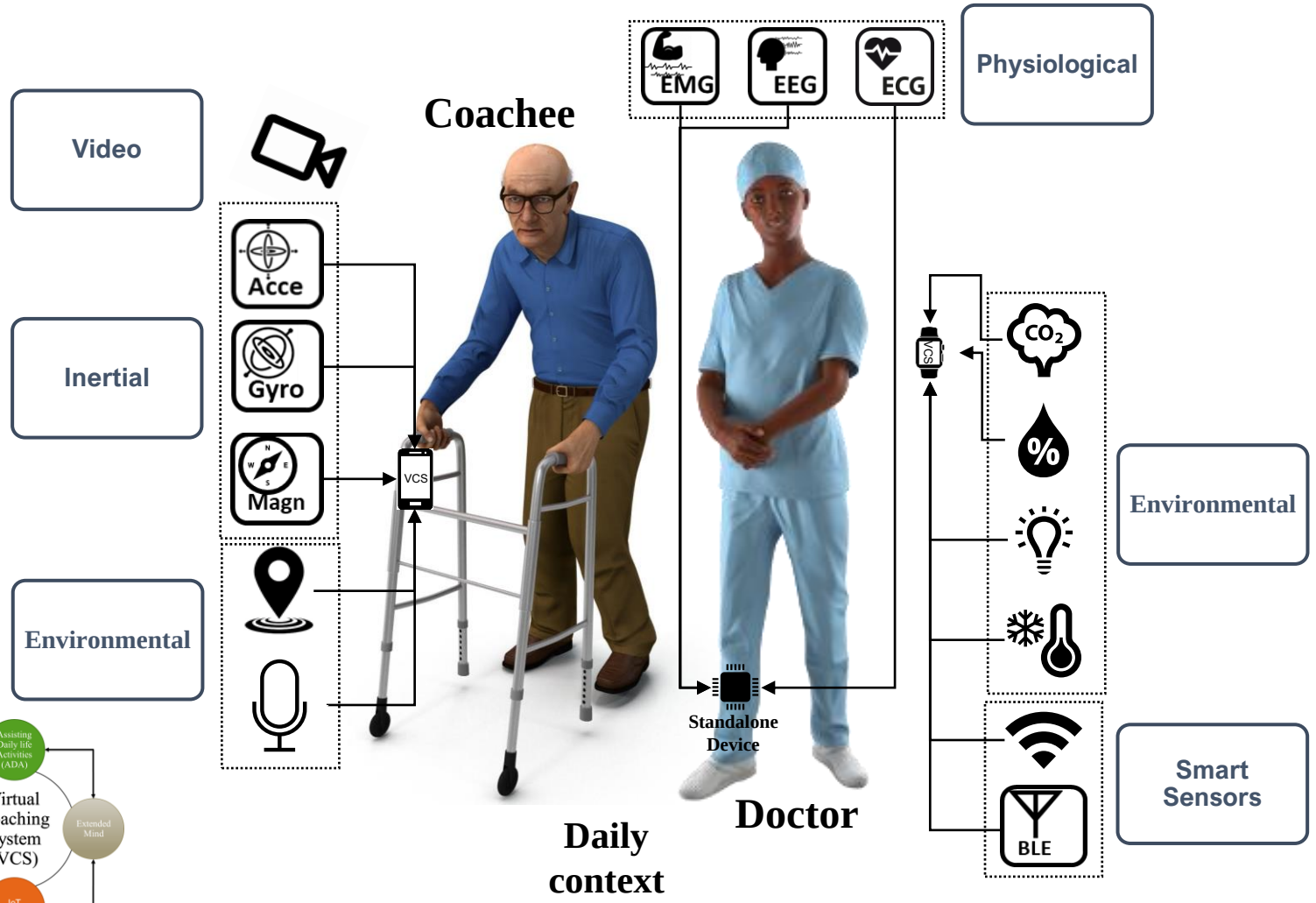
DATA — Identifying the context of the environment and people

Sensors — Perceive the environment and people context

Data analysis
- Artificial Intelligence
- Pattern Recognition
- Data processing

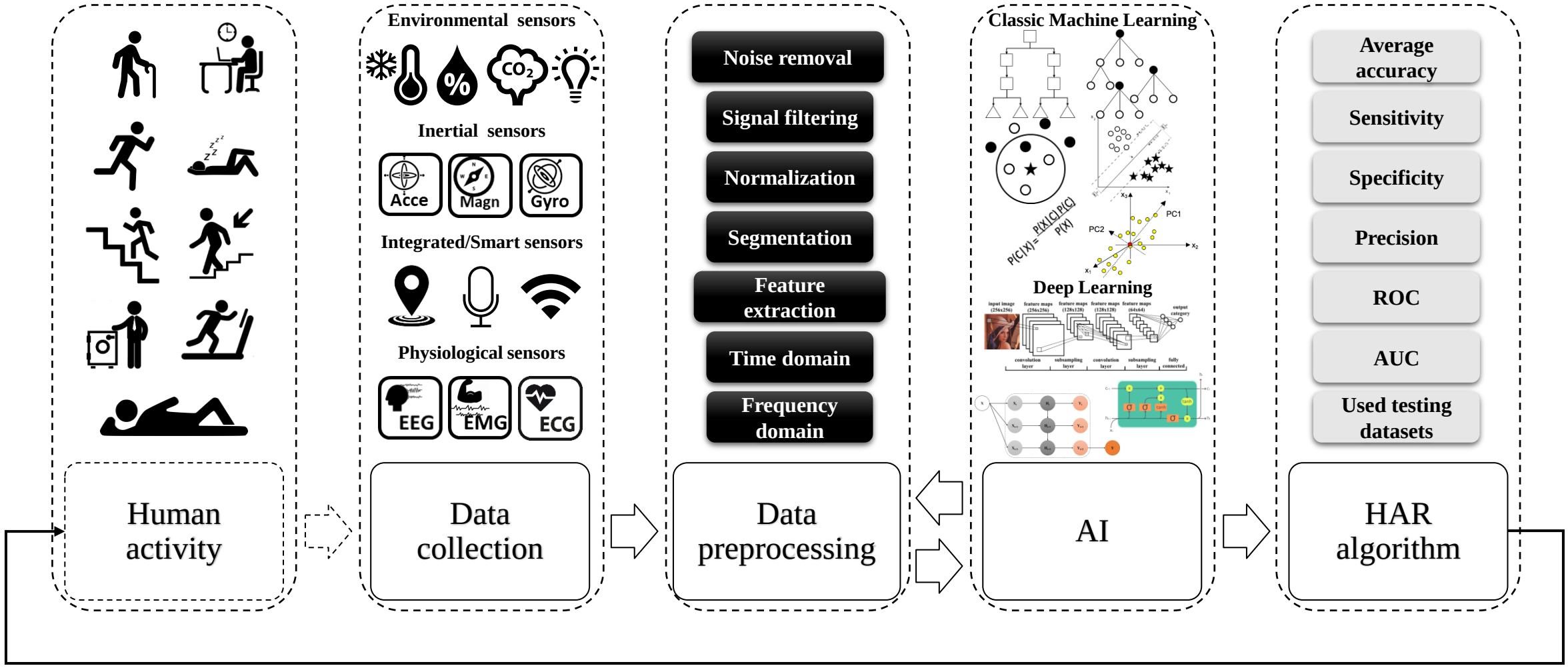
Human Activity Recognition





Human Activity Recognition (HAR)

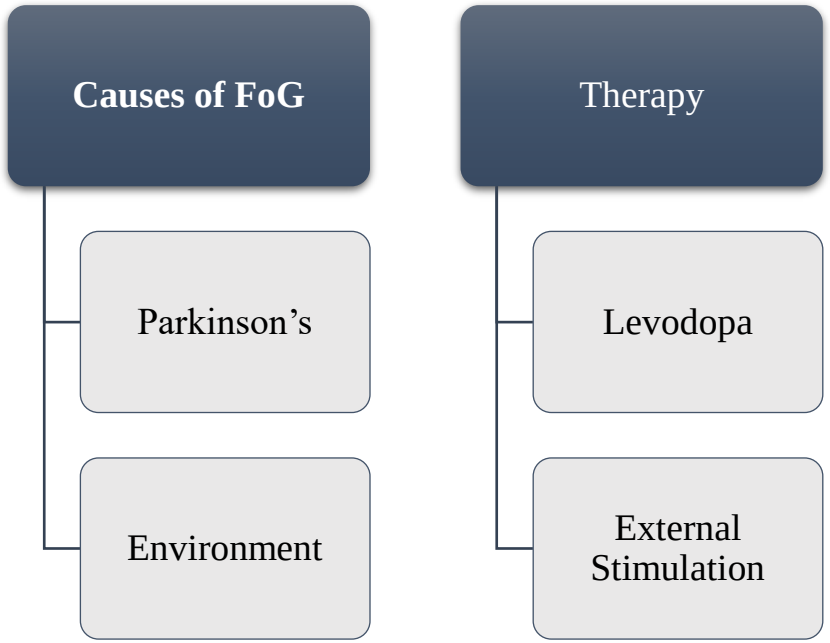
Human Activity Recognition (HAR) aims to recognize human activities in controlled and uncontrolled settings



VCS in Parkinson's disease (1)

Parkinson's Disease is a long-term degenerative disorder of the central nervous system that mainly affects the motor system.

Freezing of Gait (FoG) is a seriously debilitating symptom of Parkinson Disease (PD) defined as a brief episode within which the patient manifests an inability to generate regular movements.



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VCS in Parkinson's disease (2)

Thank you for your attention

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