

Smart Spaces

Chapter 0:

Introduction

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Introduction

- ▶ What?
- ▶ For whom?
- ▶ How?
- ▶ Course overview
- ▶ For reading

Goal:

Gentle introduction to mathematical and concept modeling for topical application problem domains

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What?

Approaches in modern applications

- ▶ Client-Server, Peer-to-Peer
- ▶ Web, Internet services, Semantics
- ▶ Huge data collections (Big Data), Cloud computing
- ▶ Mobile devices, hardware miniaturization, digital convergence (Internet of Things, M2M)
- ▶ Fog and Edge computing
- ▶ Artificial Intelligence
- ▶ ...

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For whom?

- ▶ Educational course in MSc study programs
 - ▶ Applied Math & CS
 - ▶ Information Systems & Technology
- ▶ Students with interest in
 - ▶ Networking & Distributed systems
 - ▶ Computer Science
 - ▶ Information Technology
 - ▶ Software Engineering

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How?

- ▶ Lectures + seminars
 - ▶ 3h per week
 - ▶ Introduction to the Smart Spaces Paradigm
 - ▶ Design of own smart application (project)
- ▶ Grades
 - ▶ Project + Questions
 - ▶ Exam: 3, 4, 5
 - ▶ passed / not passed

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Lectures overview

1. Ubiquitous Computing: Internet of Things, Smart Services, Multi-agent Systems, ...
2. Agent interaction models: Blackboard and Publish/Subscribe
3. Semantic Web and Ontology Engineering
4. Application Design (Project)
Idea. Concept!

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Project overview (Seminar)

Each student starts own project for a Smart application

1. Idea and use case
2. High-level architecture and data flows: agents and application smart space
3. Problem domain and ontology
4. Scenarios: how the architecture and ontology implement the functionality

Presentation and discussion in class

At the end: a set of slides (presentation)

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Online Resources

1. Course web-page

http://cs.petrsu.ru/studies/umk/2024/Mathematics/5_PMI_IS.-Msc_Smart_Spaces_Korzun/

2. Latest resources on "Smart" topics (MSc research)

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Literature & Resources

- ▶ Recent research papers (in English)
- ▶ Кашевник А.М., Корзун Д.Ж., Баландин С.И., Пономарев А.В. Разработка рекомендующих систем на основе интеллектуальных пространств : учеб. пособие для студентов мат. и техн. специальностей вузов. - Петрозаводск: Изд-во ПетрГУ, 2015.
<http://elibrary.karelia.ru/book.shtml?id=22842>
- ▶ Ambient Intelligence Services in IoT Environments: Emerging Research and Opportunities. IGI Global, 2019
<https://www.igi-global.com/book/ambient-intelligence-services-iot-environments/218560>
- ▶ Research seminars of AIC in PetrSU
 - ▶ <https://ai.petrsu.ru/events/robots>
 - ▶ <https://ai.petrsu.ru/events/iot>
 - ▶ Семинар ЦИИ вторник-числитель 15:15 ауд.153
 - ▶ 22503-ИИТ - учебно-ознакомительная практика
 - ▶ 22503-Анда - опционально
 - ▶ [22503-ИИТ-ИИТ](#)

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