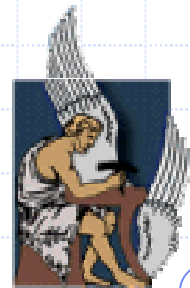


# Agents in biomedical applications

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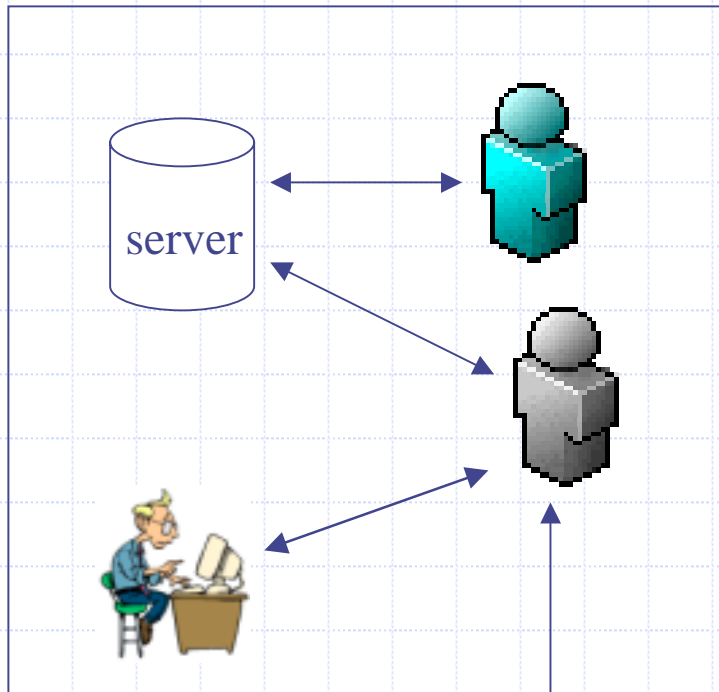
# Overview

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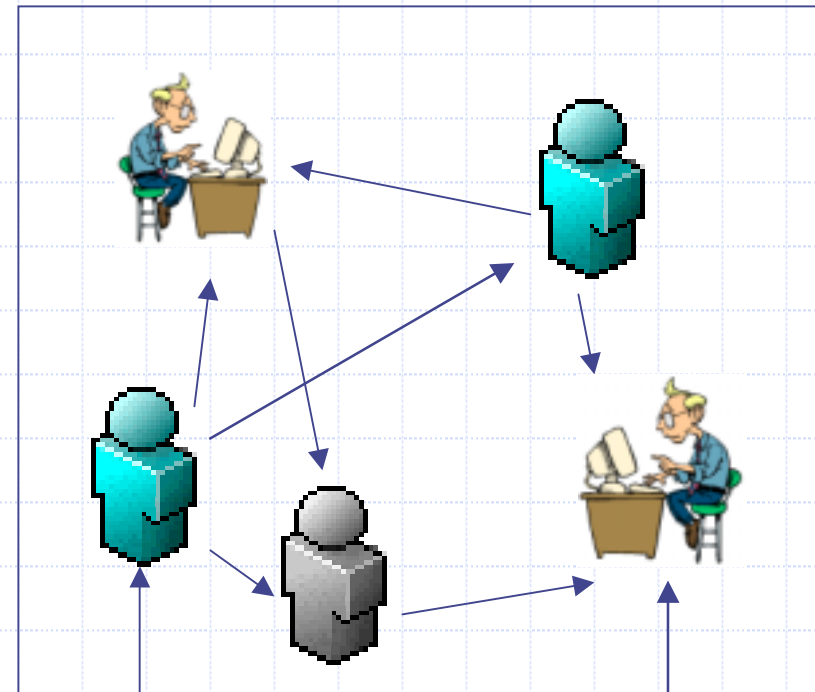
- ◆ System architectures
- ◆ Presentation of 4 different biomedical systems:
  - MeLiSA
  - Medical Image Interpreter
  - GeneWeaver
  - Medical Protocols Monitor (architecture)

# System architectures (1/2)

## Centralised



## Distributed

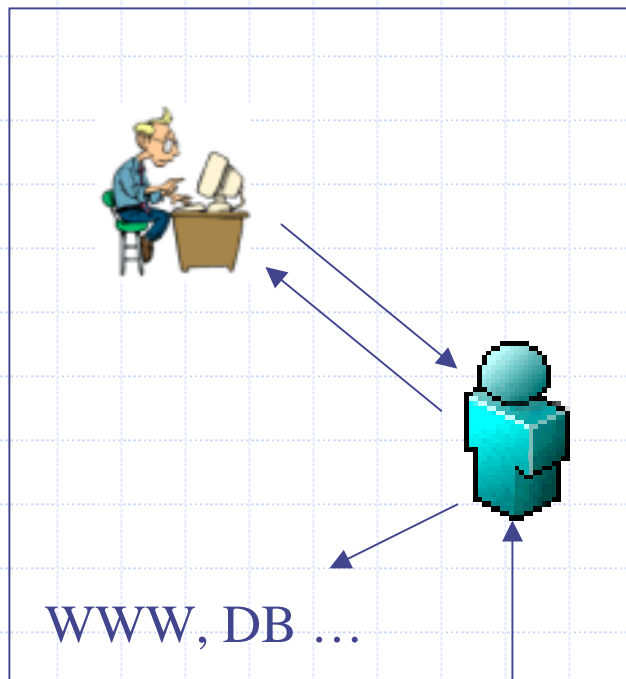


Agents

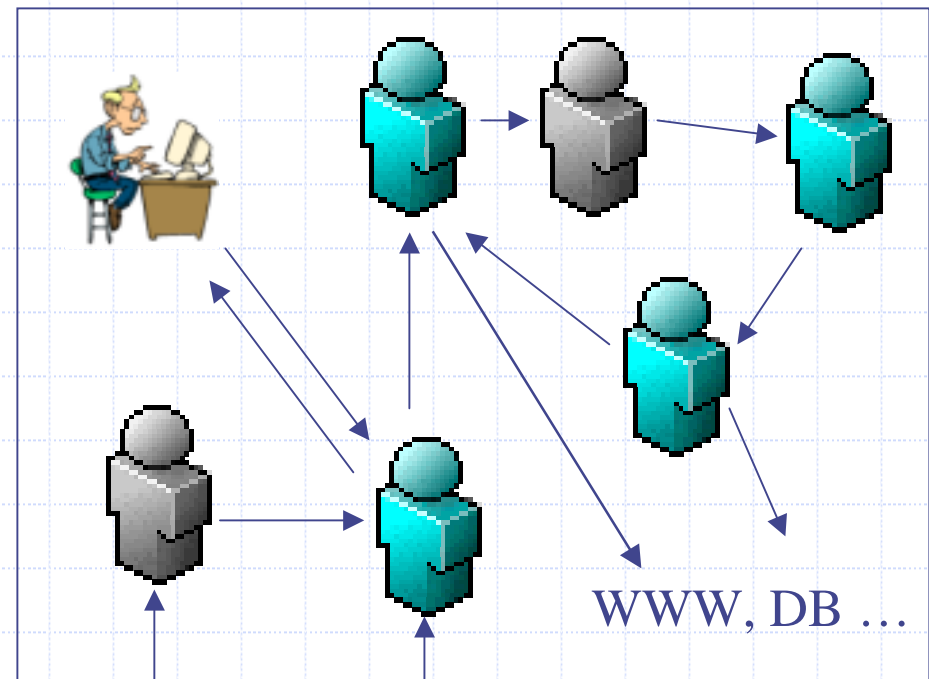
User

# System architectures (2/2)

## Single - Agent



## Multi - Agent



Agents

# MeLiSA (1/2)

- ◆ Medical Literature Search Agent
- ◆ Used for medical literature retrieval by posting queries to medical databases (e.g MedLine) and search engines
- ◆ Single-agent system

# MeLiSA (2/2)

“Levofloxacin treatments of pneumonia. Evidence about this”



Keywords

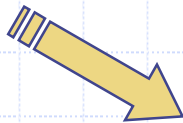
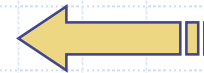
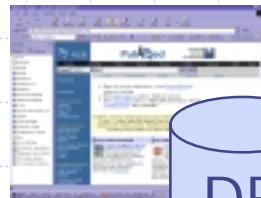
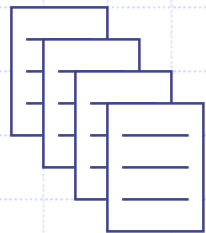
‘Levofloxacin’  
‘pneumonia’

Categories

‘Good evidence quality’  
‘Therapy’  
‘Guidelines’

Constraints

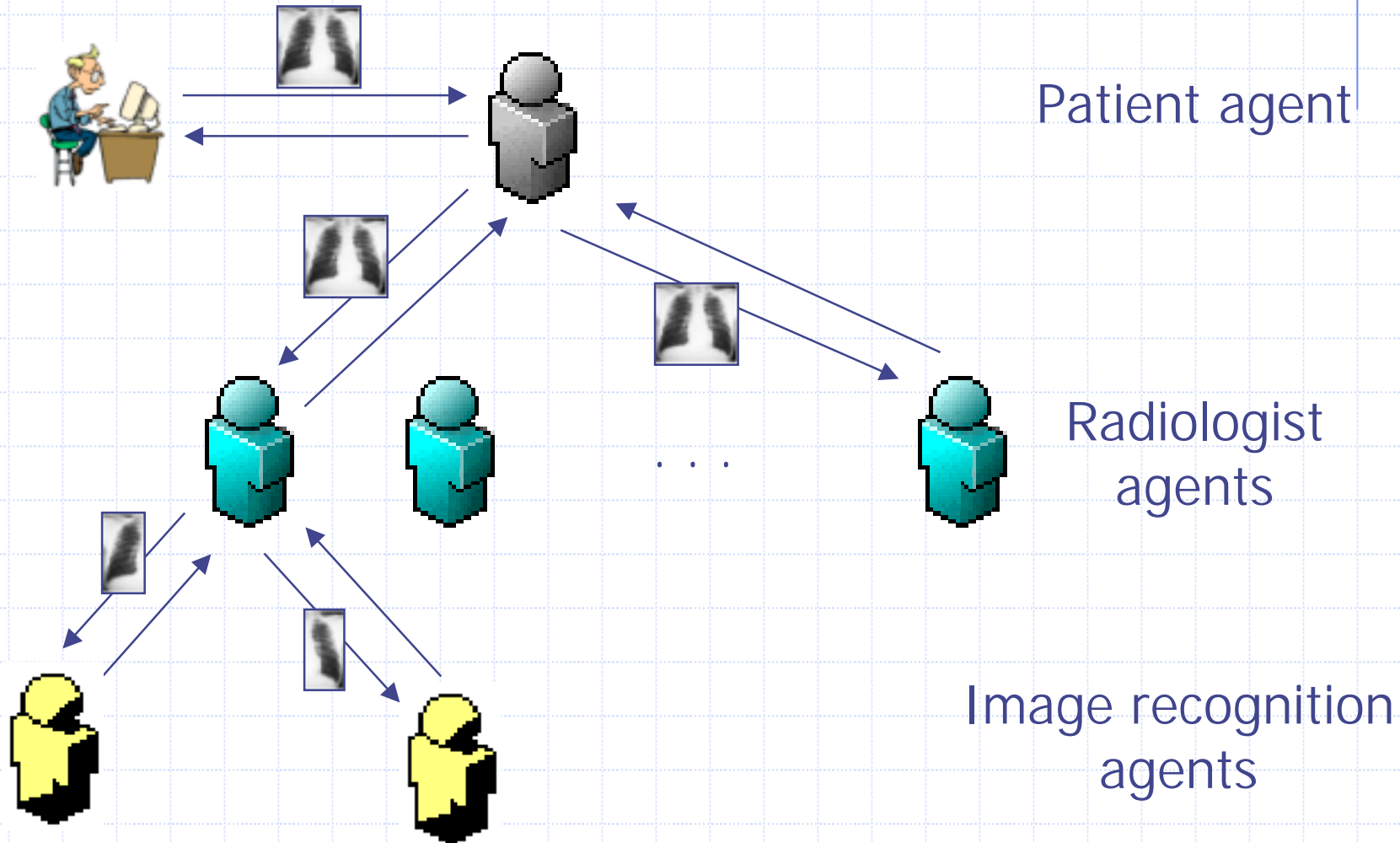
Documents after 1960



# Medical Image Interpreter (1/2)

- ◆ Used for the interpretation of medical images (e.g. x-rays or MRIs) on behalf of the user. It asks and integrates opinions from different radiologist agents.
- ◆ Multi-agent system

# Medical Image Interpreter (2/2)

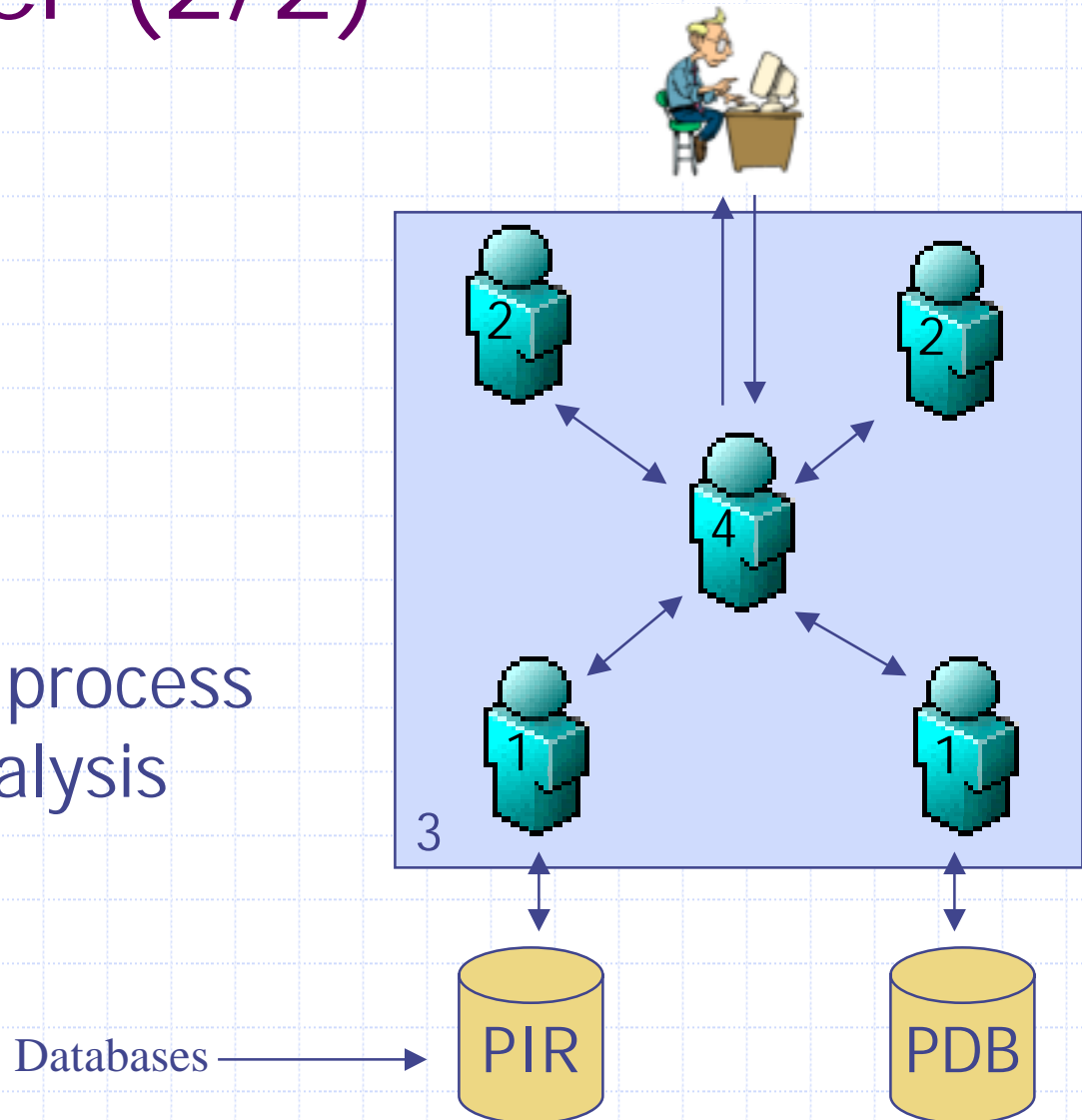


# GeneWeaver (1/2)

- ◆ Used for genome analysis and protein structure prediction
- ◆ Integrates heterogeneous biological databases and incorporates tools for data analysis
- ◆ Multi-agent system

# GeneWeaver (2/2)

- ◆ Agent types:
  1. DB integrator
  2. Calculator
  3. Middle agent
  4. User agents
- ◆ Automate the process of genome analysis

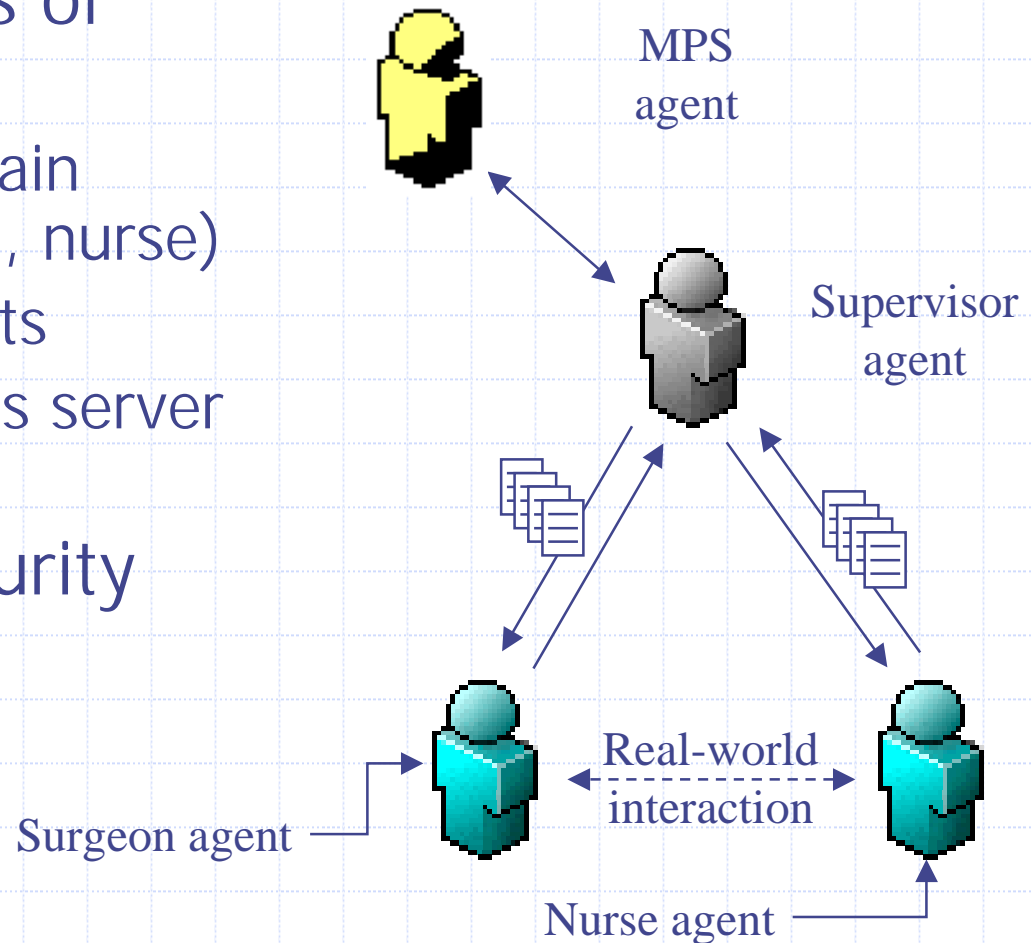


# Medical Protocols Monitor (1/2)

- ◆ Used for modeling of medical services in a hospital environment. Medical protocols are interpreted as negotiation processes between agents.
- ◆ Multi-agent system

# Medical Protocols Monitor (2/2)

- ◆ Uses many types of different agents
  - Specialised domain agents (surgeon, nurse)
  - Supervisor agents
  - Medical protocols server agents
- ◆ Aims also at security and privacy of communications



# Conclusions

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- ◆ Only a few out of many agent systems available were presented
- ◆ Agent technology is a rapidly developing research area. More and impressing systems are to be expected
- ◆ Medicine and biology applications are included in the list!

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*Thank you*