Personalized Explainable Artificial Intelligence for decentralized agents with heterogeneous knowledge
Challenges

Data Integration
Interpretation
Negotiation/Coordination
Personalization
Neuro-symbolic integration

No XAI

XPECTATION

Personalized Explainable Artificial Intelligence for Decentralized Agents with Heterogeneous Knowledge
Personalized Explainable Artificial Intelligence for decentralized agents with heterogeneous knowledge.
Theoretical outcomes
Mechanisms to extract, combine, explain and negotiate heterogeneous symbolic knowledge

Technological outcomes
Explainable-by-design systems can boost trust and transparency (imperative in many domains)
Widening the adoption of AI-based systems in the real-world

Impact
Theoretical outcomes
Mechanisms to extract, combine, explain and negotiate heterogeneous symbolic knowledge

Technological outcomes
Explainable-by-design systems can boost trust and transparency (imperative in many domains) Widening the adoption of AI-based systems in the real-world

Application domain
Explain recommendation in eHealth and wellbeing application is strategical to boost Acceptance and understanding, henceforth therapy adherence

Ethical aspects
Enabling algorithmic assessment in terms of fairness and transparency, given the sensitive nature of the input data and the possible effects of the outcomes
Personalized Explainable Artificial Intelligence for decentralized agents with heterogeneous knowledge.

- Frontend - MAS (user ag)
- Backend - MAS (doctor ag)
- Databases
- Communication Server

Gateway Agent
- Convert & forward
- Web interface
- Behaviors
- Therapy model

Patient Agent(s)
- Patient profile
- Patient settings
- Behaviors

Doctor Agent
- Databases

- Telegram flow
- Users/Doctors flow
- Erebots flow

- 2 papers
- 1 framework
· Single agent perspective
  • symbolic + sub-symbolic processing capabilities

· Need to move knowledge from/into the (sub)symbolic realm
  • 2 key mechanisms
    • symbolic knowledge extraction
    • symbolic knowledge injection

· Interoperability with semantic web technologies and linked data
• Symbolic knowledge extraction/injection: approaches selection
  • surveyed ~90 methods for SKE and ~70 methods SKI
  • generalization of a coherent framework
• Intra-agent XAI library implementation
  • PSyKE (software library for SKE): 2 papers, 1 library, 6 SKE algorithms
  • PSyKI (software library for SKE): 1 paper, 1 library, 2 SKI algorithms
• Semantic representation (HES-SO)
  • designing an extension of Psyke Semantic Web Technologies
    • 1 paper + 1 software tool [ongoing]
We designed an interaction protocol for human-agent negotiation in which:

**The agent can**
- elicit user **constraints** and **preferences** via a pre-structured interaction,
- build up a user profile,
- generate **personalized** food recipe **recommendations**, generate **explanation for the given recommendations**, update the user modeling based on the given feedback.

**The human users can**
- specify their **constraints** and **preferences** in a structured way,
- **evaluate** given recommendations and specify whether they **accept** or **reject**, give **feedback** on recommendations and “criticize” explanations, implicitly update the **system behavior** via these **counter-explanations**.

I recommend you **Grilled Salmon with the avocado salad**. It has ...... **ingredients** prepared with the **instructions** ...... Because it is healthy and avocados will help you lose weight.

- 1 paper,
- 1 survey (~60 studies) [OG],
- 2 software libraries,
Exploitation and Dissemination

OpenAccess scientific papers

Working prototype

Networking Events

Dissemination

http://expectation.ehealth.hevs.ch/

https://extraamas.ehealth.hevs.ch/archive  4 May 2021
https://extraamas.ehealth.hevs.ch  9-10 May 2022
Other XAI-CHIST-ERA-related events  Xxx May 2022
Personalized, transparent, and ethical eHealth & wellbeing applications

New Theories for XAI, ML, and MAS

XAI-by-design for (sub)symbolic AI

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