A Musical Robot for People with Dementia

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Technology and music are now playing a major role in People with Dementia's therapies. AI can be leveraged to improve therapies and support PwDs in contexts where Professional Caregivers or informal caregivers need help.

This research focuses on creating a Musical Robot for People with Dementia. In practice, this work aims to personalize therapeutic interventions while exploring the role of Human-Robot Interactions in cognition and mood improvements.

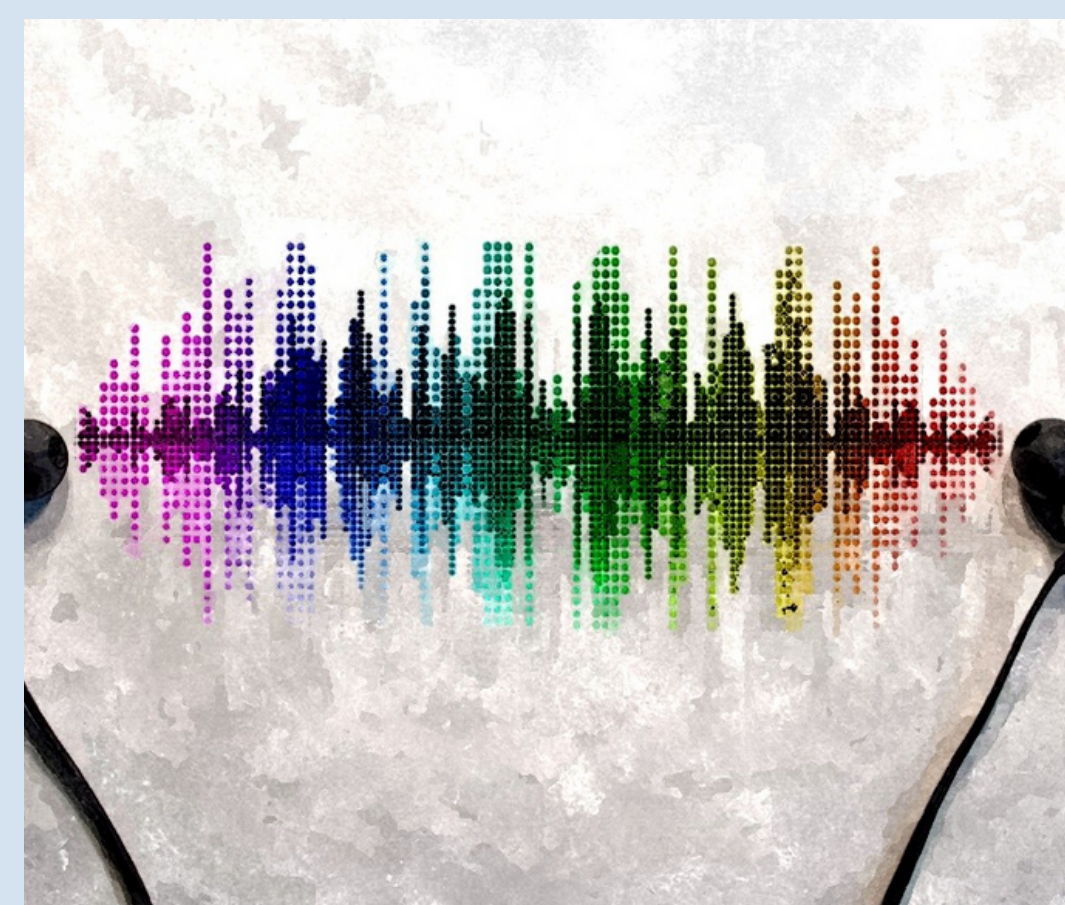We also look at how music and episodic memories can be linked in these kinds of therapy.

This research is part of the QoLEAD project which aims at bridging the gap between care and AI for People with Dementia.

How to foster meaningful activities for People with Dementia?

- RQ1: How to create links between episodic memories and songs to leverage a music recommendation system that can support emotion regulation strategies?

- RQ2: Is a personalized music elicitation of an episodic memory based on planned activities capable of effectively change PwDs mood during robotic-assisted activities?

- RQ3: Can a personalized musical storytelling robot reduce Cognitive communication disorders (CCDs) between PwD and their informal caregivers?

- RQ4: Is musical co-creation able to reduce agitation for nursing home residents?
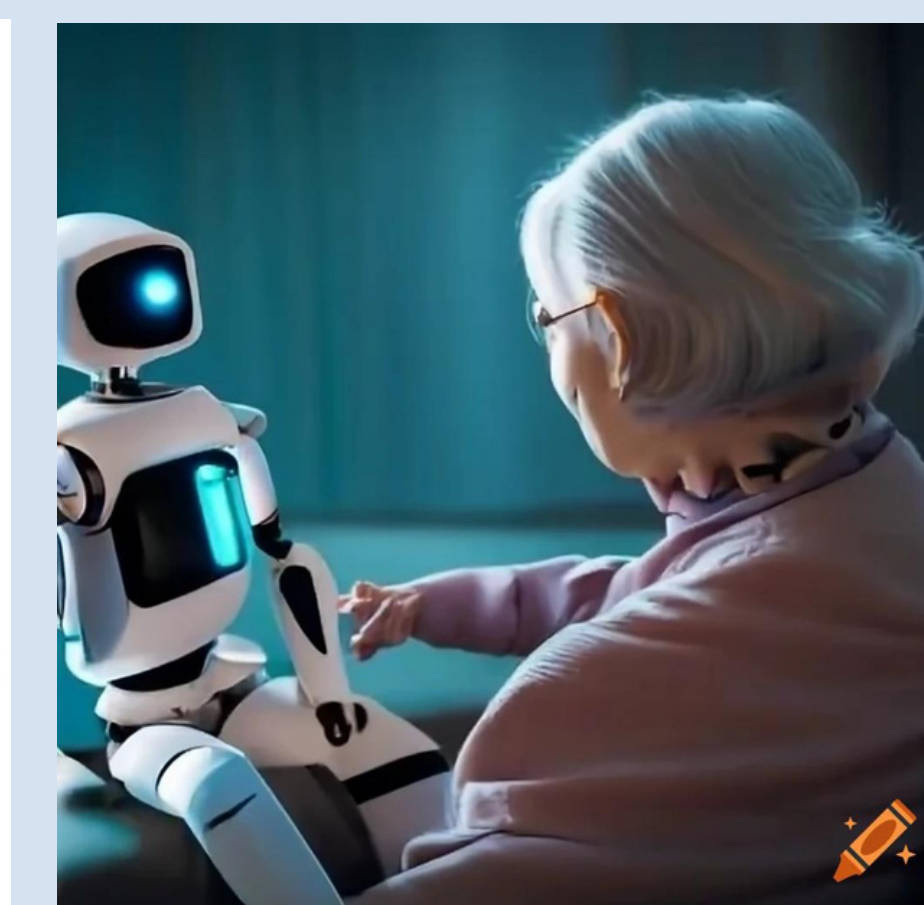
Creation Steps

Music Recommender System Based on Episodic Memories

Schedule Based Robotic Interactions

Autobiographical Storytelling Generation
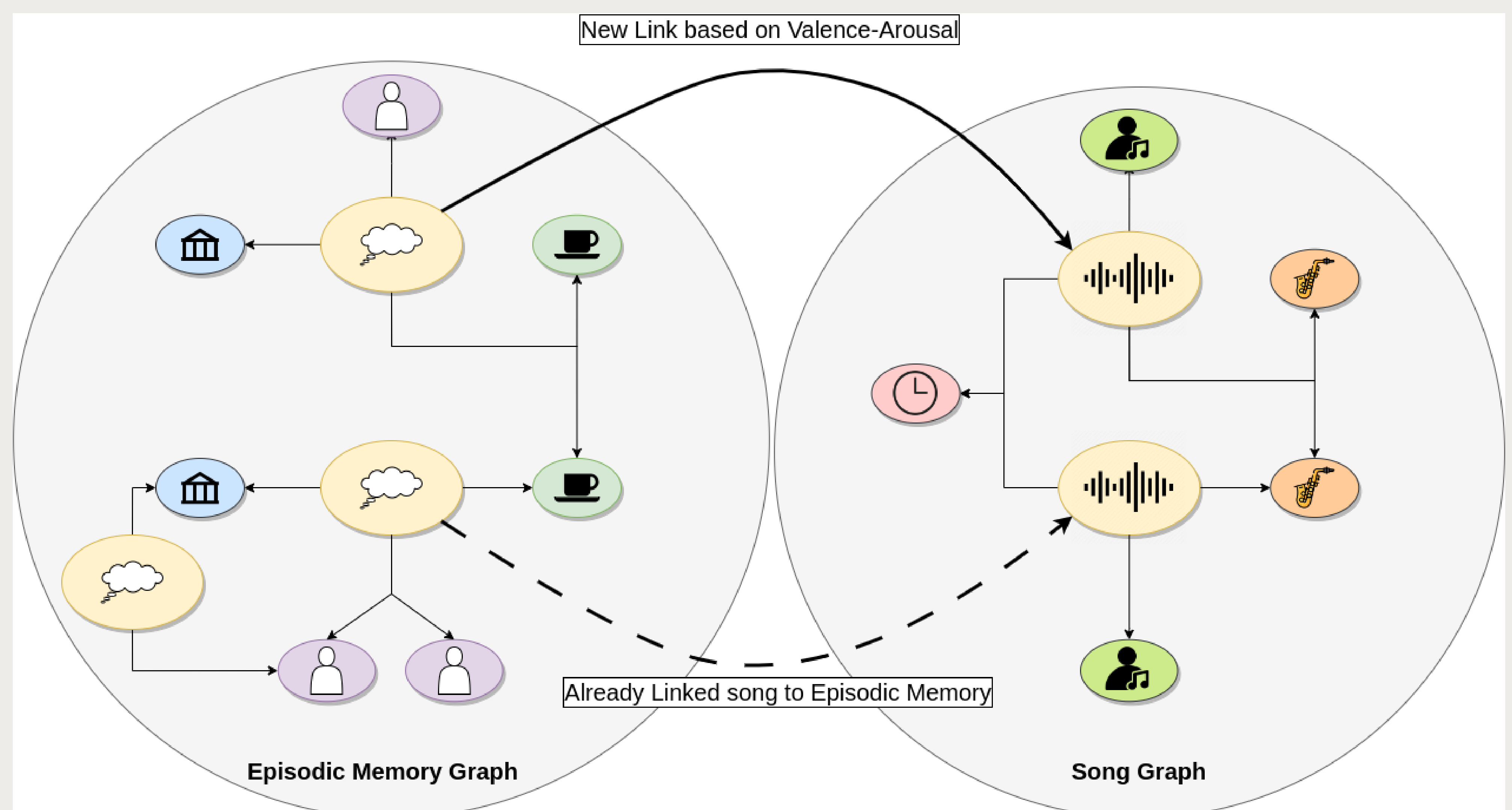
Group Musical Creations in Nursing Homes

New Computer Science Systems to support Daily Tasks and Warm Care

Towards the creation of Meaningful Activities for People with Dementia, Care Partners and Professional Caregivers

Linking Episodic Memories To Songs

- 30% of popular songs in the memory bump are generally linked with an episodic memory

- Memory bumps for involving episodic memories in songs for PwD

- Music recommender system from songs to episodic memory, and mood implications

- Co design study mapping episodic memories to vibrotactile patterns

New Link based on Valence-Arousal

Already Linked song to Episodic Memory

Episodic Memory Graph

Song Graph

- Hypergraph Structure

- Look into chatbot and robot's memory, figure out what is relevant

- Link through embeddings in random walks, or distances calculation

Linking Music, Episodic Memories and Robotics could support
People with Dementia's mood and reduce agitation

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