**Motivation**

- The risk of cognitive-decline in an individual increases with age due to decreased mental and physical activity.
- Engaging in cognitively stimulating activities such as solving puzzles may reduce the risk of cognitive deterioration. Furthermore, coping with the decreased social activity with the inclusion of robot companions may lead to positive long-term benefits.
- In this position paper, a pedagogical approach is proposed towards teaching the user to solve the 2048 Puzzle Game.
- A companion robot shall actively monitor the emotional state of the user and use it, along with the performance of the user in the task, to adapt its strategy towards modelling an interaction with the user.

**Approach**

- **Multi-sensory Emotion Appraisal**
  - Emotional Appraisal
  - Affective Appraisal
  - User Response
  - Nao interacting with the user
  - Nao Robot

- **RL-Based Dialogue Management**

- **2048 Puzzle Game Solver**

**Interaction Scenario**

- Affective Appraisal
- Emotional State of the User
- Performance in the task

- NAO offering Assistance

**Proposed Model**

- User performance in the game
- Dialogue
- Next Move
- Global Context
- User Response
- Game Rules

- Deep Q-learning model
- Current 2048 grid map

**Conclusion**

- An emotion-based dialogue management model is envisaged that uses reinforcement learning techniques to learn optimal dialogue states based on the emotional state of the user.
- The model uses a multi-model emotion appraisal system to infer the emotional state of the user, based on visual, auditory and linguistic information. This affective understanding is then used to assist the users towards solving the 2048 Puzzle Game.
- The model learns when to give advice to the users, enriching their experience playing the game and at the same time assist in improving their cognitive abilities.

**References**


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