

Project Rainy Day

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1 Requirements

We are working with an elementary school to develop an educational game that allows students to interact with educational content projected by a projector onto the floor. Three dimensional sensors provided by a Kinect sensor allow movement to be translated into gameplay. The objective of this game is to facilitate learning through gameplay.

1.1 Functional Requirements

1. The system must allow the loading of educational content, in this case with the use of .csv files with key/value pairs.
2. The system must include game play execution.
3. The system must allow the setting of game parameters through a GUI.
4. The system must connect with the Kinect hardware.
5. The system must translate user movement into controls for game play.
6. The system must update player scores as gameplay progresses.
7. The system must update the graphical user interface to reflect game play.
8. The system must save game state to allow for replaying and recovering from system failure.

1.2 Non-Functional Requirements

1. System reaction time after player movement must be $\leq 1s$
2. System should store up to 10,000 student ids but allow only maximally four players to play at one time.
3. System should be playable with one kinect and one projector.
4. System should be playable with a minimum of 16 game cards (4x4 grid)

1.3 Access Permission

- Systemadmin: system maintenance has full access
- Teacher: Gameadmin has access to GUI can Read/Write
- Active player (Student): Can write
- Passive player (Student): no access cant write/read

1.4 Glossary

1. Memory : a game in which a grid of blank boxes is displayed. Players select two cards in consecutive order a card, which 'flips' the card to reveal the 'content side'. If the two 'content sides' match, the player receives a point. The player with the most matches wins. If the two 'content sides' do not match, the two revealed cards flip back to the 'blank side', and the next players flip two cards.
2. Content side : The side of a 'card' which contains information fed from teacher input data, which must be matched with another 'content side' during gameplay.
3. Player : a student who is involved in active game play.
4. Teams : two players that act as a single unit, collaborating on an x, y axis to select a single 'card' to be flipped.

5. Game administrator : in this case, the teacher who is responsible for selecting game parameters such as time limits and number players/teams.
6. Kinect : sensor from microsoft with depth sensors and rgb camera which is used as a game controller to register player movement/selections
7. Depth sensors : allows to register three dimensional movement. Rather than rgb values at each pixel, a millimeter depth value is returned at each pixel value.
8. Game content : a csv table allowing for input of education content by teachers at the school. Each row represents a pair of memory cards which must be matched during game play.

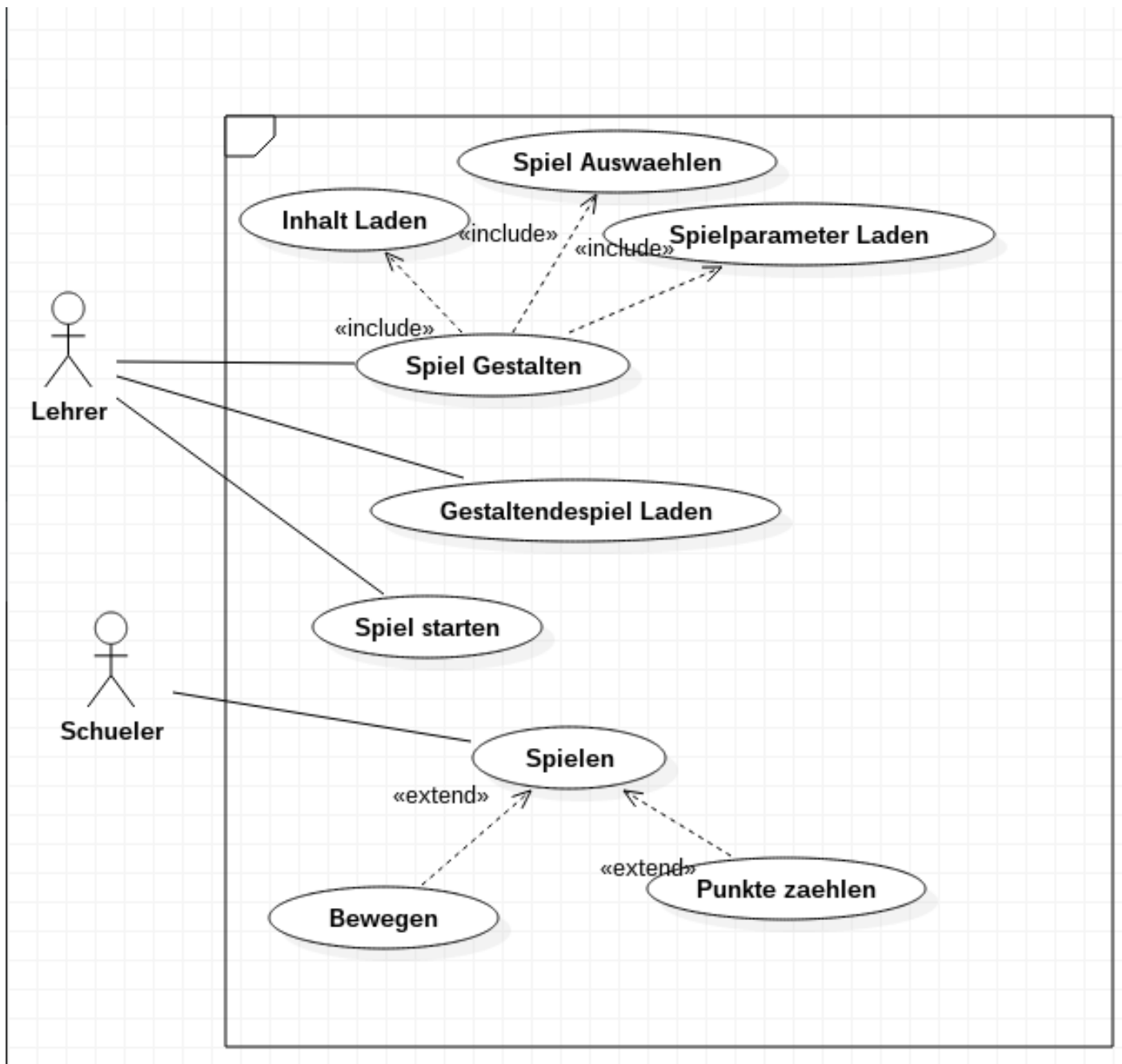


Figure 1: Use Case Diagram

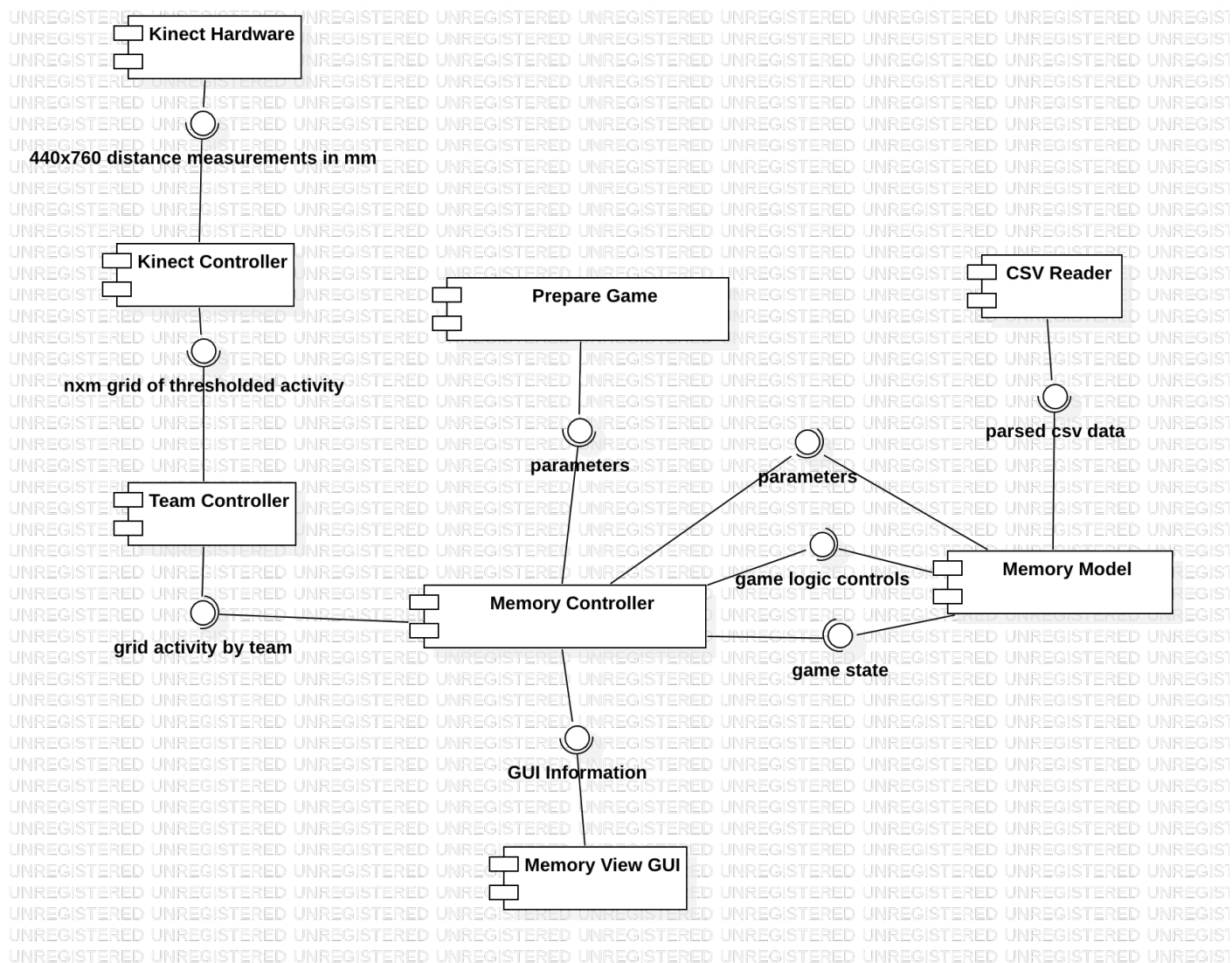


Figure 2: Component Diagram