PINS: A Prototype Model Towards the Definition of Surface Games
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1. Surface Games
2. PINS

1. Surface Games
- a field within tangible gaming
- extend traditional board game by being played on interactive tangible surfaces

Board Games vs. Computer Games vs. Pervasive Games
- Board Games - use simple symbolic pieces (e.g. Go, Oware)
  - use iconic pieces (e.g. Chess)
- Computer Games - use mouse & keyboards
- Pervasive Games - use tangible interfaces (e.g. Audiopad, Pico, TVeviews)

Tangible Gaming
- Combine multi-touch and object-recognition
- E.g. Entertaible - LCD-based multitouch-tangible platform for digital board games
- E.g. Reactable - collaborative electronic music game using computer vision technology
1. Surface Games

-a class of computer games played with tangible playing pieces on an interactive surface

Surface as referee & fluid interaction

- Interactive surface acting as referee
- Reactive game play surface
- Increase flow and fluid interaction

Relative environments

- Use open playing areas (dynamic characteristics)
- Proximity and orientation
- Physical object acts as relative indicators of the entire game states

Physicality & game balance

- Simultaneous physical game dynamics
- Multi-handed interaction
- Manipulation and balance of playing pieces beyond traditional board games

Tangible playware & surfaces

- Bridge real-world interaction with computer games
- Compose of tangible playing pieces and interactive surface
- E.g. Emancipated Pixels - wall surface tracking and mediating the game
2. PINS

- Use the sets of symbolic tokens (bound to iconic digital representation)
- Use the reacTIVision framework for the creation of an interactive surface

- Designed for a multitouch-tangible surface
- Iconic nature of a piece is determined in real-time
- State of playing pieces can change throughout the game

**Interaction & representation**

- **Symbolic Tokens (Physical representation)**
  - PINS의 play piece는 아크릴 재질의 fiducial marker방식

- **Game Piece Types (Digital representation)**
  - Circle: physical token 주변에 원모양 생성, token을 돌리면 반지름이 커지거나 작아짐
  - Line: physical token에서 하나의 선모양 생성, token을 돌리면 선의 방향이 바뀌어짐
  - 선의 길이는 테이블 끝까지 또는 상대방편의 token과 intersect한 지점까지

- **Defining Game Pieces (by touch interaction)**
  - Game surface에 처음 token을 놓으면, circle/line인지와 어떤 player에 속하는지를 지정해야 함
  - Player의 소속 지정: 두 손으로 token을 타치한 후에 player쪽으로 드레그하는 모션을 취하면 됨
  - Circle 지정: token을 타치한 후에 원모양의 모션
  - Line 지정: token을 타치한 후에 한 손으로 드래그하는 모션을 취하면 line으로 됨
2. PINS

Gameplay: 플레이어는 상대방의 play piece를 더 이상 움직이지 못하게 pin(즉 trap)하는 것

<table>
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<tr>
<th>Game Piece States</th>
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<td>Active state</td>
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| - 활성화된 상태 (아직 상대방 편에 의해 inactive 되지 않은 살아있는 상태)
|                   |
| Held state        |
| - 원 안에 들어오게 되면 held 상태로 더 이상 token을 translate 또는 rotate 할 수 없음
|                   |
| Inactive state    |
| - 상대편 선과 intersect되면 inactive 상태로 되며 움직이거나 상대편에 영향을 줄 수 없음
|                   |
| Terminated state  |
| - inactive 상태에서 상대편의 다른 선과 함께 intersect되면 terminate 상태로 됨 |

[Diagram of game piece states]