ENT-013: CSUN-AT 2017

A study on finding virtual items by foot through AR Shogi game

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OVERVIEW

A new study of investigating how hard the tasks are when
- visually impaired people walk around
- they have a support from intelligent navigation system

A preliminary study towards
"Development of new and practical navigation system"
(the final goal of our research project)

In a shape of a game - AR Shogi
Shogi = Japanese chess
Each cell in the board is in human size
TSUME-SHOGI

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Opening movie in 3D CG (to get the idea of the game)

3

3

Opening movie in 3D CG (to get the idea of the game)

4

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Actual play

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SHOGI in Augmented Reality

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Tsumeshogi

From Wikipedia, the free encyclopedia

Tsumeshogi (詰将棋 or 詰め将棋 *tsumeshōgi*[7]) or **tsume** (詰め) is the Japanese term for a shogi problem in which the goal is to checkmate the opponent's King. Tsume problems present a situation that might occur in a shogi game, and the solver must find out how to achieve checkmate. It is similar to a chess problem.

The term **tsumi** (詰み) means the state of checkmate itself. The verb form is **tsumu** (詰む) "to checkmate". (The related term *tsumero* 詰めろ refers to the slightly different concept of "threatmate". See: Hisshi.)

Note that the concept of stalemate as in western chess does not exist in shogi as it essentially does not occur.[1][2] Thus, *tsumeshogi* problems are strictly mate problems.

Contents [hide]
1 Rules
2 Purposes of tsume problems
2.1 Shogi training

△ pieces in hand: 飛2角金4銀桂4歩17

▲ pieces in hand: 銀

A classic tsumeshogi problem whose composer is unknown. The solution is 1. +B-5b 2. S4ax5b 3. S*4b or 1. +B-5b 2. S6ax5b 3. S*6b.[a]

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BACKGROUND

Nagivation system for visually impaired
⇒ Our research in progress for system building
⇒ Design of user interface – HOW?

"Trekker Breeze" : An example of conventional GPS based navigation system for visually impaired
(provided by Prof. Ishikawa, one of our research members)

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FUND BY GOVERNMENT

JST RISTEX 2014-2017
多世代共創による視覚障害者移動支援システムの開発
Development of mobility support for visually impaired by multi-generation collaboration and creation

国立研究開発法人 科学技術振興機構

Japan Science and Technology Agency (JST)
Research Institute of Science and Technology for **Society** (RISTEX)

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MOTIVATION

To introduce a navigation system …

★Behavior analysis
Which task is critical for visually impaired?

We want to see actual behaviors …

★Game play !
Shogi game in human size
Players have to walk, build a map, and map yourself
– Similar tasks in actual navigation

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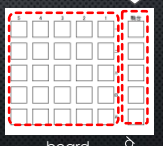
GAME PROCEDURE

1. A player learns the map.
2. The player practices to learn how the system works.
3. The player begins the game from the starting point.
4. In 10 minutes, the player has to
   a. Find all the pieces (“SEARH”)
   b. Find the moves (“THINK”)

Starting point ★



board

Pieces in hand

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GAME PLAYERS

- Visually impaired
- Ranging from 20s to 70s
- Male and Female
- Members of a Shogi club
  - Knows board and pieces very well
  - Good at remembering pieces on the board

They were serious on game plays.

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TASKS

- Listen to the voice from the system
  - Piece name at the position
  - Landmark / orientation instruction
- Position the information on the map
  - Pieces on the board
  - Landmarks in the map
- Locate himself/herself on the map

Doing them simultaneously
- Same in Game and Navigation

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NEWSPAPER ARTICLES

朝日新聞

静岡新聞

中日新聞

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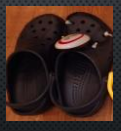
INSIDE THE SYSTEM

Software : Unity 3D
Sensor : RF-ID
Reader : Tecco (GOV)
TAG : Big antenna (30cm)



Voice : Same voice used in conventional navigation system

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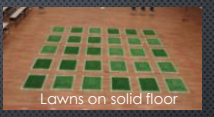
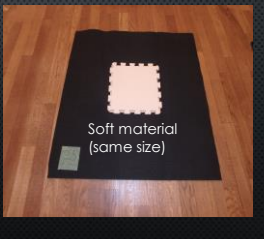
LOCATION IDENTIFICATION





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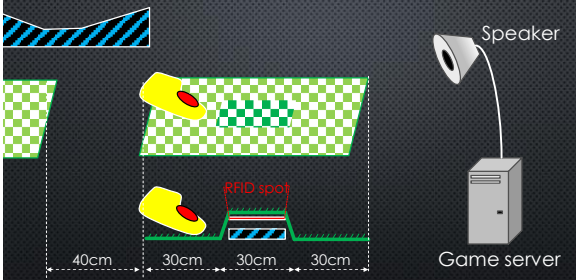
FINDING VIRTUAL ITEMS BY FOOT



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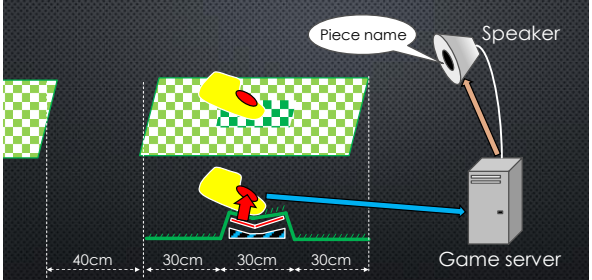

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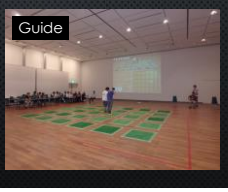
VIDEOS

Starting point



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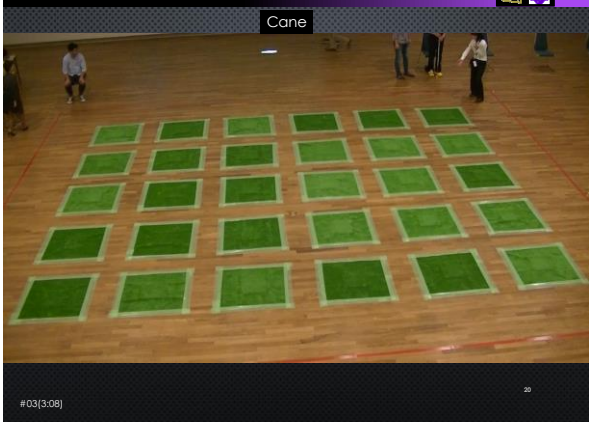

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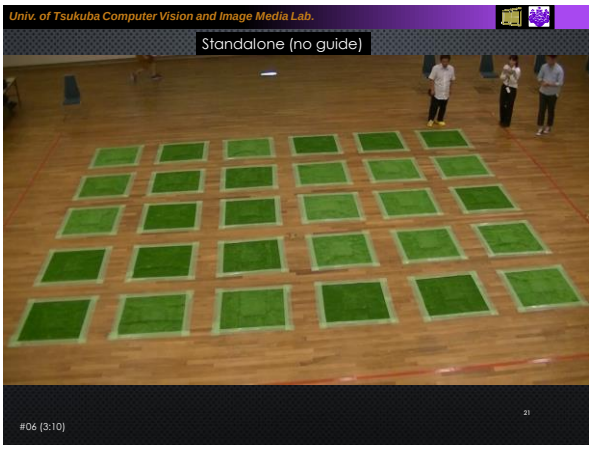

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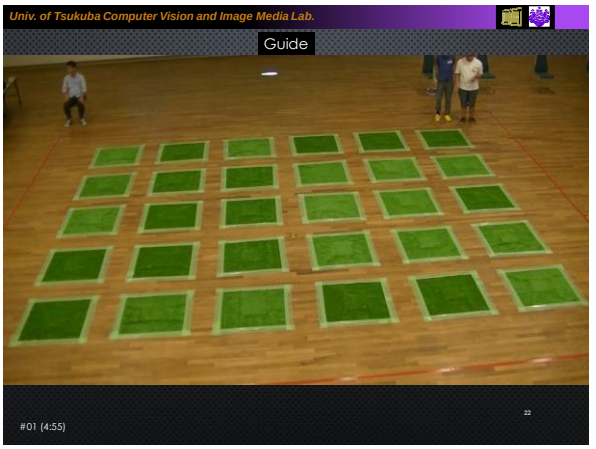

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EXTENDED ABSTRACT

1. OVERVIEW
2. AR SHOGI IN HUMAN SIZE
3. GAMR PLAY
4. EXPERIMENT
5. CHALLENGES

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