# User-Defined Gestures For Augmented Reality

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**Human-Computer Interaction** 

[1]

#### What is AR?

AR = Augmented Reality = Reality++

- Pokemon Go and Ingress
- Hololens
- Google
  - Glass
  - Lens
  - Translate

Industry Education



[2]

# AR problems

Battery

Lots of tech; Little Space

Social Normalisation (you look weird)

**Content Creation** 

Usability, and standardisation

- History
- Experience

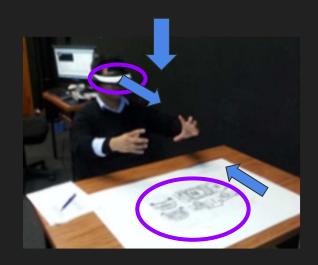
## Overview

Create a consensus set of tasks

40 user defined tasks

20 participants

- 12 male, 8 female, aged 18 to 38
- Minimal AR knowledge and experience.



[1]

Simulation/media controls The Tasks Play/Resume Transform Pause Stop/Reset Short, Long Move -Speed -Increase, Roll(x), Rotate -Pitch(y), Decrease Browsing Yaw(z), Scale - x, y, z, **Previous** Uniform Next

The Tasks

Insert

Selection

Editing

Single, Multiple, Box,

Delete

Menu

All

Undo Redo

Group Ungroup

Accept Reject

Cut, Copy, Paste

Horizontal

Vertical

Object centric

Open, Close, Select

# Kinds of Gestures [3]

Form

Nature

Binding

Flow

Symmetry

Locale

```
Form
Static pose
Dynamic pose
Static pose and path
Dynamic pose and
path
(one-point touch)
(one-point path)
```

Nature

Symbolic

Physical

Metaphorical

Abstract

Binding

Object-Centric

World-dependant

World-independant

Mixed dependencies

Flow

Discrete

Continuous

Symmetry

Dominant unimanual

Non-dominant unimanual

Symmetric bimanual

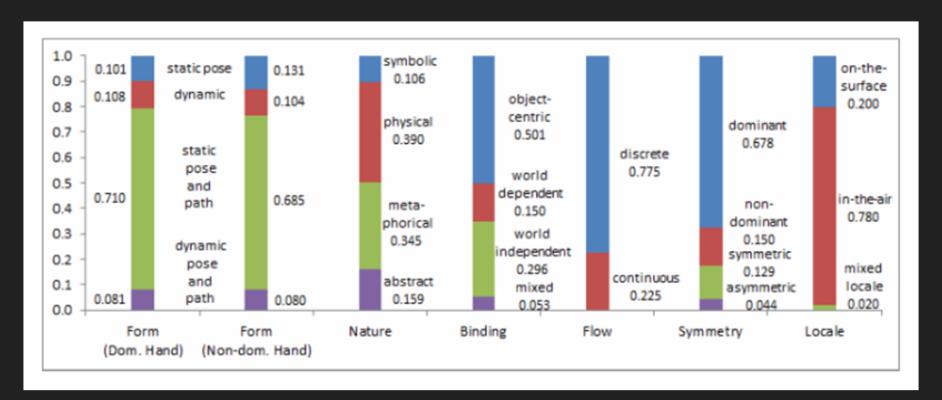
Asymmetric bimanual

Locale

on-the-surface

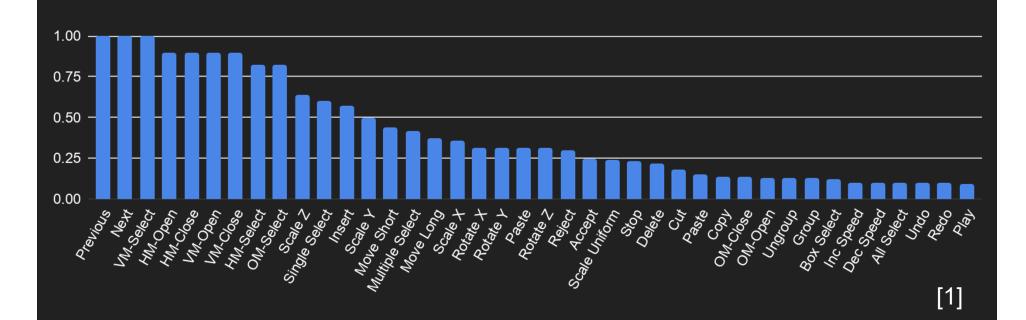
in-the-air

Mixed locales

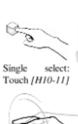




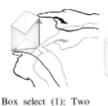
$$\sum_{n=0}^{t} \left(\frac{p_n}{20}\right)^2$$



#### Consensus set







hands point at a

single bottom corner,

one drag across,

another lift up. [H11]

Box select (2): One hand reverse pinch indicating the box diagonal length and lift off for height then pinch to commit. [H01-02]



workspace.

[H11]

Scale Uniform (1): Two hands move apart/together along X-axis to enlarge/shrink [H09]



Rotate X-axis (Roll): Turning the wrist up/down, palm facing sideward. [H01-04]



CW/

body.

Scale Uniform (2): Two hands grab each diagonal corner of target move apart/together along XY plane to enlarge/shrink. [H01-04]



Scale X-axis (1): Two Scale Y-axis (1): Two hands grab left/right side hands grab front/back side of target move of target apart/together along Xapart/together along Yaxis to enlarge/shrink. axis to enlarge/shrink. [H01-04,08] [H01-04,08]



Scale Z-axis (1): Two hands grab top/bottom side of target move apart/together along Yaxis to enlarge/shrink. [H01-04,06,07]



CCW, palm facing

from

Turning wrist

away

Rotate (Yaw): Turning the wrist in/out, palm down/sideward. [H01-05]

Previous: Swipe

left to right. [H08,10-11]



Scale Uniform (3): Move thumb and other fingers apart/together diagonally along XY plane to enlarge/shrink. [H08]



Scale X-axis (2): Move thumb and other fingers apart/together along X-axis enlarge/shrink. [H08]



Scale Y-axis (2): Move thumb and other fingers apart/together along Y-axis to enlarge/shrink. [H08]



Scale Z-axis (2): Move thumb and other fingers apart/together along Zaxis to enlarge/shrink. [H08]



# Analysis

Previous experience

Camera placement influence

Goodness

Menus

Bias

#### References

[1]

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[3]

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