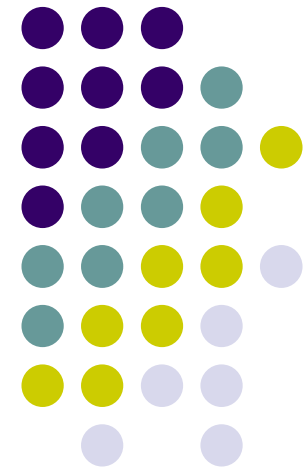
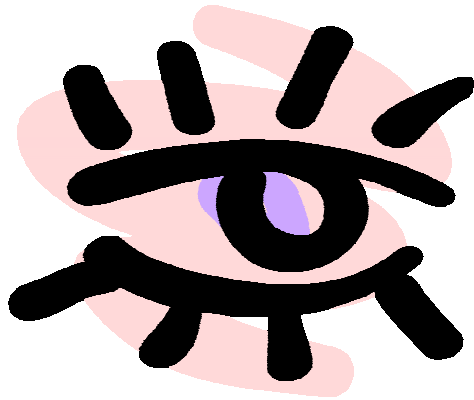


Automatic Preference Detection

by Analyzing the Gaze 'Cascade Effect'

Nikolaus Bee, Helmut Prendinger, Elisabeth André
and Mitsuru Ishizuka



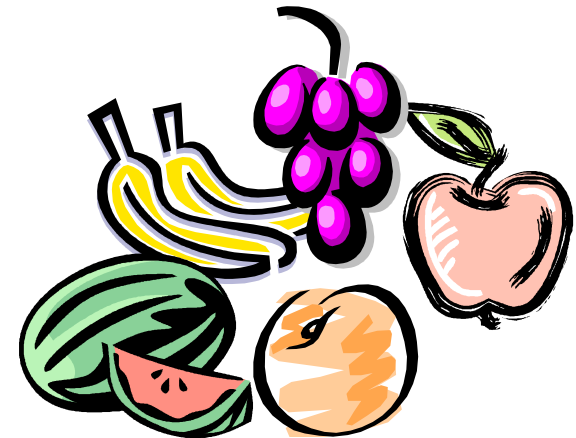
September 4, 2006
Turin, Italy



Motivation

- non-conscious interaction (for e.g. interest detection)
- non-command interface (for e.g. Locked-In syndrome)

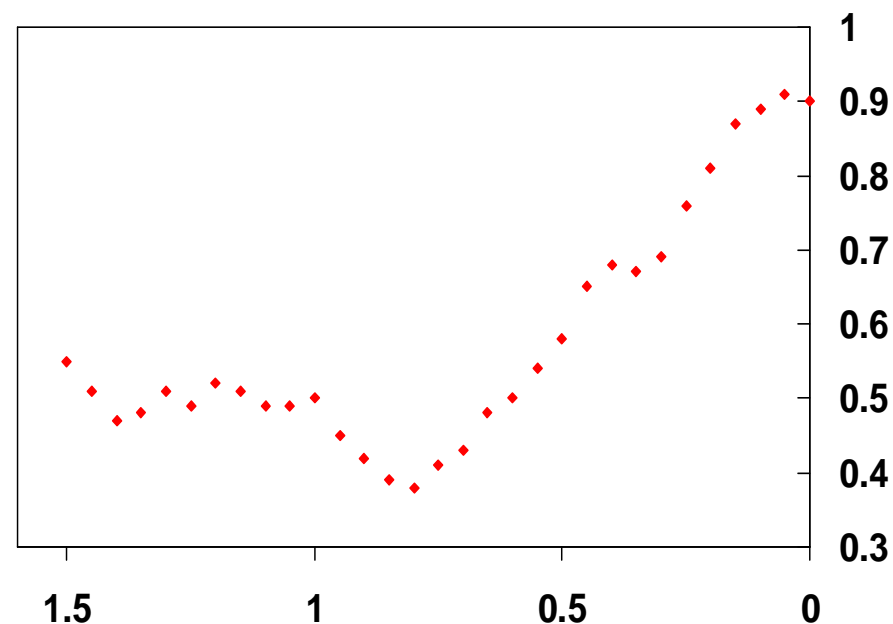
highly interesting for future human-machine interfaces





Gaze Cascade Effect

- major role in our application played the *gaze cascade effect* from Shimojo & Simion (CALTECH)
- analyzed the gaze behavior 1.5 s before a selection was made by pressing a button
- subjects had to choose one out of two faces (similar and different)





Goal

- automate everyday choice tasks within everyday items (e.g. food, cloths)
- we turned the results from Shimojo's & Simion's research into an automated selection process
- we used pictures of neckties as we needed objects within a common group



Tie Contest

- Task: *Selecting a tie for themselves or their friend for a graduation party.*
- 62 choices divided into 4 phases



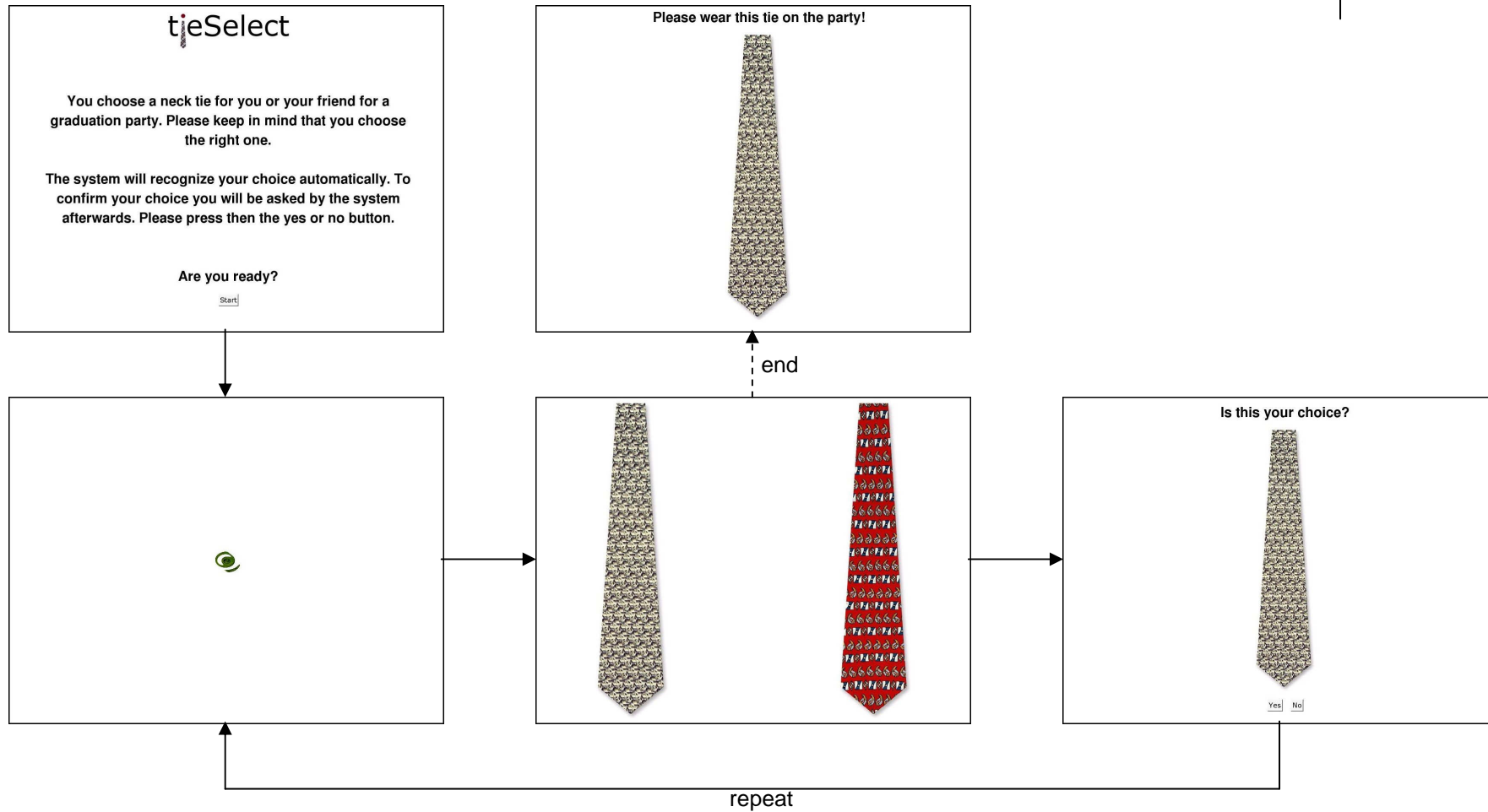
introduction
(6 pairs)

different ties
(13 pairs)

similar ties
(13 pairs)

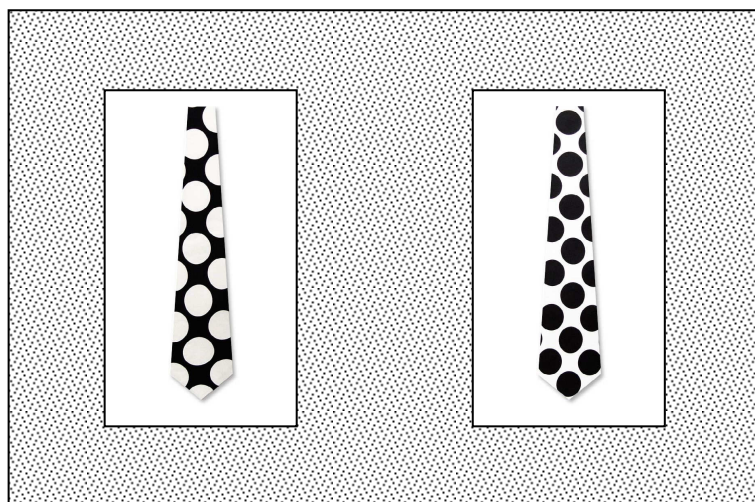
winner ties
(30 pairs)

AutoSelect





Tie Selection



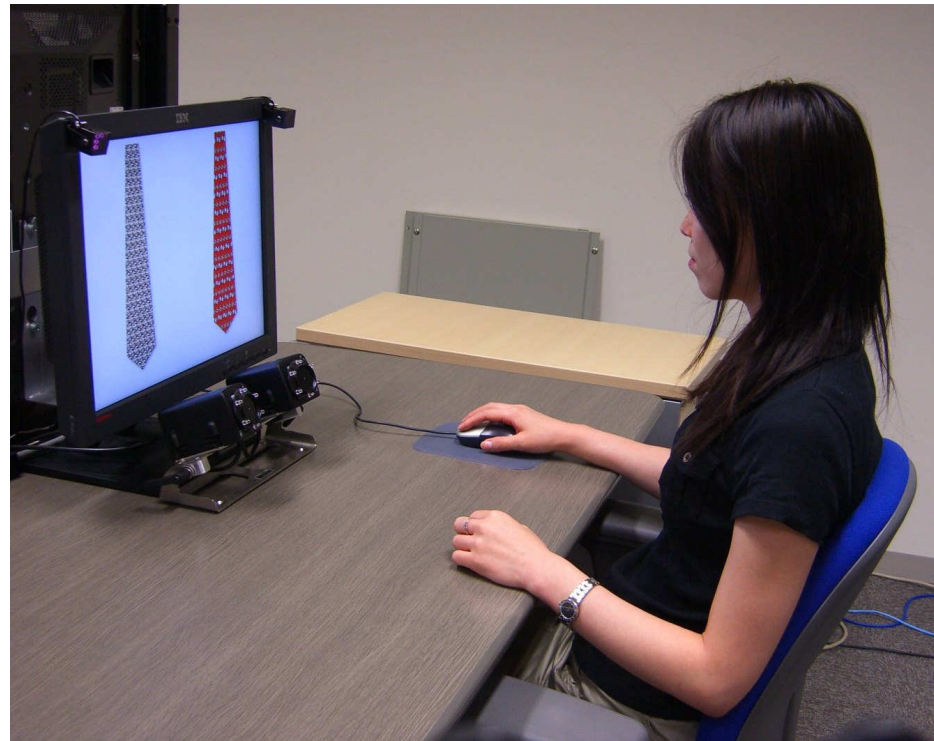
-1 0 1

- time window for *gaze bias* is 1.5 s
- time window for *focus* is 300 ms
- 90% of gazes and the current focus must be on the preferred tie
⇒ tie is selected



Pilot Study

- test our application (investigate: subjects behavior, selection process)
- exploratory study with 8 subjects (4 female / 4 male)
- 1,000 ¥ award for participating successfully





Results

- our system chose the subjects preferred tie correctly in **81%** of all cases
- further investigation of decision time and recognition rate
 - Shimojo et al. showed a faster decision time within different faces.
 - Is the recognition rate influenced by decision time?



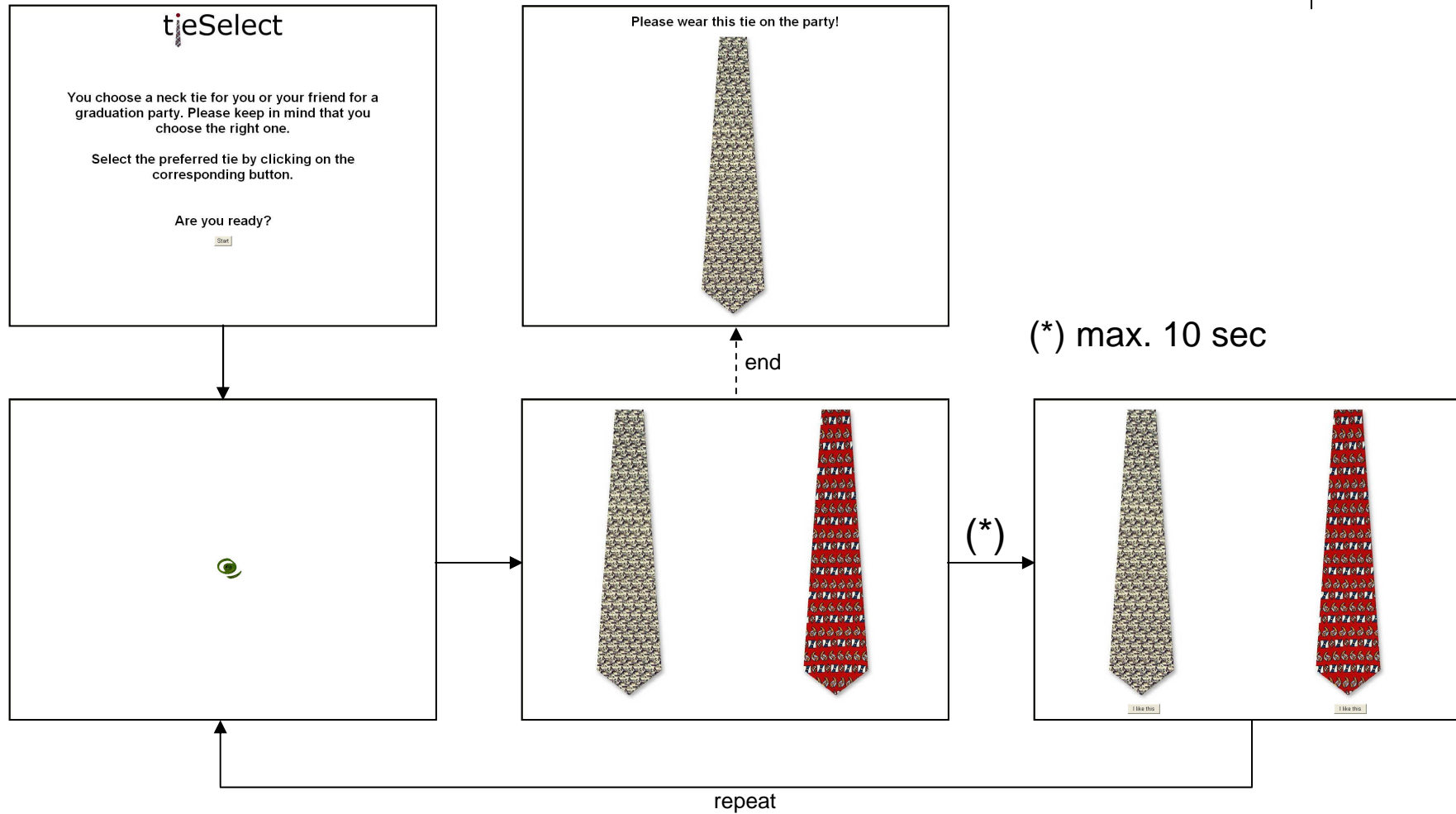
Different vs. Similar

- selection process for similar ties lasted longer but was more accurate
- differences in decision time were significant

	<i>rec. rate</i>	<i>dec. time</i>
<i>different</i>	75%	6.80
<i>similar</i>	81%	7.65

t-test: $t(180) = -1.66; p = 0.049$

AutoSelect 2





Conclusion

- Recognition rate with AutoSelect was 81%
- but the experimental design should be improved

- Therefore we conducted a new study
 - new experimental design
 - new subjects (9)
 - new result is **72%** (but very stable)
 - What happened to the missing 30% (20%)?

Thank You

