Research Summary

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Prof. Jane Yung-jen Hsu

- Director, NTU IoX Center, featuring global research collaboration among MOST/Taiwan. NTU, Intel, Delta, and local industry.
- Professor, Computer Science and Information Engineering/Graduate Institute of Networking and Multimedia at National Taiwan University.
- President of Taiwanese Association for Artificial Intelligence (2013-2014)

- Her research interests include artificial intelligence, internet of things, crowdsourcing, intelligent agents, intelligent data analysis, commonsense knowledge, and context-aware computing.

Research Topics

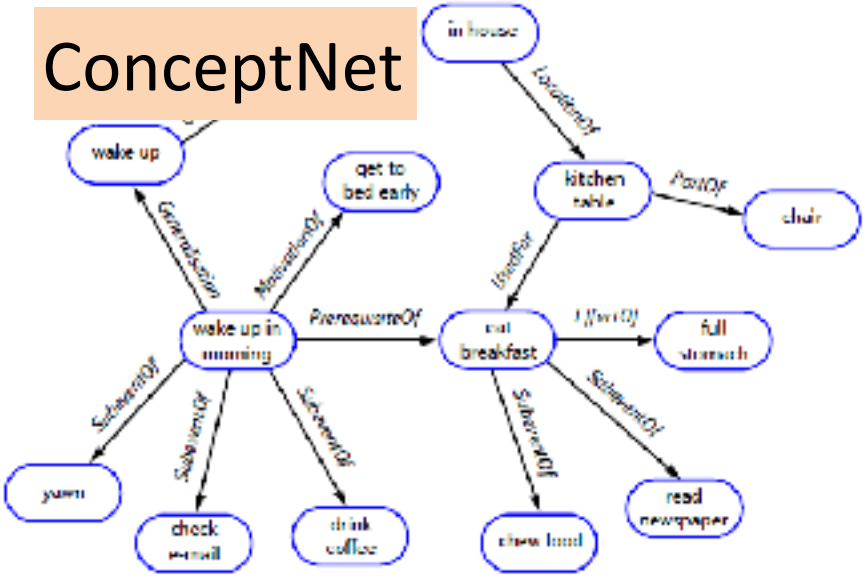
- Common Sense Knowledge Base
  - knowledge mining
  - machine learning
  - crowdsourcing
- Smart Internet of Things
  - activity recognition
  - context-aware computing
- Social Robots for Elder Care
  - affective computing
  - human-robot co-learning

Freebase

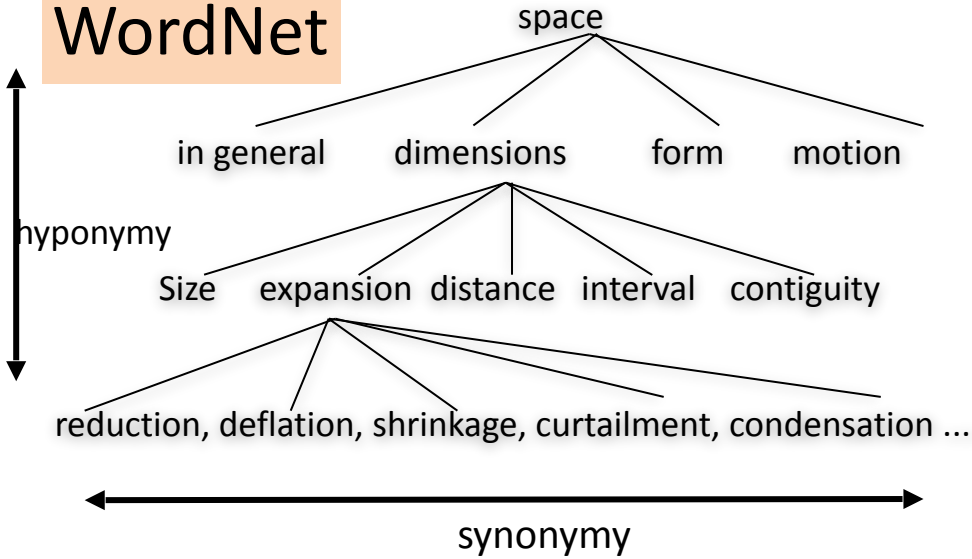
cycorp

State-of-the-art Commonsense Knowledge Bases

ConceptNet



WordNet



ConceptNet


Open Mind Common Sense
Knowledge about 台北101
Similar concepts:
41 台北101 是一種 地標。 by pet_14476
5 台北101 是一種 大樓。 by pet_6031
4 台北101 是一種 建築物。 by pet_6031
3 台北101 是一種 藝術。 by pet_7402
3 你可以在 台北市信義區 找到 台北101。 by pet_12756
3 你可以在 台北 找到 台北101。 by pet_12783
2 在 台北101, 你會 吃飯。 by pet_10818
2 在 台北101, 你會 看煙火。 by pet_10818
2 在 台北101, 你會 看書。 by pet_10818
2 在 台北101, 你會 照相。 by pet_11818

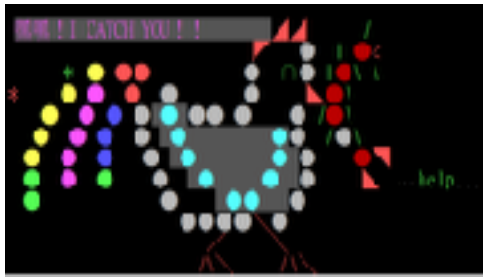
Crowdsourcing Common Sense Knowledge

- GWAP + Knowledge Mining
  - Precision
  - Sustainability
  - Resource-bounded
  - Real-time

Virtual Pets on PTT

Q. When cooking, which appliance do you use?: ____

New assertions are generated.



Q

a virtual pet on the web

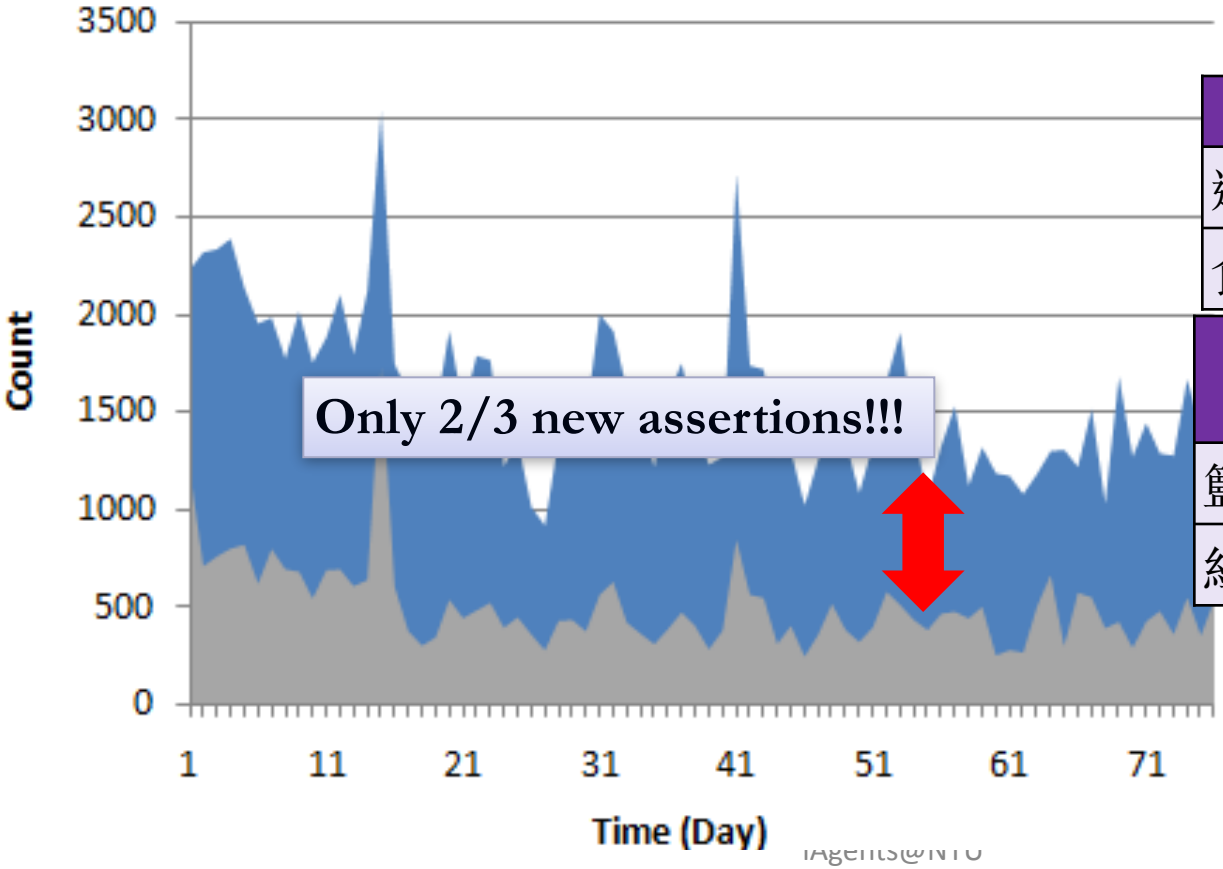
A

microwave
electric pot
oven
…

crowds

Effectiveness of Knowledge Collection

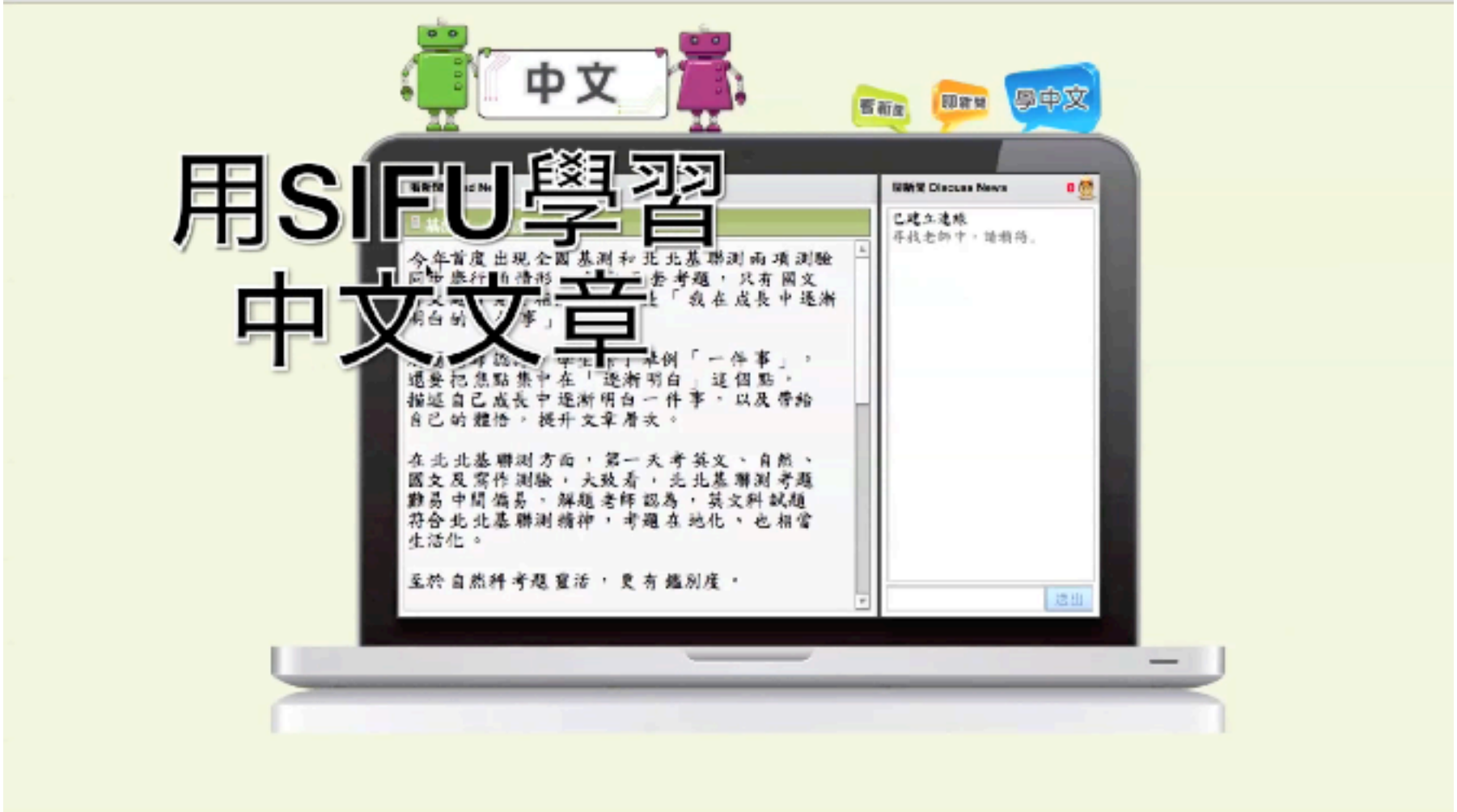
- 75-day collection (Aug. 2009 ~ Oct. 2009)



General concept	# of sentences
運動 sport	5073
食物 food	2157

Specific concept	# of sentences
籃球 basketball	341
紅蘿蔔 carrot	142

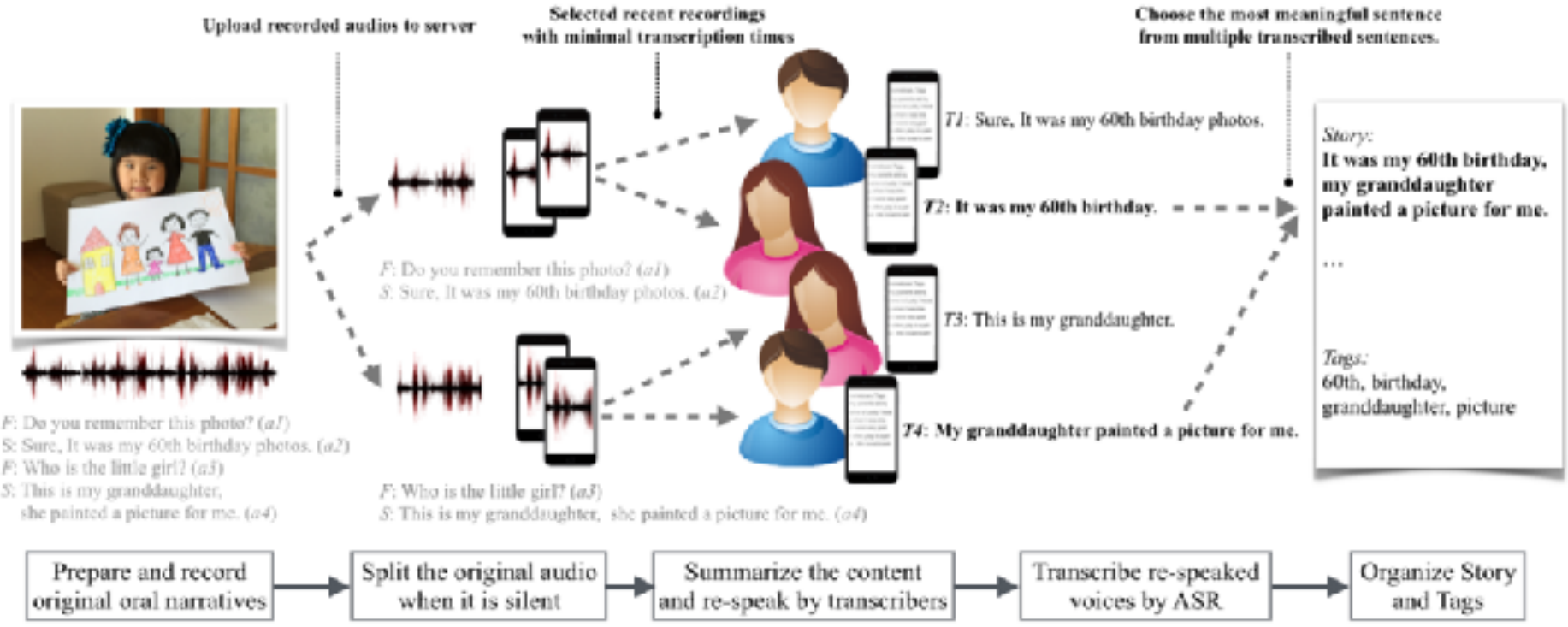
Common Sense Knowledge for Language Learning



VoiceTranscriber

Crowd-powered Oral Narrative Summarization System

- **VoiceTranscriber** is a mobile crowd-powered system for summarizing stories from recorded voices that relies on the human abilities of discrimination and expression.



Hung-Chi Lee and Jane Yung-jen Hsu. VoiceTranscriber: Crowd-powered Oral Narrative Summarization System, In *Proceedings of the Third AAAI Conference on Human Computation and Crowdsourcing* (HCOMP-2015), 2015.

PicMemory:

Enriching Intergenerational Family Interaction and Memory Collection

- PicMemory, an interactive mobile application for for enriching the family interaction and collaboratively collecting family stories among family members.

Hung-Chi Lee and Jane Yung-jen Hsu. PicMemory: Enriching Intergenerational Family Interaction and Memory Collection. In *Proceedings of the 34rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems*, CHI EA '16.

Enhancing Diversity and Coverage of Crowd-Generated Feedback through Social Interaction

This work suggests that collaborating with other people could generate greater diversity and coverage of feedbacks for facilitating paper revision.

Group Collaboration Strategies

Individual Work

- Simple and easy to scale

Sequential Work

- Existing feedbacks enable **learning** from others

Simultaneous Work

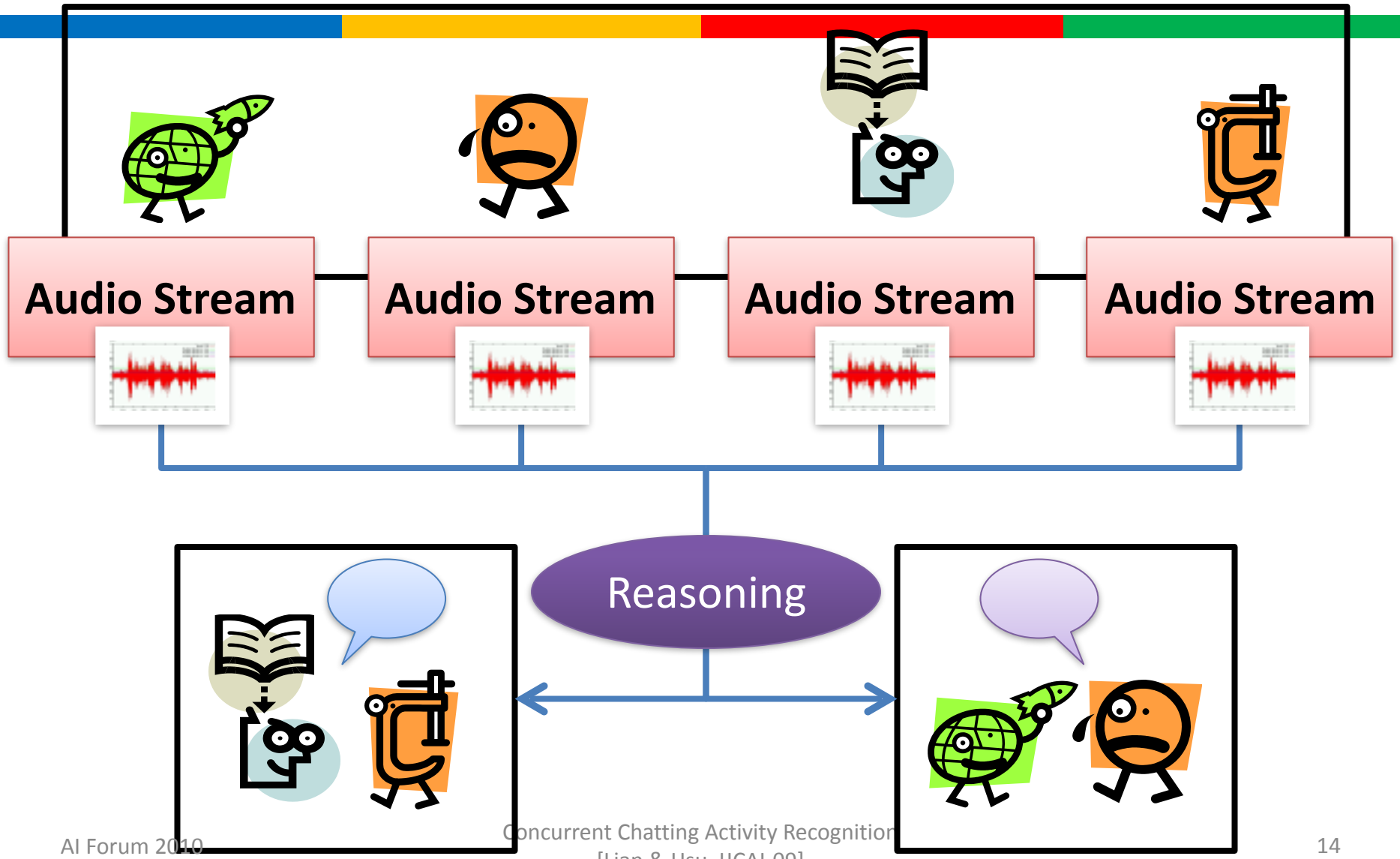
- Social awareness guides **to avoid duplication conflicts**

Y.-C. Huang, H.-C. Wang, and J. Y.-j. Hsu. Enhancing diversity and coverage of crowd- generated feedback through social interaction. In *Proceedings of the Third AAAI Conference on Human Computation and Crowdsourcing,* HCOMP-2015, San Diego, USA, November 2015.

Activity Recognition

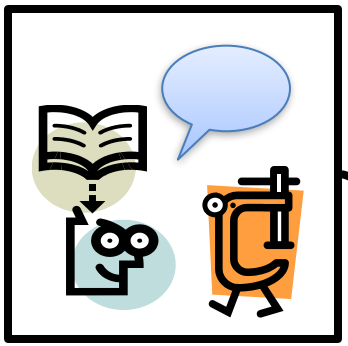
- Location tracking
- Activities of daily living
- Concurrent chatting activity recognition
- Social engagement

Chatting Activity Recognition



Probabilistic Learning

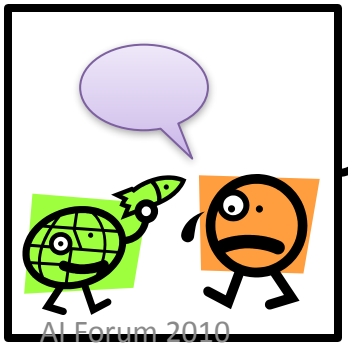
- Use FCRFs probabilistic model to conduct inference and learning from the patterns of multiple concurrent chatting activities.



1. Model Dynamic Pattern

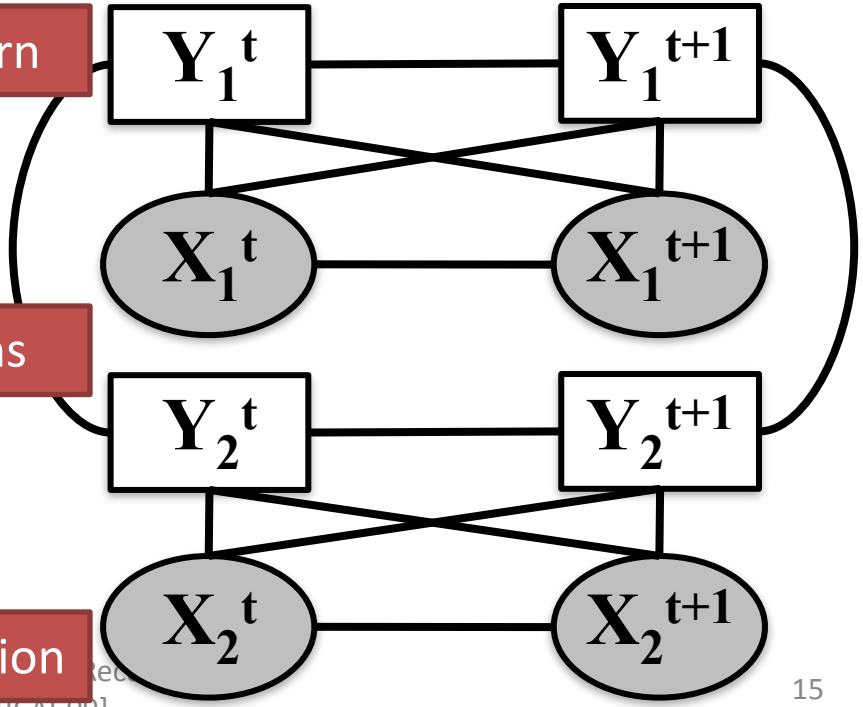
...11100222200...

2. Co-temporal Relations



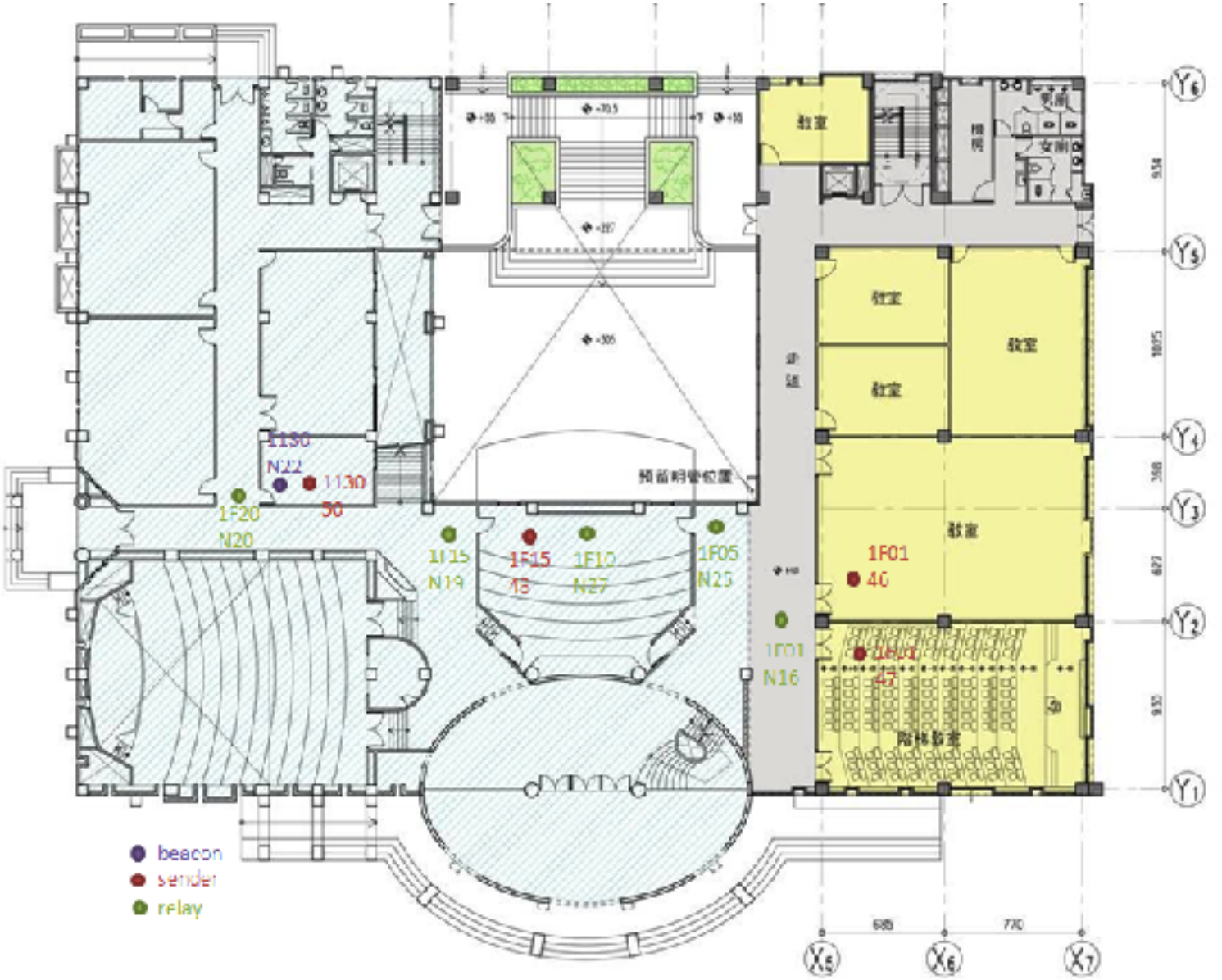
...11100222200...

3. Relax Markov Assumption



[Lian & Hsu, IJCAI-09]

Environment Sensing

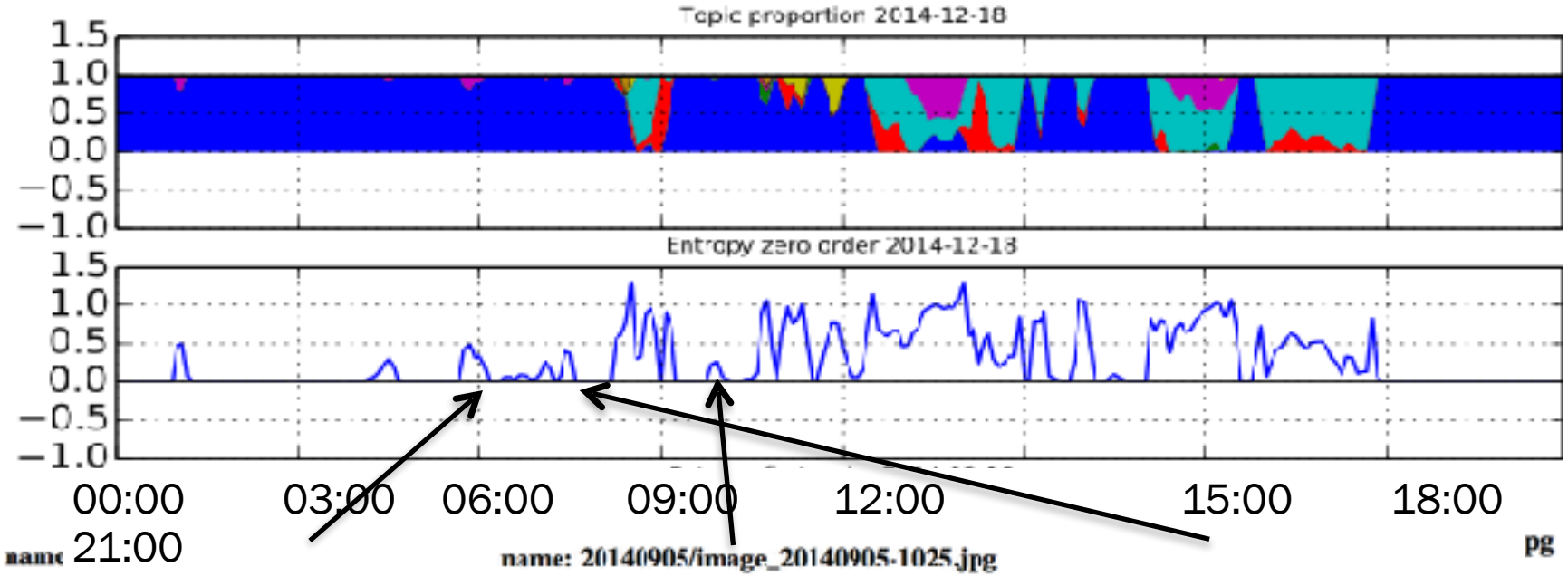


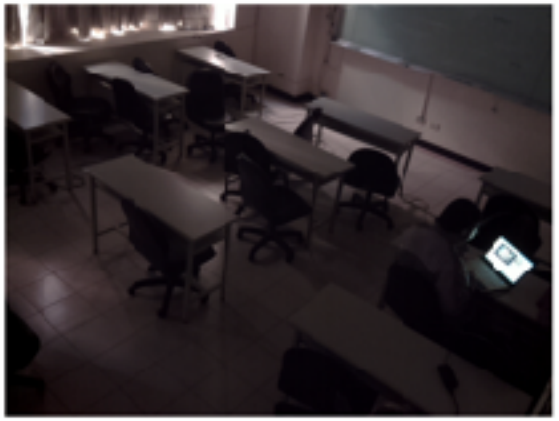
Results: Irrelevant Appliance Detection

- Appliance and activity in the experiment are highly related.
- Irrelevant appliance could be easily detected.

battery charger	laptop	electric fan	dehumidifier	refrigerator	air conditioner	exhaust fan	
16	29	1	47	2	2	23	hit
0	0	0	0	0	0	0	miss
3	2	0	0	0	0	0	false alarm
100	100	100	100	100	100	100	recall (%)
84.21	93.55	100	100	100	100	100	precision (%)

Abnormal Activity Pattern

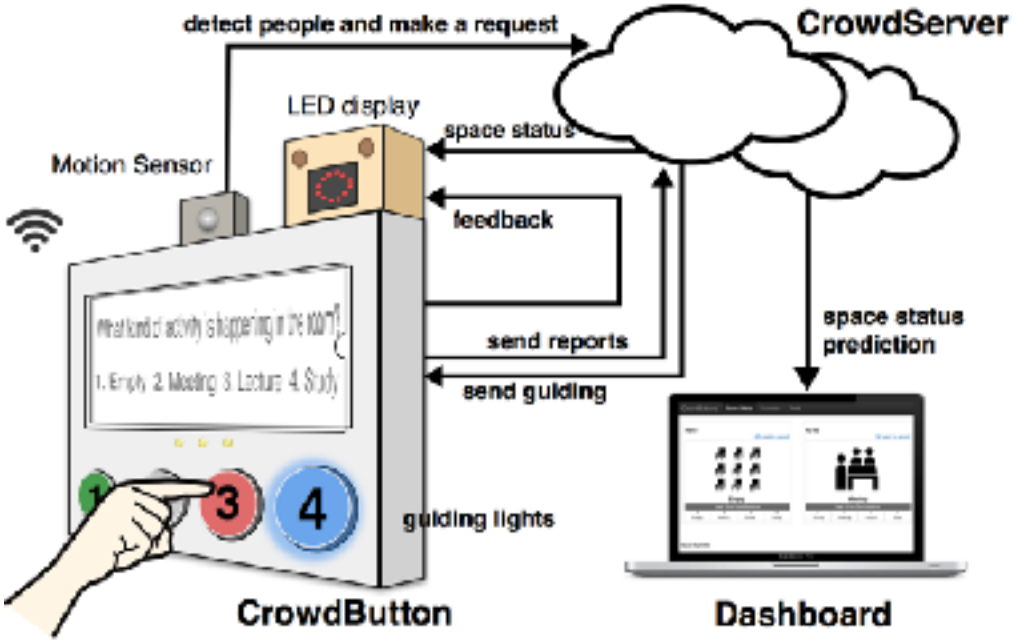




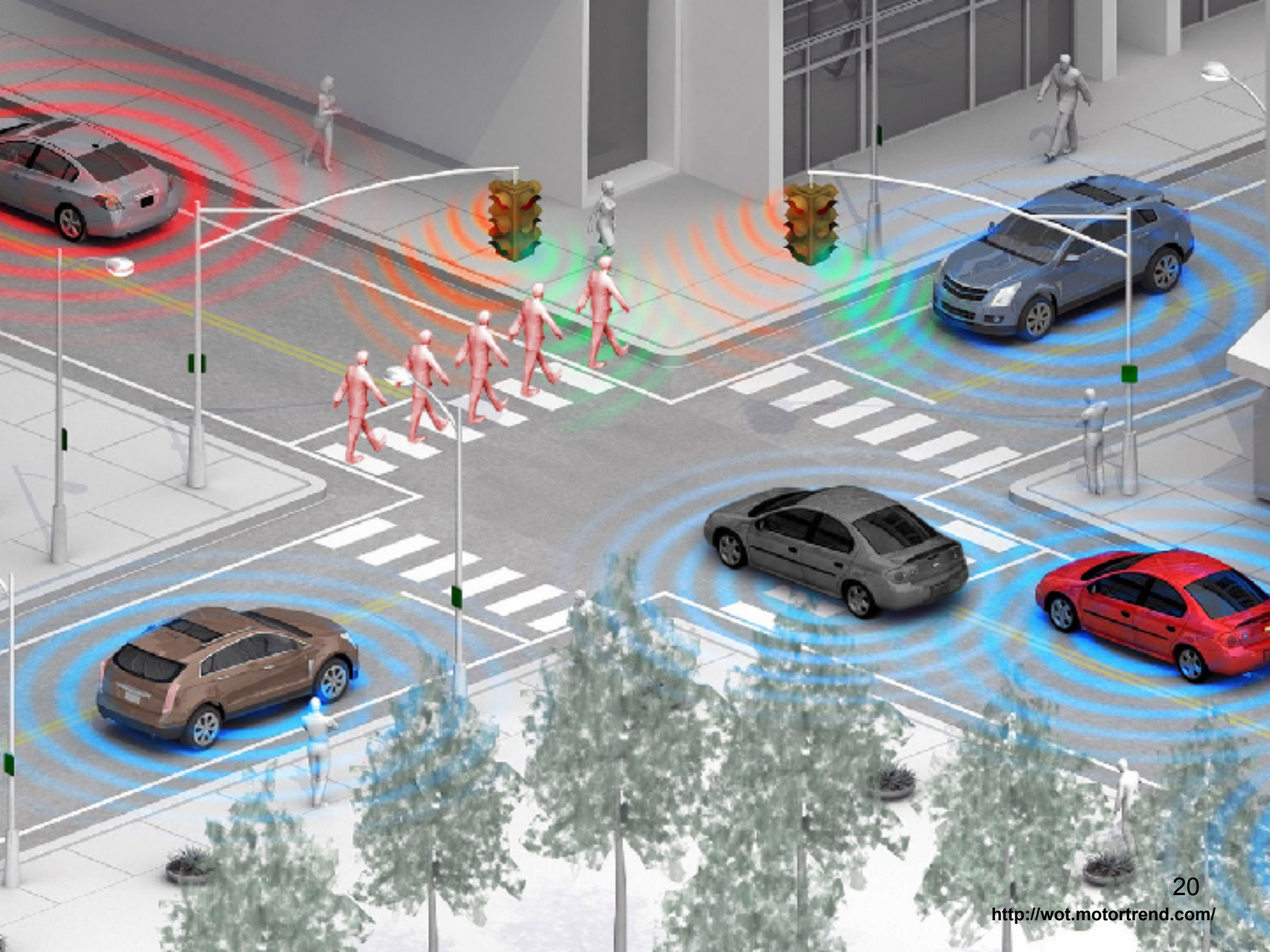
Designing a Micro-Volunteering Platform for Situated Crowdsourcing

CrowdButton

- A situated micro-volunteering system allowing passersby to report the activity status of a room by clicking a button for improving common space utilization

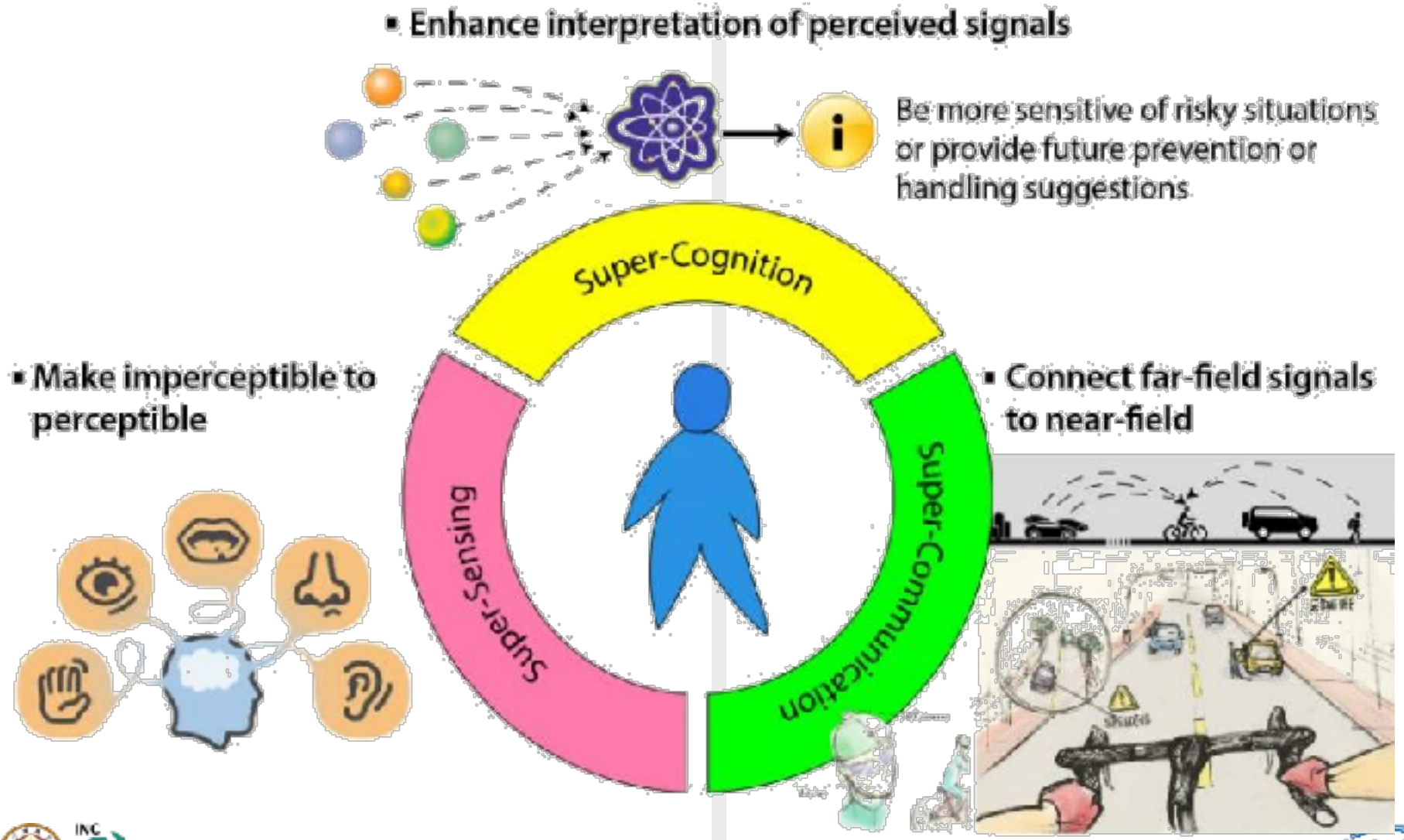


Y.-C. Huang. Designing a micro-volunteering platform for situated crowdsourcing. In *Proceedings of the 18th ACM Conference Companion on Computer Supported Cooperative Work and Social Computing*, CSCW'15 Companion, pages 73–76, New York, NY, USA, 2015. ACM.

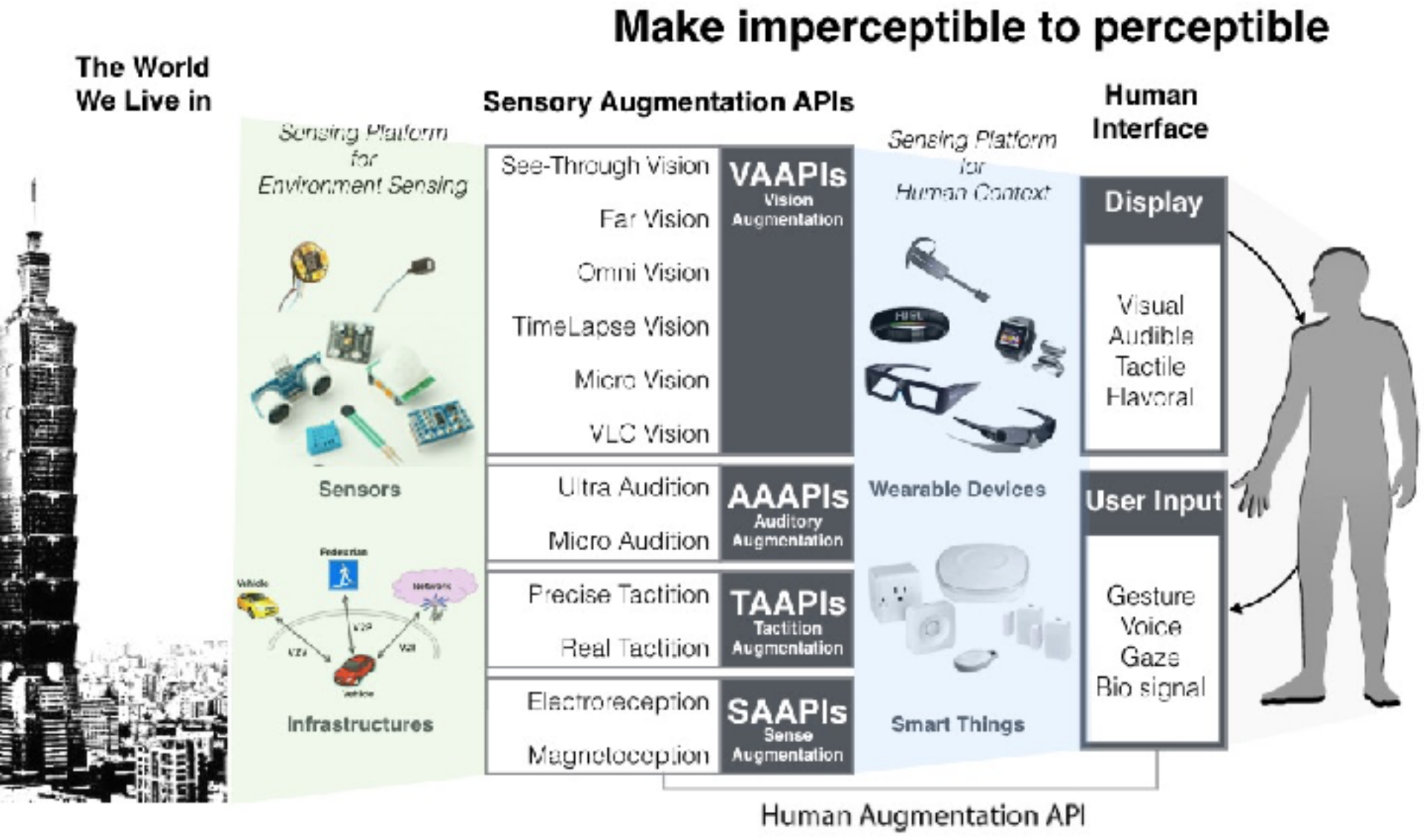


http://wot.motortrend.com/

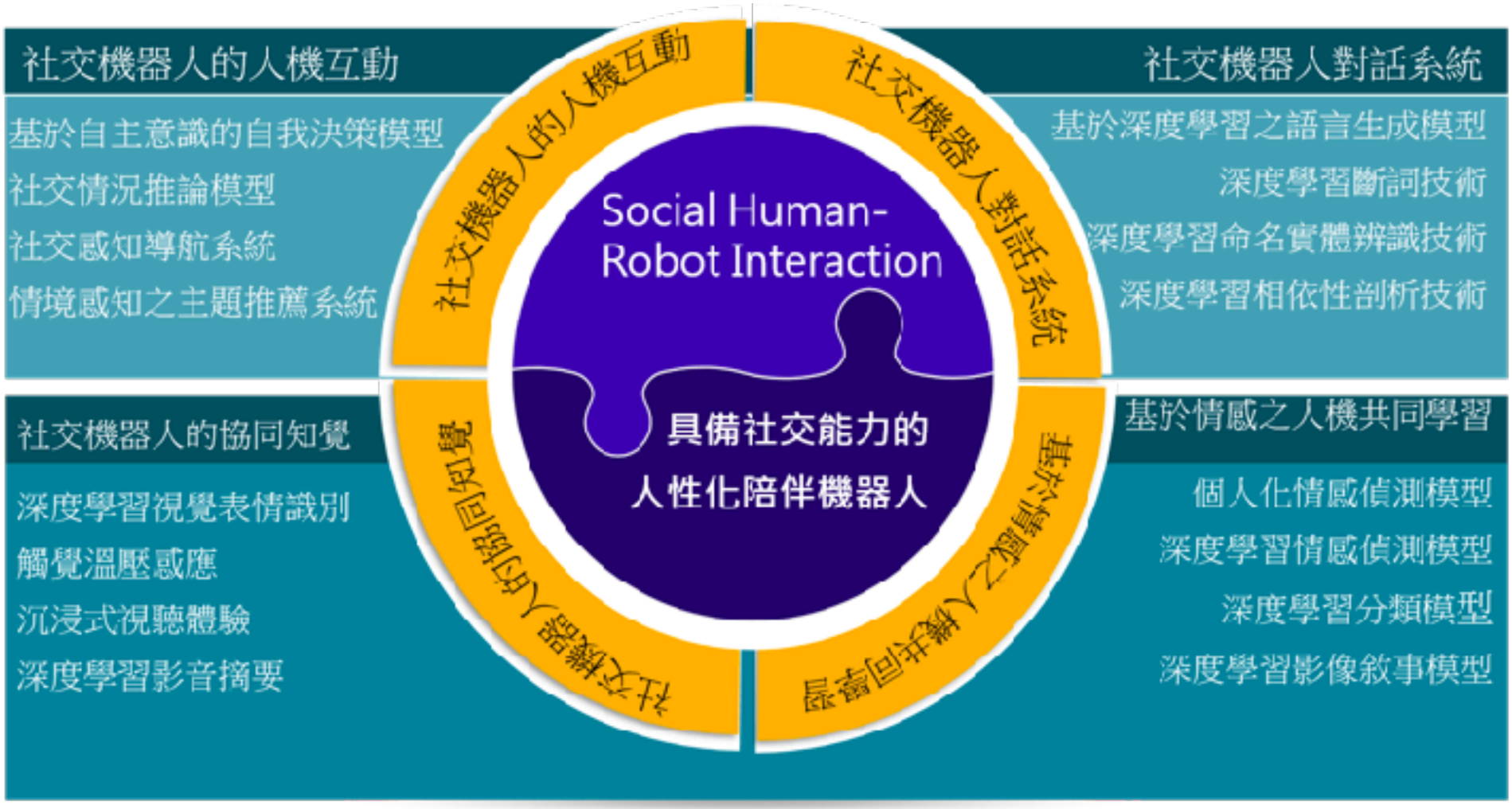
ACB Conceptual Framework



Human Augmentation APIs



Social Robots for Elder Care



Thank you!

Q & A