

Spoken Dialogue Robot for Watching Daily Life of Elderly People

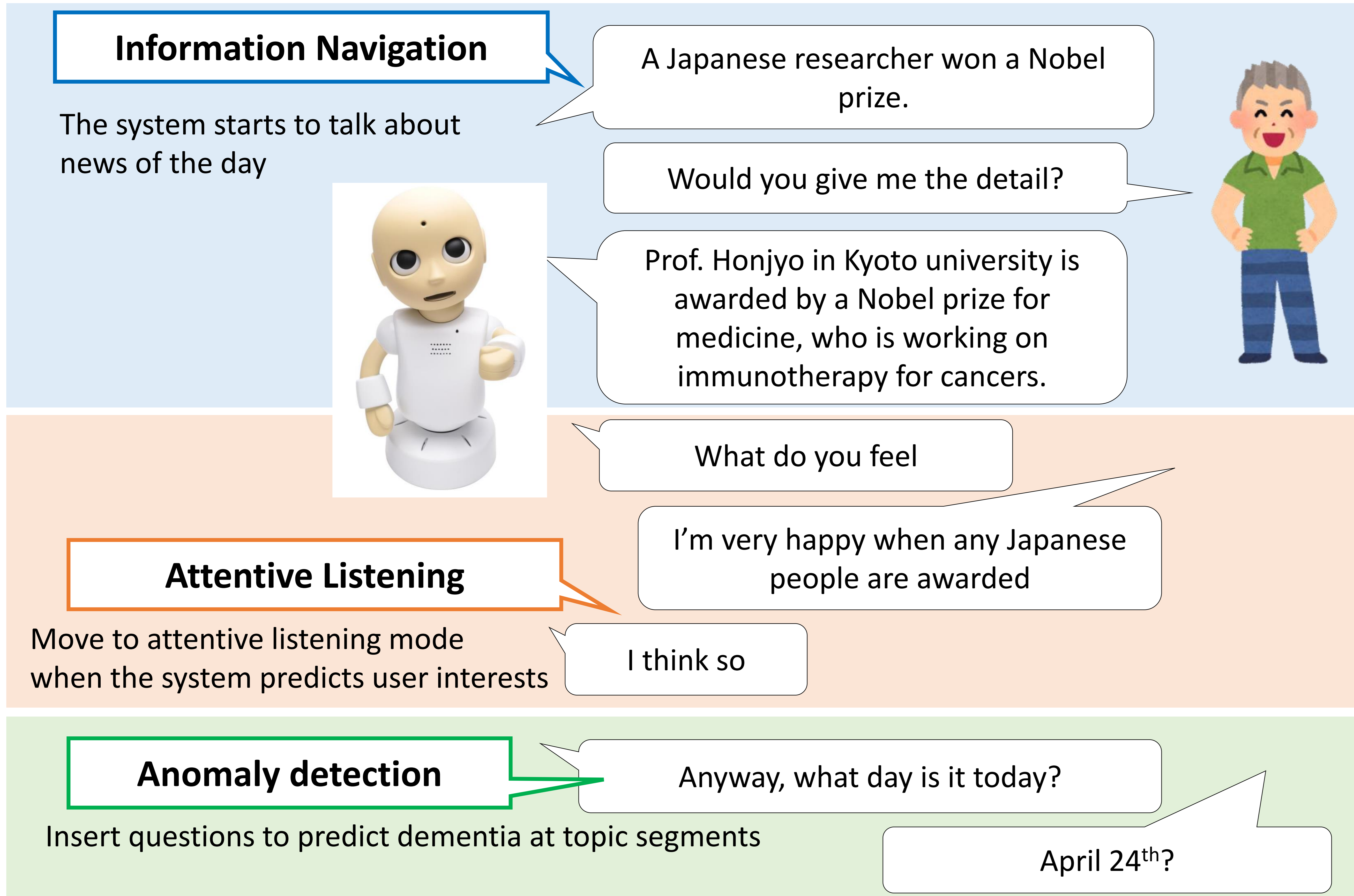
Nara Institute of Science and Technology, JAPAN
 RIKEN Center for Advanced Intelligence Project, JAPAN
 PRESTO, Japan Science and Technology Agency, JAPAN
 The University of Tokyo, JAPAN



Koichiro Yoshino, Yukitoshi Murase, Nurul Lubis, Kyoshiro Sugiyama, Hiroki Tanaka, Sakti Sakriani, Shinnosuke Takamichi, Satoshi Nakamura

A prototyping of dialogue systems for elderly care taking

- Building a system for elderly watching, caretaking based on dialogue technologies toward super-aged society
- Integration of base technologies to evaluate a total system

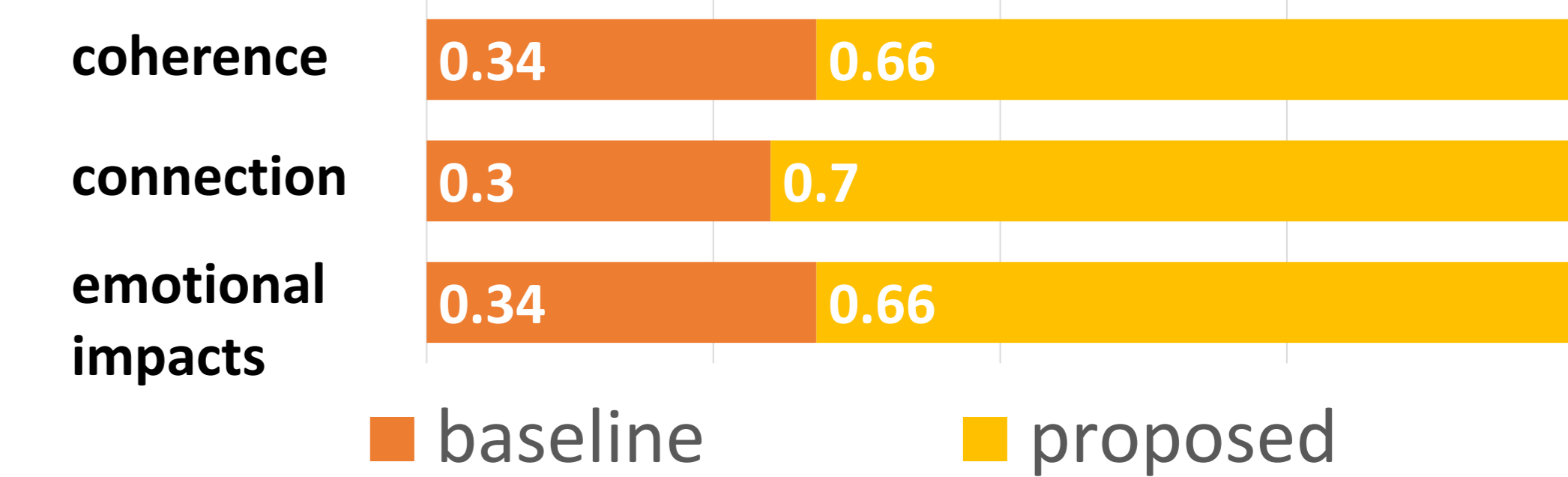


Information Navigation

- The system predicts user focus and select an appropriate dialogue module based on dialogue acts
 - The dialogue contents are selected from Web news
 - The system transits to the attentive listening mode once the system detects user interests
 - **Action selection accuracy: 0.834-0.893**
- K.Yoshino et al., Conversational system for information navigation based on POMDP with user focus tracking, CSL, 2015

Attentive Listening

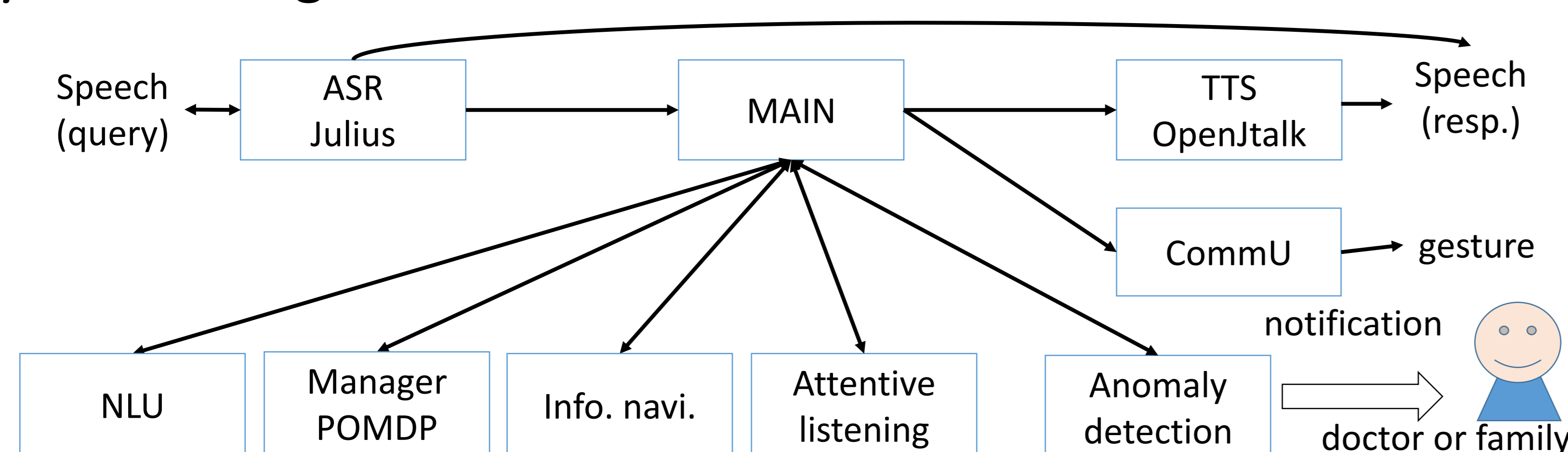
- Select a response based on emotion elicitation
 - Considering emotion triggers (system utterances) and their impacts (emotion improvement)
- N.Lubis et al., Positive emotion elicitation in chat-based dialogue systems, IEEE-TASLP, 2019.



Anomaly detection

- **Dementia detection**
 - Dementia can be detected by response delays to sudden questions
 - There are some typical questions to detect dementia
 - **AUC: 0.93**
- **Other Anomalies can be detected through a conversation**
 - Delirium, Depression, Heart infraction
- T.Ujiro et al., Detection of dementia from responses to atypical questions asked by embodied conversational agents. Proc. INTERSPEECH2018

System Configuration



Dialogue data

- **60 dialogues, 27,986 utterances**
 - between elderly people and licensed counselor, care-takers
 - The data are used for the training data of the system
- K.Yoshino et al., Japanese Dialogue Corpus of Information Navigation and Attentive Listening Annotated with Extended ISO-24617-2 Dialogue Act Tags. Proc. LREC2018

Dialogue Evaluation

- **Dialogue with 10 elderly people**
 - 6 of them preferred a system that consider emotion elicitation and gesture
 - Elderly people have very high expectation to conversational robots → dialogue contents of daily conversation is very important for continued use