

Tree-Based Interview Topic Guidance for Collecting Target Information under Adaptive Topic continuation/switching

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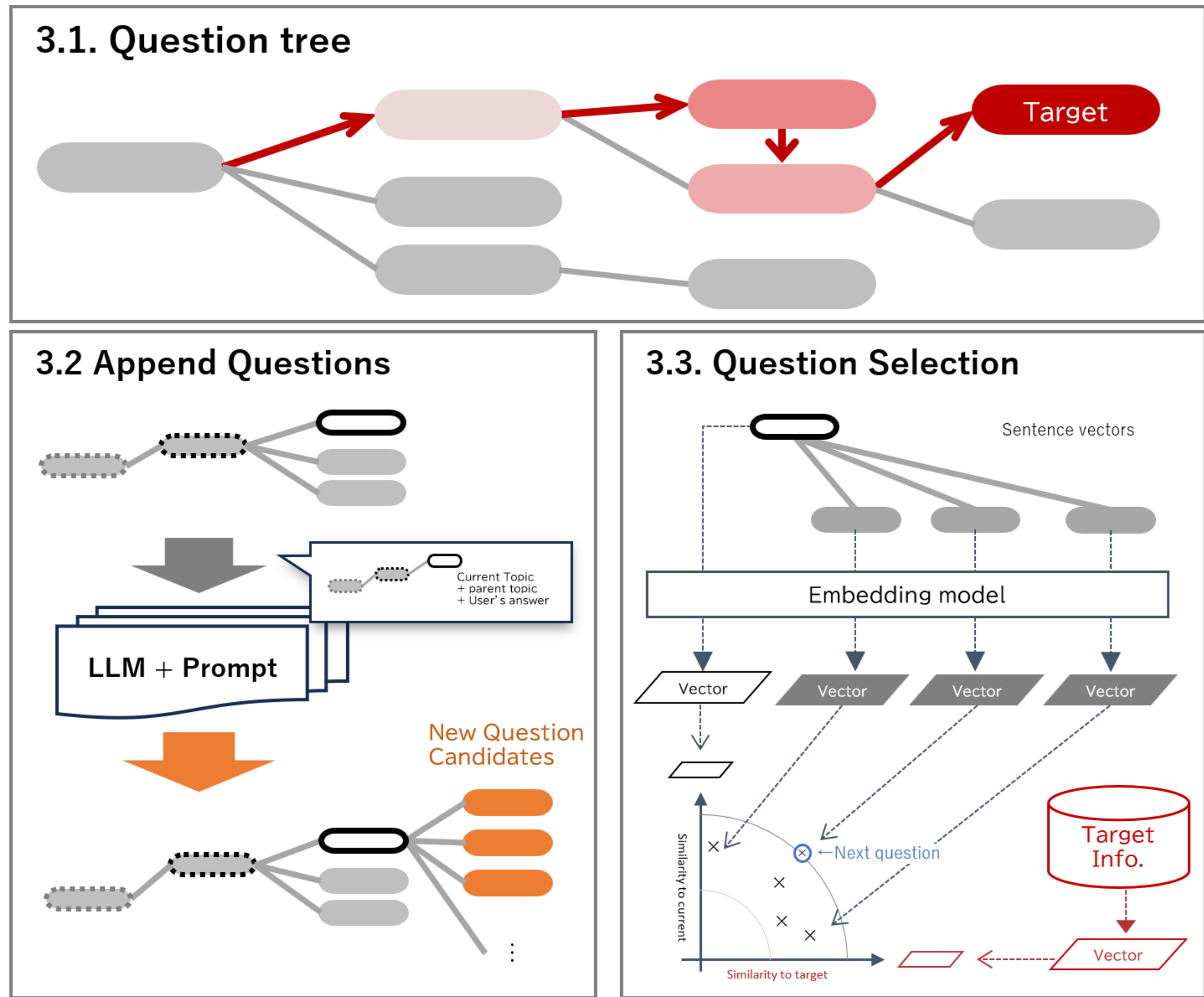
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Goal : Interview-based Human-Computer Interface

- Extraction users’ deep-seated needs and interests through adaptive interviews
- Aims : Interface technology **that will help users struggling with verbal expression.**

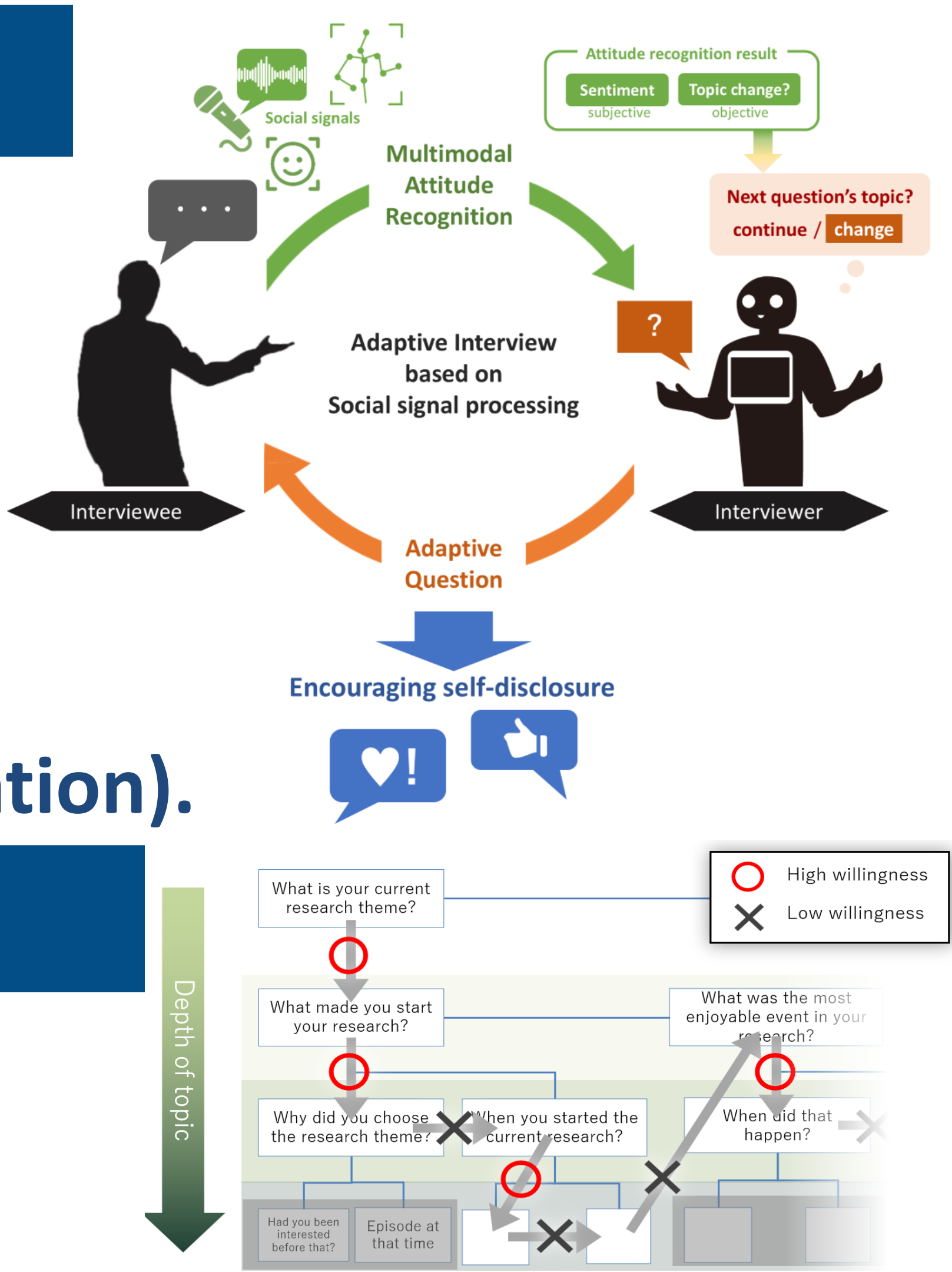
Topic adaptation (continuation/switching) based on Multimodal Attitude Estimation
Encouraged users self-disclosure [Nagasawa25],
but it tends to steer **topics that “what the user wanted to talk about.”**
Systems must also collect the information necessary to provide its services (=target information).

Question-Tree & Topic Guidance



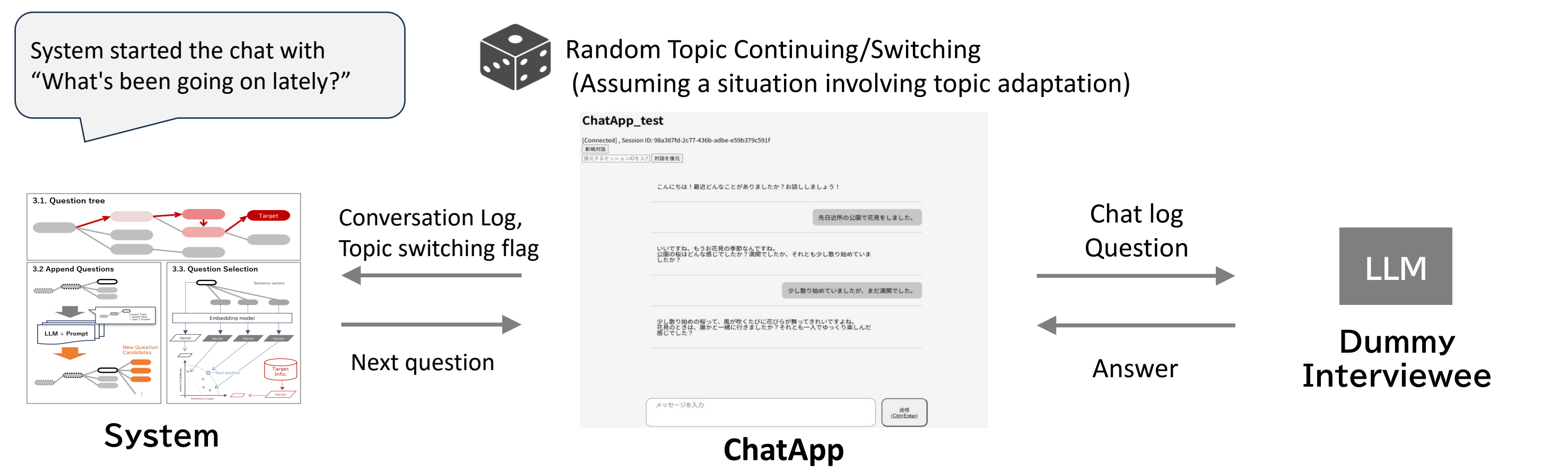
Guidance that gradually leads the user toward the **target information**, even under the topic adaptation.

- 3.1. Arrange questions in a tree-graph based on topic-elaboration relationships
 - Topic continue & elaboration → move to children nodes
 - Topic switch → move to brother nodes
- 3.2. **Real-time nodes (question candidate) generation with LLMs.**
 - Questions to elaborate current topics / to approach target information
- 3.3. Select next questions based on semantic similarity.
 - maximizing sum of cosine similarity with current topics and target info.



Target-info collection simulation exp.

Can Question-Tree-based question guiding enhance of target-information collection rate?



- LLM-based interview simulation
- Model : openai/gpt-oss-20b
 - Embedding:openai/text-embedding-ada-002
 - 4 condition × 100 sessions

Condition	Candidate Questions	Selection Guidance
(A)Baseline	Deepening only	No(Random)
(B)+Approach	Deepening+Approach	No(Random)
(C)+Selection	Deepening only	Yes
(D)+All	Deepening+Approach	Yes

- 10 Exchanges in 1session
- Target information : 24 Questions for Various Stages of Self-Disclosure[Niwa10]
 - Level 1: Hobbies x7 , Level 2: Past difficult experiences x4,
 - Level 3: Non-critical weaknesses x6, Level 4: Negative personality x7

Analysis
→ Does topic guidance increase the collection rate of target information?
→ Can topic guidance be used to gather information involving deep self-disclosure?

Results

Condition	Avg.(%)	collection-rate			
		SD	$p(X)-(A)$	$r(X)-(A)$	
(A)Baseline	10.8	8.40	—	—	
(B)+Approach	24.3	3.42	0.009	+0.72	
(C)+Selection	20.5	2.99	0.010	+0.66	
(D)+All	26.6	2.02	0.002	+0.75	

Condition	Average filled slots count Self-disclosure level			
	Lv1	Lv2	Lv3	Lv4
(A)baseline	2.59	0.00	0.00	0.00
(B)+Approach	4.21	0.30	0.00	0.00
(C)+Selection	4.90	0.03	0.00	0.00
(D)+All	6.00	0.39	0.00	0.00

Maximum Avg. with “(D)+ALL” (A: 10.8% → D: 26.6%)
+Improved target information collection performance.
Standard deviation decreased significantly with (D)
+Reduced variability in collection performance across sessions.

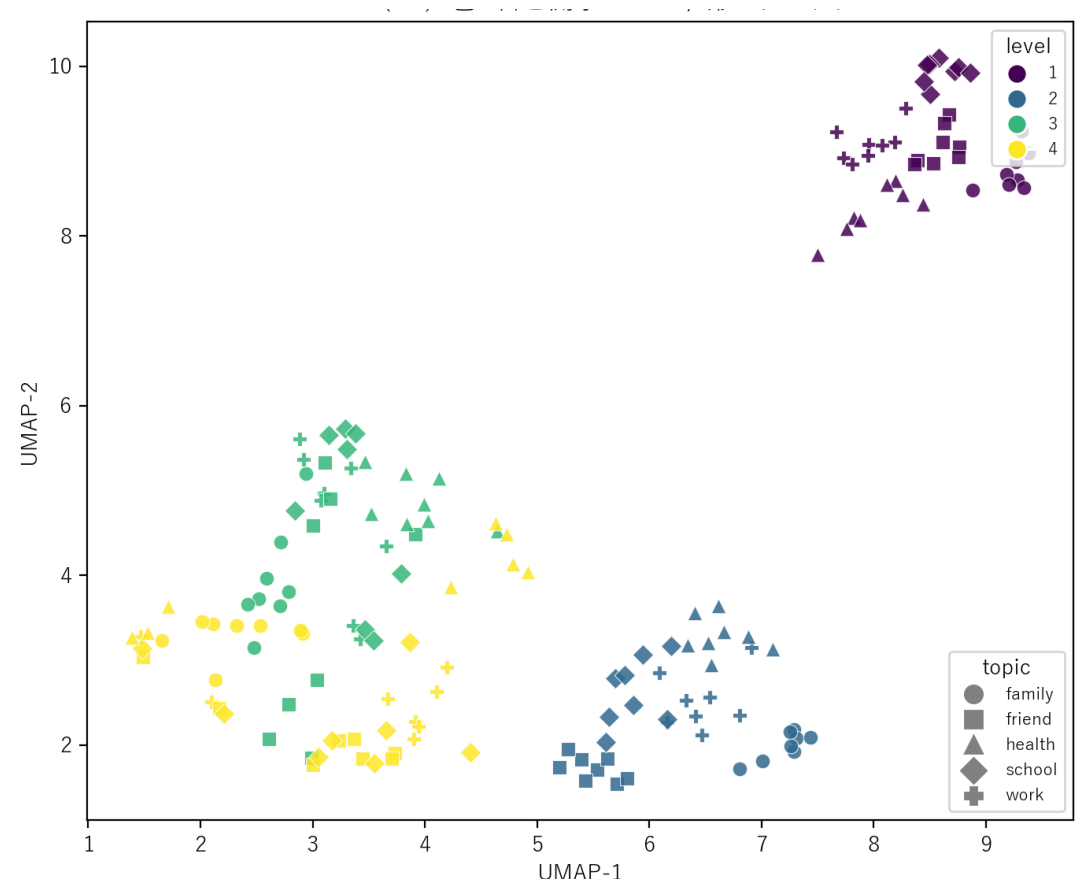
Most of the collected information fell into Lv1 (Hobbies) and Lv2 (Past difficult experiences).
This trend was particularly pronounced in (C)+Selection and (D)+ALL.
— Topic guidance based on cosine similarity caused Heavy-collection on topics with a low level of self-disclosure.

Limitation & Future Tasks

Excessive computational cost
Generating Multiple Candidate Questions and Selection
→ Unnecessary computations resulting from the generation and embedding of questions that were not selected.
Future-task: Eliminate waste by generating text with the required vectors

Only low-levels of self-disclosure was collected
Differences in self-disclosure levels have a stronger influence on the distribution of text vectors than topic

Future-task: Improving the prompt generation algorithm to account for self-disclosure levels



[Nagasawa25] Fuminori Nagasawa and Shogo Okada. 2025. “Can Adaptive Interviewer Robot Based on Social Signals Make a Better Impression on Interviewees and Encourage Self-Disclosure?” In Proc of the 27th International Conference on Multimodal Interaction (ICMI '25).
[Niwa10] Niwa, Sora, and Shun'ichi Maruno. "Development of a Scale to Assess the Depth of Self-disclosure." *Japanese Journal of Personality/Pasonariti Kenkyu* 18.3 (2010).