Design of Interaction Process for Communication Robot to Talk Users' Worries

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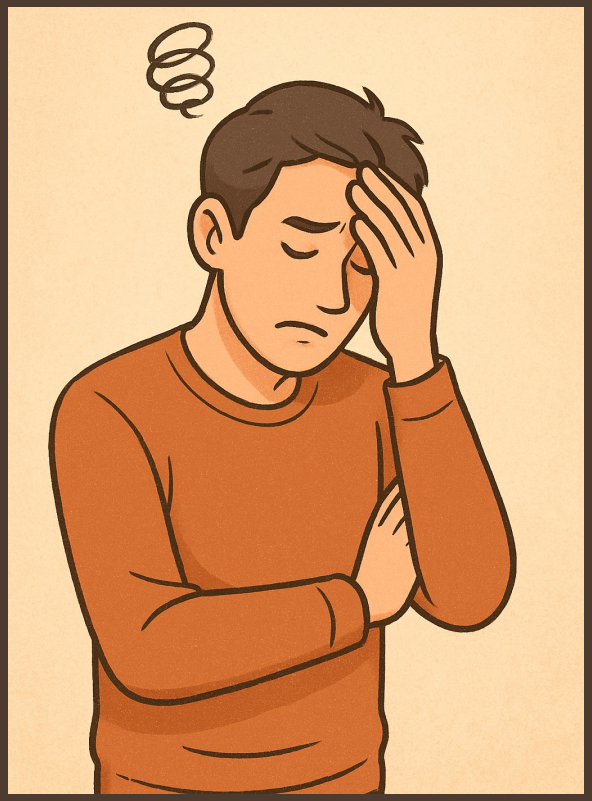
Achievements of this research

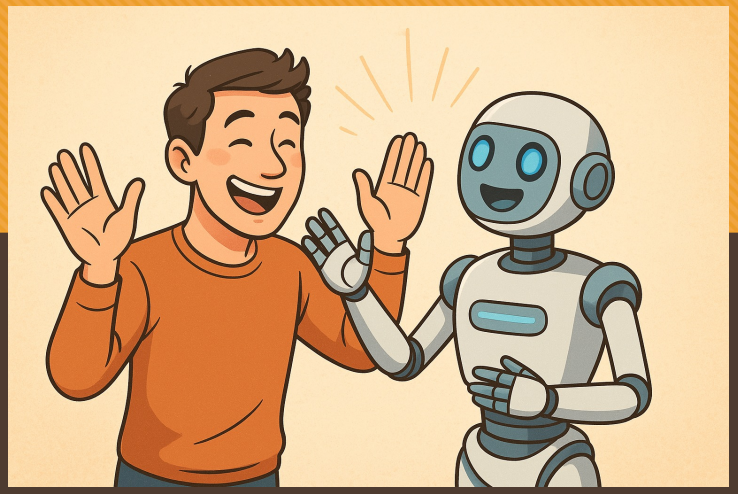
- Users are encouraged to help the robot.
- The user receives thanks from the robot after help.
- The robots asks about any worries.
- This interaction process facilitated users to disclose worries.

Research Background



- Users often hesitate to casually disclose worries to others.
- It can be difficult to talk about worries.
- Our aim is to facilitate worry disclosure

Research Objective



- We change the consultation partner to a robot
- In gratitude for the assistance, the robot inquires if the user has any worries
- Interaction process can promote positive/active interaction & facilitate worry disclosure!

The Proposed Interaction Process

Process 1: Robot seeks help

If the user approaches and helps

Process 2: The user receives robot's gratitude

Process 3: Robot asks if the user needs help

If the user disclose worries

Process 4: Robot helps the user

BOCCO emo

Process 1: Robot Seeks Help

・The robot calls out ”help! help!" to surroundings.

・Helper’s prosocial behavior is reinforced.

・We assume the user to approach and help robot

Process 2: The User Receive Robot's Gratitude

・The robot expresses gratitude to user.

・The expression of gratitude
can recognize the act of helping
and enhance self-affirmation.

・We expected to make it easier to seek
help from the robot

Process 3: Robot Asks if the User Needs Help

- The robot asks "Is there anything you would like help with?"

- We anticipate the user to share worries

Process 4: Robot Helps the User

- If the user discloses worries, the robot provides a solution.
- We use LLM To Generate Solutions

  - Used prompt for LLM

    I am having trouble with [contents of worries].
    Please tell me how to solve this problem.

    - Conditions
      - Don’t use honorific language
      - 200 hundred Japanese characters
      - Finally, tell them, “Good luck!”

Explanation of Evaluation Experiment

- Experimental Procedure:

  We compare the results of the proposed method with the comparative method.

- Participants (N=16):

  Both groups (proposed and comparison group) comprised 8 college students each (7 male, 1 female).

- Data Used for Evaluation:

  Pre-questionnaire and post-questionnaire.

- Evaluation Metrics:

  Averages of pre- and post-questionnaires and results of the t-test.

Pre-Questionnaire Content

- measure "help-seeking orientation"

[Adapted from Nakabayashi & Goto, 2015]

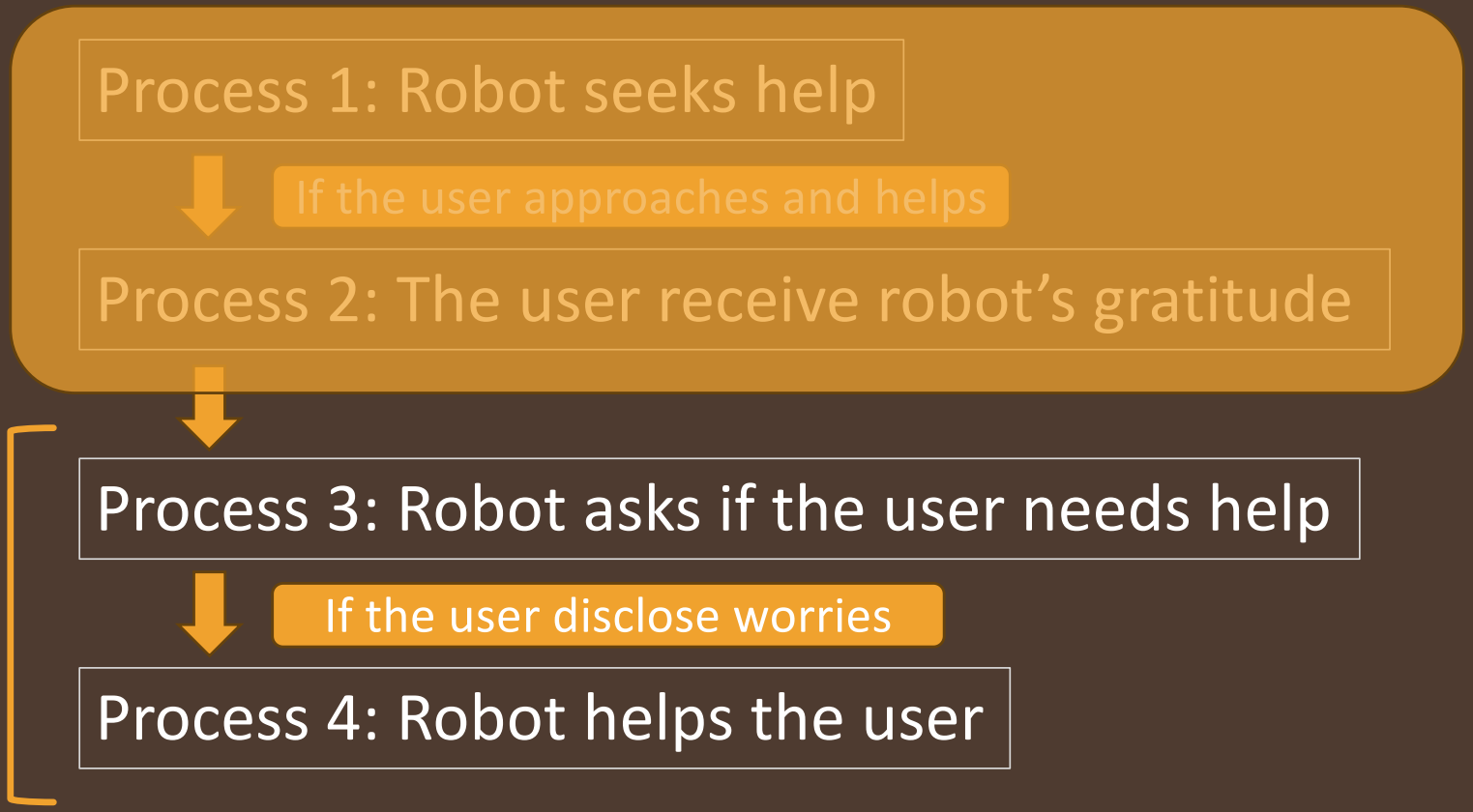
1	I want advice and assistance from others to solve my worries.
2	I want someone who will work with me to solve my worries.
3	When you are in worries, you want someone to listen to you.
4	I want to solve everything on my own without relying on others.
5	When I am in worries, I want people around me to leave me alone.
6	I want to continue to do well with the help of those around me.
7	Unless there is a compelling reason, I do not consult with others.
8	Resistance to receiving advice or assistance from others.
9	I always feel uncomfortable when I consult with others or ask for help.
10	I don’t think other people’s help or advice is very useful.

Post-Questionnaire Content

- measure effect of proposed method

1	Was it easy to approach the robot?
2	Did you think about helping the robot?
3	Was it easy to communicate with the robot?
4	Did you understand the robot's instructions right away?
5	Did you feel comfortable confiding your worries and complaints to the robot?
6	Did talking about your worries make you feel better?
7	Did you get the response you expected from the robot after telling it your worries?
8	Why did you decide to study robotics? as a text comment

Comparative Method Flow



Pre-Questionnaire Results (Help-Seeking Orientation)

- Pre-Questionnaire :

Question No.	1	2	3	4	5	6	7	8	9	10
Proposed Group	6.125	6.375	7	3.75	3.75	6.375	3.25	2.5	2.875	2.875
Comparison Group	6.25	6.375	6	4.25	2.625	6.375	3.25	2.5	3.375	2.125
P-value	0.082	1	0.179	0.615	0.167	1	1	0.506	0.305	0.287

No significant difference was found in all items.

Post-Questionnaire Results

- Post-Questionnaire Items with Significant Difference (Excl. Q2)
  - Q1: Was it easy to approach the robot?
  - Q3: Was it easy to communicate with the robot?
  - Q5: Did you feel comfortable confiding your worries and complaints to the robot?
  - Q6: Did talking about your worries make you feel better?

Question No.	1	2	3	4	5	6	7
Proposed Group	6.5	7.25	7.25	7.5	6.375	6.375	6.5
Comparison Group	4.5	2.75	5.125	6.25	3.875	3.625	5.125
P-value	0.029	9.55E-06	0.014	0.128	0.004	0.002	0.171

The effect

It has been found that the participants become

- more comfortable approaching robots
- find communicating with them easier to understand
- feel more at ease discussing their worries with robots
- experience a sense of relief after sharing their worries

Contents of Worries

・Proposed Group

Type of Worries	Participant Count
Daily Life	3
Academic Studies	4
None	1

・Comparative Group

Type of Worries	Participant Count
Daily Life	2
Academic Studies	6

・No significant difference was found between the two groups.

・Example of worry

I'm worried about whether I'll be able to pass my courses

My research is not progressing.

I'm lonely living alone.

Conclusion of This Study

・We proposed an interaction process using a robot to make it easier for users to consult about their worries

・We compared the proposed and the comparative method with eight participants each, based on a questionnaire

・The proposed method was found to make it easier to confide worries.

・The interaction process of the proposed method can facilitate the expression of worries.