

## “tsuzumi” with physical senses and a robot body

### IOWN Pick Up

NTT version Large Language Models



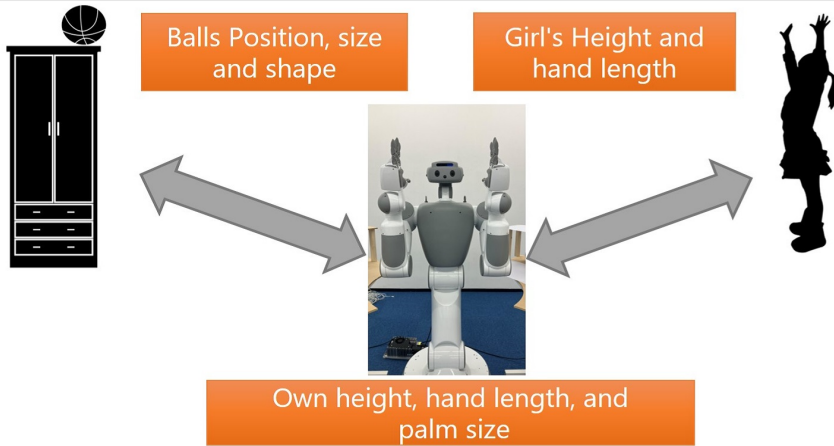
### Background

In order to use LLMs in the physical world, it is necessary to give LLMs bodies and also to make LLMs understand their own physicality and that of their users.

### Summary

Real-time control of the robot by LLM has enabled the robot to respond flexibly to ambiguous user instructions and unexpected changes in the situation. In addition, by understanding the user's physical behaviour, the robot can spontaneously assist the user.

### Action plan from oneself, one's surroundings, and the surrounding environment



### Smart and flexible behavior

**In:** The girl wants to get the ball. The girl reaches for the ball but cannot reach it.

**Out:** speech "I will take the ball"

**In:** The distance from my position to the shelf is 3m. My height and the height of the shelf are about the same.

**Out:** Action plan: "Walk 3 meters to the shelf position, raise your hands to head height..."

### Features

- The LLM learns how to move the robot's body, inputs sensor information to the LLM and controls the robot with the LLM's output
- It achieves an understanding of human physicality and behaviour that has not been possible with previous robotic systems. This enables spontaneous user assistance from the robot
- NTT-LLM enables real-time control of robots by LLM, which is difficult with existing LLMs

### Future\_benefits

LLMs learn knowledge of physical tasks such as 'tricks' and 'waza', and robots use the tricks and waza to perform inexperienced physical tasks and teach the tricks to others.

### Exhibiting Company

NIPPON TELEGRAPH AND TELEPHONE CORPORATION

### Contact

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