A Robot as a Teaching Assistant in an English Class

Elective in Artificial Intelligence

Human-Robot Interaction

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Outline of the presentation

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Paper Description

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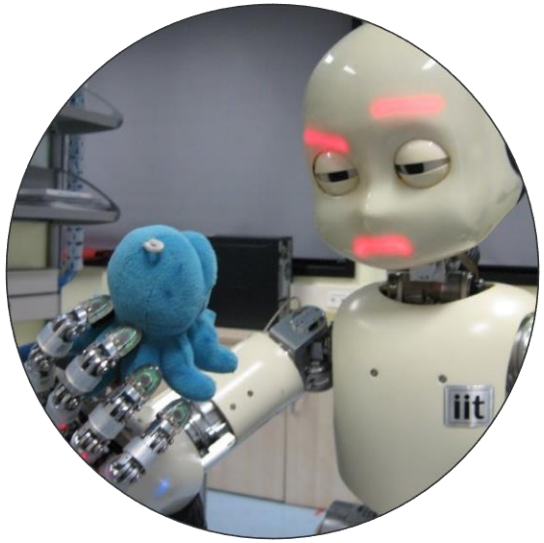
The **humanoid physical form** makes human-robot social interactions happen in a **more natural way**



Application domains

- Recommender system
- Personal assistant
- News presenter
- Education
- Home appliances
- Entertainment
- …

Paper Description

There is a direction worthy of exploration:

Robots as partners of a teacher in a classroom

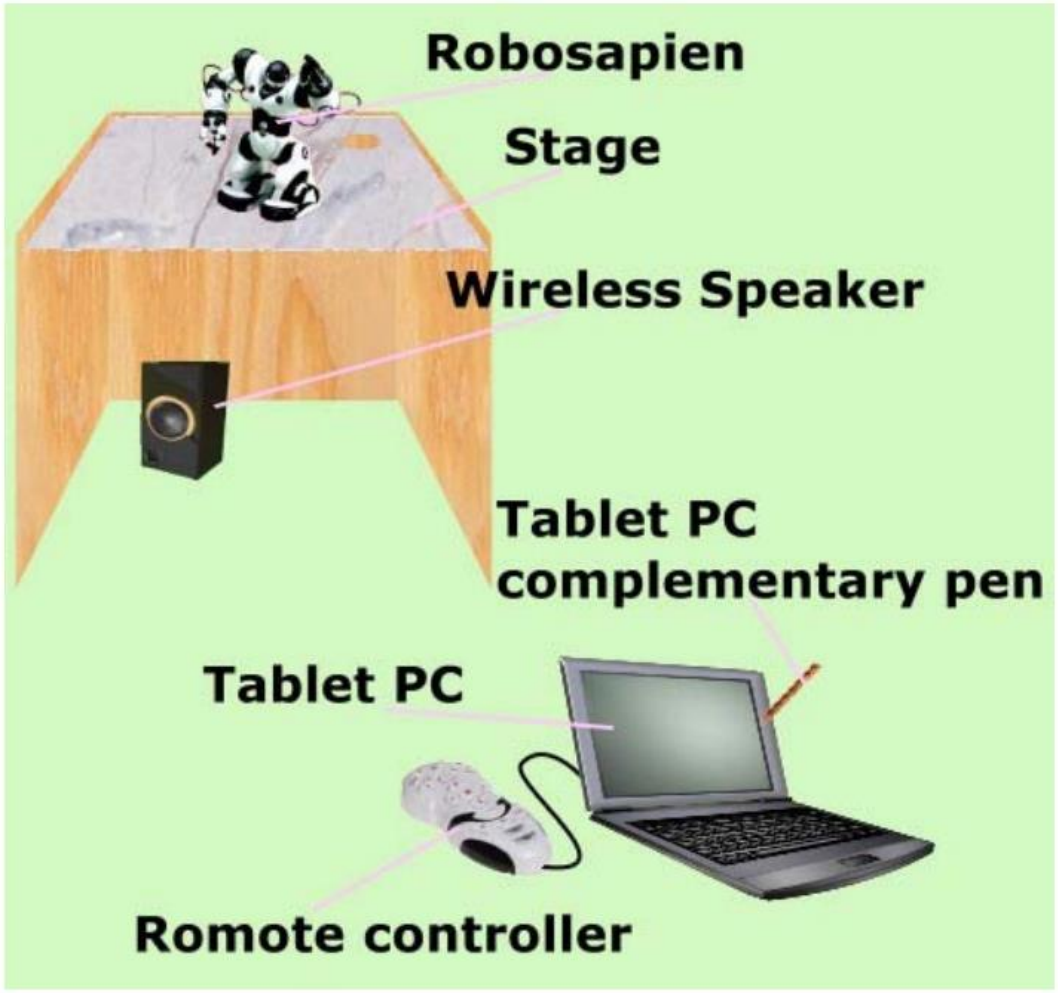
In particular, this paper explores the use of **Robosapien** to help teaching English in Taiwanese elementary classrooms

- A programmable low-cost humanoid robot
- Produced for the toy market by WowWee

Robot Platform

Robot Platform

The Robot Platform consists in a combination of various pieces of **Hardware** and **Software**



- Height: 36cm
- Weights: 2.1kg
- 4 "D" alkaline batteries
- Eye lights and comic sounds for **emotional state**

- Robosapien's remote controller was extended with a DSP board that is connected to a Tablet PC

Robot Platform

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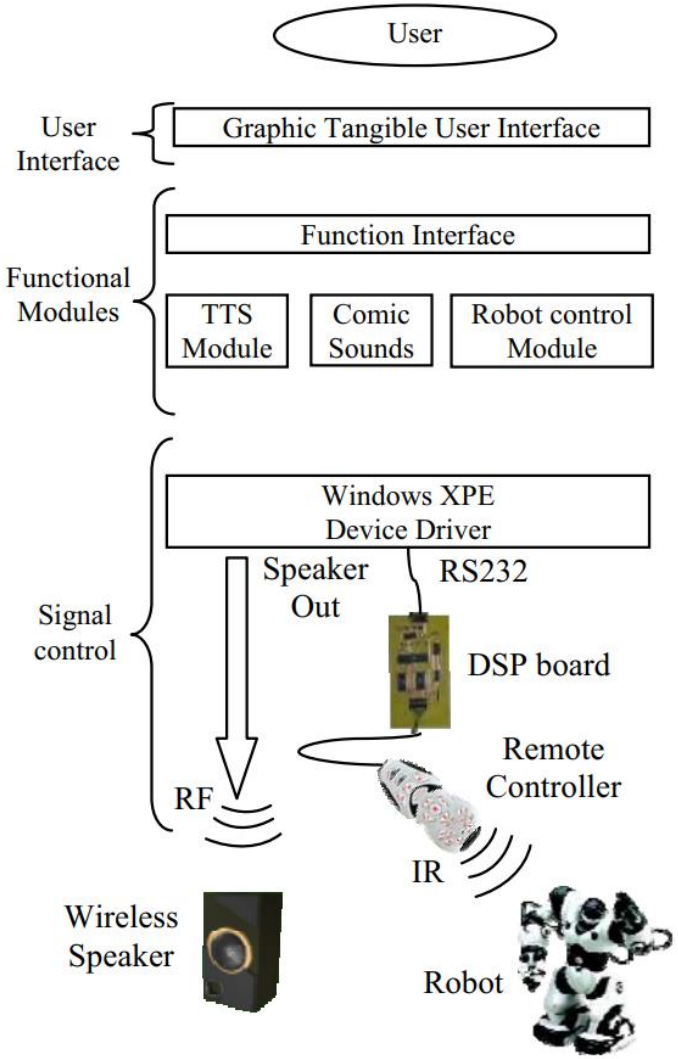


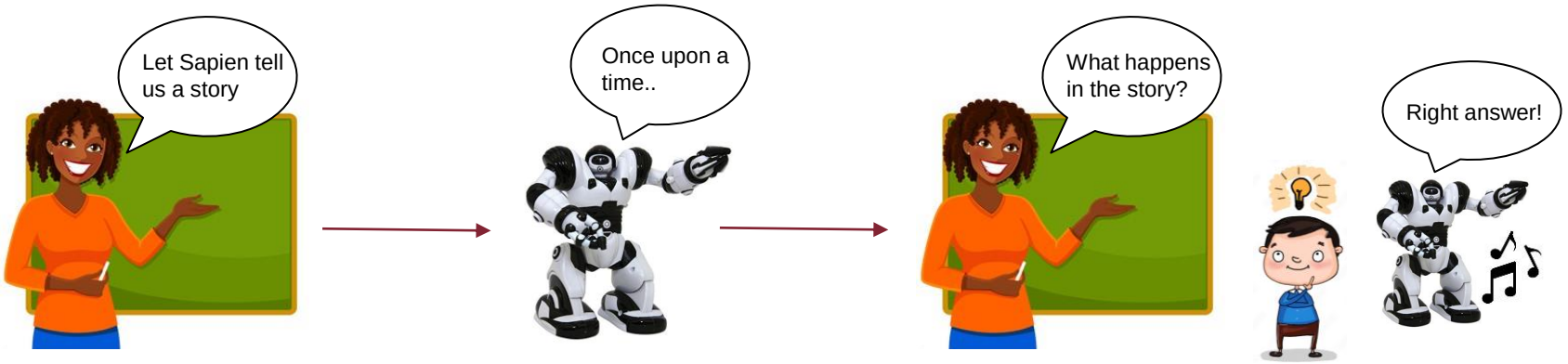
- Software integrates speeches, sounds and gestures control of the robot
- Speech of the robot is generated by Microsoft Speech SDK for text-to-speech
- The speaking rate, identity of the voice, and volume could be adjusted in real-time to fit the requirements

Teacher-Robot Interaction Models

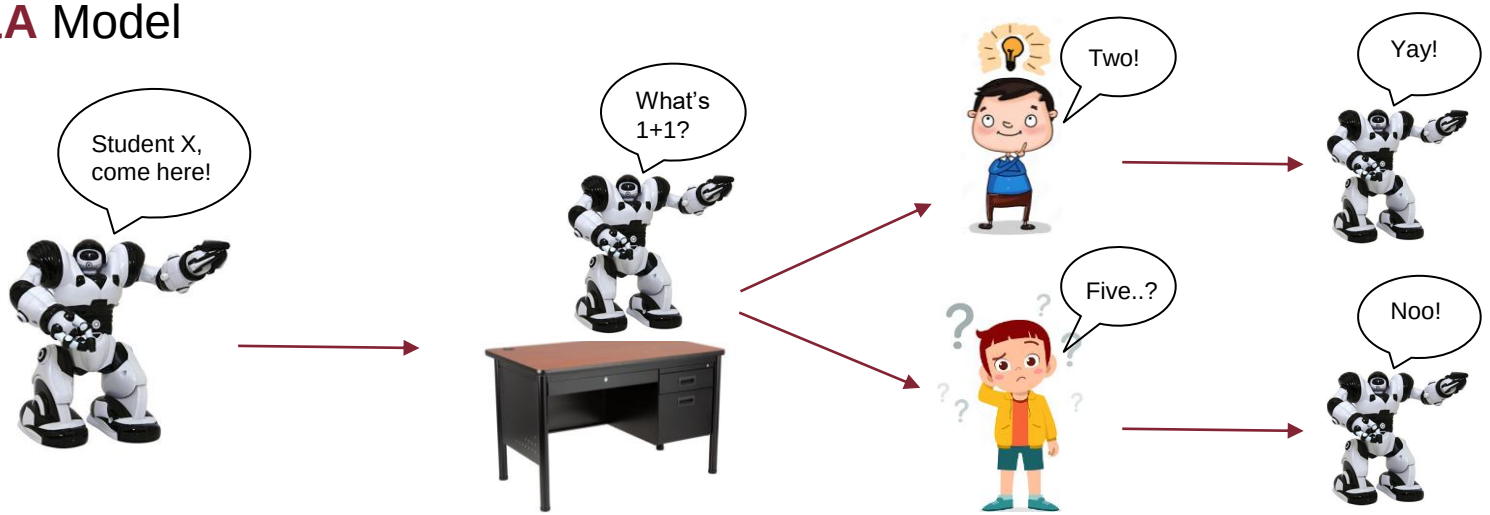
Teacher-Robot Interaction Models

Five methods for teacher-robot collaboration are proposed:

1. **Storytelling** Model



2. **Q&A** Model



Teacher-Robot Interaction Models

3. Cheerleader Model

- Q&A
- Picking the corresponding word or picture
- Performing actions

4. Let's Act Model

5. Pronunciation Leading Model

Experiments

Observations and Results

Experiments

- Three fifth grade classes (11 years old students) were involved in the experiments:
  - class A (33 students)
  - class B (35 students)
  - class C (32 students)
- The teacher of these three classes is the same
- For each class, the experiment was carried out in two lessons (40 minutes each) in two consecutive weeks

Experimental Observations

1. **Storytelling** Model

All the students were very excited and focused in listening and watching what the robot was doing. Most students desired to answer the teacher's question about the story. Usually, the students are not so involved in the activities.

2. **Q&A** Model

Some students were excited when the robot called them, but most of them were shy.

3. **Cheerleader** Model

Students participated in the competition activities more enthusiastically than usual.

4. **Let's Act** Model

Most students could follow what the robot ordered them to do. In the second part, at the beginning the students gave simple commands that Robosapien could do. Later, students began making fun of it, ordering it to perform some actions that it could not do.

5. **Pronunciation Leading** Model

Students repeat loudly full of joy after the robot. We believe the students were more willing to speak in English while the robot cheered them.

Experimental Results

Q1. When the robot cheers me, I feel very happy.
Q2. I think the robot's motion is very funny.
Q3. The robot can always attract me to the content of the class.
Q4. I like the robot's speaking more than the CD player.
Q5. The robot makes me like more this class.
Q6. The robot performs with the teacher very well.
Q7. I wish the robot will appear again in class next time.

	Class A		Class B		Class C	
Questions	M	SD	M	SD	M	SD
Q1.	3.61	1.20	4.24	1.28	3.97	1.23
Q2.	4.12	0.99	4.41	1.16	4.10	1.42
Q3.	3.58	1.17	3.77	1.35	3.94	1.09
Q4.	3.67	1.27	3.86	1.17	3.94	1.22
Q5.	3.79	1.17	3.97	1.25	3.75	1.39
Q6.	3.97	1.06	4.06	1.28	4.32	1.01
Q7.	4.09	1.42	4.46	1.20	4.41	1.24

Final Personal Comment

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- Given the observations and results, the presence of a robot is positive even in the classroom domain.
- Important Aspects: **Novelty Effect** and **Teacher Understanding.**
- Suggestions:
  - Longer experimental period
  - More teachers/classes
  - Use a better performing robot
- Our project also aims at including a **reasoning module**.

References

- **Zhen-Jia Y., Chi-Yuh S., Chih-Wei C., Baw-Jhiune L., Gwo-Dong C.**
  "A Robot as a Teaching Assistant in an English Class", 2006 Sixth International Conference on Advanced Learning Technologies