UbiComp 2015, Demo

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I–Eng

An Interactive Toy for Second Language Learning

Natural Acquisition of a Second Language

The ideal scenario in language education is children learning new words and sentence–building skills on their own. However, natural acquisition of a second language is difficult, as children have less exposure to a second language compared to their native tongue. One approach to expand second language exposure to children is to introduce include language elements in toys, which are always around children.

We propose an interactive second language learning toy named I–Eng to support language learning experience of children. Diverse stories are made by role playing with I–Eng, and the toy speaks sentences corresponding to the situation.

By trying out various interactions, children "learn by doing" with context–related words and sentences. We expect the language model to be built naturally inside children's minds by them engaging in various actions, and observing the reactions of the toy.

Components

Talking Plush Doll

- Detects and tangible object toys in front.
- Gives interactive feedback corresponding to the situation.

Tangible Object Toys

- Comes as a group with themes. (e.g. Food, Transportation, Plants, etc.)
- Provide language expressions related to the theme.

Storybook

- Serves as storage for the toy pack.
- Contains essential expressions related to the theme pack inside the story.

Interaction Design

Detecting Combination of Objects

- The doll can detect multiple objects at once.
- Different responses reflect the combinations of objects.

"A piece of bread! What a perfect match with my warm tea."

"Let's make apple juice."

Detecting Movement of Objects

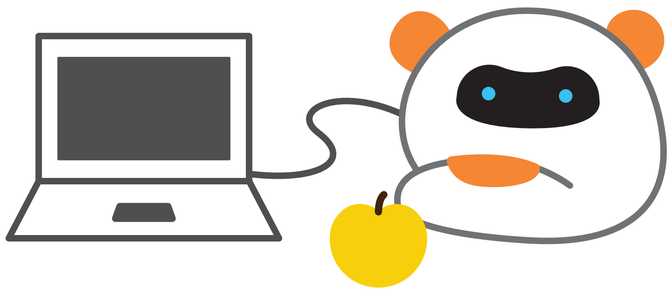
- The system keeps track of the tagged objects placed near to the doll.
- Responses are modeled based on three movement states.

Approach State	A tag that has not been previously detected is newly detected.
Idle State	A tag is continuously detected for more than 5 seconds.
Loss State	A tag that has been detected is lost.

Facial Expressions

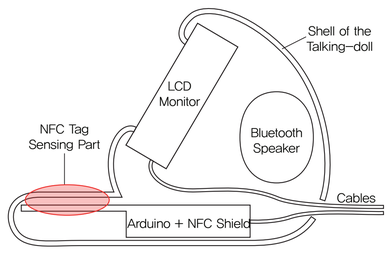
- Different facial expressions are assigned depending on the mood of the response sentence.
- Help children recognize the doll's social character and support understanding of the language.

Prototype Implementation



Talking Plush Doll

- An Arduino board + NFC shield.
- An LCD monitor for face of the doll.
- A Bluetooth speaker for sound.



Side section view of the doll

Laptop

- Processing code running as a core part.
- Connected with the plush doll to recieve and send signals.

Tangible Object toys

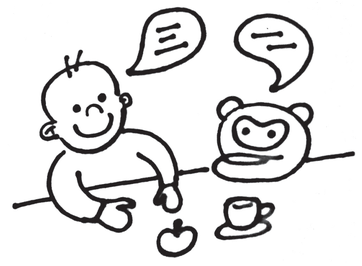
- NFC tag embedded for identifying objects.
- Approximately 5cm detection distance limit.

User Scenario

I–Eng is designed for both children learning a second language and their caregivers. The interaction design supports two scenarios.

Free Play Scenario

- A child plays freely and independently with I–Eng.
- The child learns second language words and sentences by introducing various object toys to the doll.
- The doll collects usage data to provide learning progress to the caregiver.



Guided Interaction Scenario

- A caregiver reads the storybook that comes with the object pack.
- While reading the book, the users role–play synchronously with the guided sequence of object toys.
- Important expressions are emphasized along with the guided interaction.