A Human-AI Collaborative Chatbot for Parent-Child Interactive

Storytelling

Motivation:

University of California, Irvine has developed StoryBuddy to address the need of interactive storytelling for language learning. StoryBuddy is a system where parents collaborate with AI in creating interactive storytelling experiences for children. StoryBuddy allows parents to configure question generation and answering, and track child progress towards goals. However, StoryBuddy as a pilot conversational AI to offer storytelling experiences does not support bilingualism, trialogue and cultural heritage learning. We aim to address all these three concerns by building an AI-powered conversational agent in creating interactive storytelling experiences for Macau and Hong Kong children with diverse mother tongues and cultural background through Children-Parent-AI interaction.

Key Insights from literatures:

- Parents prefer interactive storytelling systems because it leads to more engaged and active learning
- Parents view technologies as an effective way to promote parent-child interaction for it can trigger interesting question-answering and extended conversations
- Parents are highly involved in selecting story content for the children through customization features since they are concerned about the age level appropriateness of the contents

Design Strategies:

Our team defined five design strategies along with implementing the conversational AI for storytelling:

DS1: Maintain child attention and optimize engagement through the alternating versions of the digital AI platform

-Through motivating students and avoiding children to get bored easily. **DS2:** Assist parents with facilitating question-answering in joint-reading through recommendations of questions to ask and opportunities to ask questions DS3: Generate appropriate follow-up questions with educational value and relevant story themes to facilitate child engagement and the effectiveness of assessmentDS4: Accommodate varied parent preferences on the granularity to configure interaction contents through providing flexible options

DS5: Address the conflict between 1) parents' desire to participate in the live storytelling process in order to strengthen parent-child relationship and 2) the limitation that AI-powered storytelling tool sometimes cannot support both synchronous parent-child joint-reading with AI assistance, and AI-facilitated storytelling where question-answering contents were asynchronously configured by parents

Participatory Design Architecture



Fig. 3. The system architecture of StoryBuddy. Lines with arrows represent data exchange between modules. The directions of the pointers on modules indicate whether the module interacts with the parents (right) or the children (left).

User Study

In the future, we will conduct a remote user study to examine five research questions evaluating the utility, usefulness and likeability of our digital storytelling platform:

- **RQ1**: Can parents successfully use our digital storytelling platform to create interactive storytelling experiences for their children?
- **RQ2**: How do parents and children interact with our digital storytelling platform in parent-attentive mode and parent-absent mode?
- **RQ3**: Do parents and children find digital storytelling platform likeable, usable, and useful?
- RQ4: Does our digital storytelling platform address the cultural heritage needs for parents and children if their mother tongue is neither Cantonese or English?
- **RQ5**: Does our digital storytelling platform address the needs for bilingual language learning?