

# POMY: A Conversational Virtual Environment for Language Learning in POSTECH

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## Abstract

This demonstration will illustrate an interactive immersive computer game, POMY, designed to help Korean speakers learn English. This system allows learners to exercise their visual and aural senses, receiving a full immersion experience to increase their memory and concentration abilities to a greatest extent. In POMY, learners can have free conversations with game characters and receive corrective feedback to their errors. Game characters show various emotional expressions based on learners' input to keep learners motivated. Through this system, learners can repeatedly practice conversations in everyday life setting in a foreign language with no embarrassment.

## 1 Introduction

The needs for computer-based methods for learning language skills and components are increasing. One of the ultimate goals of computer-assisted

language learning is to provide learners with an immersive environment that facilitates acquiring communicative competence. According to Second Language Acquisition (SLA) theories, there are some essential factors for improving learners' conversational skills: 1) comprehensible inputs and outputs, 2) corrective feedback, and 3) motivation and attitude. SLA theories imply that providing learners with the opportunity to have free conversations with someone who can correct their errors is very important for successful acquisition of foreign languages. Moreover, motivation is another crucial factor; therefore a good CALL system should have elements which can interest learners [1].

Considering these requirements, we have developed a conversational English education framework, POMY (POstech iMmersive English studY). The program allows users to exercise their visual and aural senses to receive a full immersion experience to develop into independent English as a Foreign Language (EFL) learners and increase their memory and concentration abilities to a greatest extent [2].



Figure 1: Example screenshots of POMY: path-finding, post office, and market

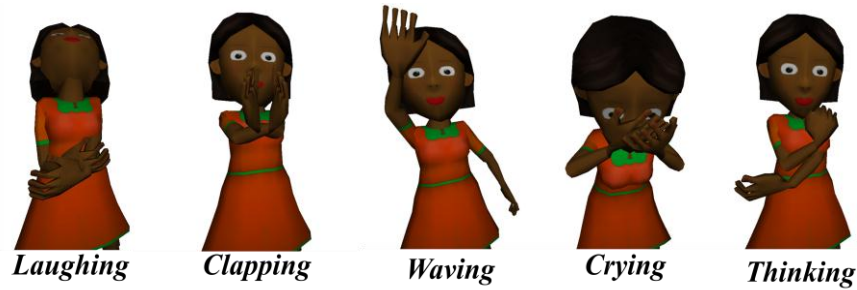


Figure 2: Various character animations

## 2 Demonstrated System

In order to provide learners with immersive world, we have developed a virtual reality environment using the Unity 3D game engine<sup>1</sup>. For the domains that learners are exposed to, we select such domains as path-finding, market, post office, library, and movie theater (Figure 1) to ensure having learners practice conversations in everyday life setting. To keep learners motivated and interested during learning sessions, learners are encouraged to accomplish several missions. For example, the first mission in the post office is to send a camera to one's uncle in England. The package must be insured and delivered by the next week. In order to send the package, a learner must talk to Non-Player Characters (NPCs) to fill in the zip-code properly.

All NPCs can perceive the utterances of learners, especially Korean learners of English. Korean learners' production of the sound is different from those of native speakers, resulting in numerous pronunciation errors. Therefore, we have collected a Korean-English corpus to train acoustic models. In addition, since language learners commit numerous grammatical errors, we should consider this to understand their utterances. Thus, we statistically infer the actual learners' intention by taking not only the utterance itself but also the dialog context into consideration, as human tutors do [1].

While free conversation is invaluable to the acquisition process, it is not sufficient for learners to fully develop their L2 proficiency. Corrective feedback to learners' grammatical errors is necessary for improving accuracy in their interlanguage. For this purpose, we designed a

special character, Ghost Tutor, which plays the role of English tutor and helps learners to use more appropriate words and expressions during the game. When a learner produces ungrammatical utterances, the Ghost Tutor provides both implicit and explicit negative and positive feedback in a form of elicitation or recast, which was manifested as effective ways in the second language acquisition processes [3]. To provide corrective feedback on grammatical errors, we use a method which consists of two sub-models: the grammaticality checking model and the error type classification model [4]. Firstly, we automatically generate grammatical errors that learners usually commit [5-6], and construct error patterns based on the articulated errors. Then the grammaticality checking model classifies the recognized user speech based on the similarity between the error patterns and the recognition result using confidence scores. After that, the error type classification model chooses the error type based on the most similar error pattern and the error frequency extracted from a learner corpus.

Finally, the human perception of NPC's emotional expressions plays a crucial role in human computer interaction. Thus, all NPCs are provided with a number of communicative animations such as talking, laughing, waving, crying, thinking, and getting angry (Figure 2). The total number of animations is over thirty from which the system can select one based on the response of a learner. The system generates positive expressions such as clapping and laughing when the learner answers correctly, and negative expressions such as crying and getting angry for incorrect answers.

<sup>1</sup> <http://unity3d.com/>

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