Toward Scalable Dialog Technology for Conversational Language Learning: A Case Study of the TOEFL® MOOC

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Abstract

We present a scalable, dialog-based conversational practice tool for English language learners that is operationally deployed on the TOEFL® MOOC. The tool consists of three applications of varying duration that recognize the learner's speech input and respond appropriately. Learners are also provided with basic feedback regarding task performance after the completion of the conversation. We envision this as the first milestone towards the proliferation of many such scalable dialog applications that can help language learners practice, assess and improve their spoken conversation skills.

Index Terms: multimodal dialog, human-computer interaction, education, language learning, language assessment.

1. Dialog Technology for Language Learning

Advances in cloud-based dialog technology in recent years have facilitated the development at scale of a large number of human-machine conversational applications in multiple domains, and computer-assisted language learning (CALL) and assessment in particular. Well-designed dialog agents have the potential to elicit the full range of *conversational* speaking skills (such as turn taking abilities, politeness strategies, pragmatic competence) that are required for successful interactive communication, many of which are not addressed by traditional speaking tests that do not contain interactive dialog. Such technologies are also important since they offer opportunities for personalizing education to each learner, providing a natural and practical learning interface that can adapt to their individual strengths and weaknesses in real time so as to increase the efficacy of instruction [1]. In the future, such systems could potentially build an individualized profile for each learner that diagnoses gaps in knowledge and ability, adaptively composes instruction material, performs formative evaluation in many rounds of testing, scaffolds student learning through intelligent tutoring strategies, recommends when the learner is ready for a high stakes summative evaluation and recommends long-term goals [2]. Such conversational technologies have another advantage in that they are scalable. Recent developments in computing, signal processing and machine learning have proliferated the development of crowdsourced learning and massively online open courses (or more popularly, MOOCs), have facilitated the delivery of educational content to learners around the world at a hitherto unprecedented scale. These portals produce large amounts of empirical student data that in turn can be used to study the learning process, design better formative and summative assessments in an iterative manner, and improve learning at scale using informed feedback [3].

This contribution briefly demonstrates how we leveraged the cloud-based HALEF[1] dialog system [4] to deploy three dialog applications for conversational practice to the TOEFL® MOOC[2].

2. Deployment to the TOEFL® MOOC

We designed three tasks to provide speaking practice for non-native speakers of English across a wide range of common linguistic functions in an academic environment, including interacting with a barista at a coffee shop on a school campus, talking to a classmate about a homework assignment, and conversing with an advisor at the school career center. We aim for such tasks to be able to provide feedback to the language learners about whether they have used the required linguistic skills to complete the task successfully. Figure 1 shows a screenshot of the application as seen on the TOEFL® test preparation course on the EdX platform. Over the past ten weeks since its deployment in January 2018, the system has processed over 1400 conversations from over 400 MOOC participants.

3. Takeaways

There is an increasing need for conversational speaking practice, in particular, and language learning in general, especially given the continued growth and development of global multilingual communities. Multimodal and scalable dialog technologies are well-poised to address this need, and we have presented one such tool that provides conversational English practice as part of the freely-available TOEFL® test preparation course on the EdX platform. Future research and development will continue to expand the diversity and capabilities of such offerings to better suit the formative and summative assessment needs of language learners.

4. Acknowledgements

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[1]`http://halef.org`
[2]These applications are free and available to the public by signing up for the TOEFL MOOC on EdX (`https://www.edx.org/school/etsx`)

Figure 1: *Screenshot of the conversational applications deployed to the TOEFL® MOOC.*

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5. References

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