Artificial Intelligence for Pronunciation Improvement in Second Language Acquisition

Dr. Syeda Narjis Fatima (nergisabas@gmail.com)
Associate Professor, Faculty of English, Bhoj Reddy Engineering College for Women, Hyderabad, India

Abstract: Along with the Improvement of technology, there are numerous possibilities that are opening up. For instance, the linguistics industry is vividly impacted by the improvement in technology. Thus, the study has aimed to analyze the importance of Artificial Intelligence for Pronunciation Improvement in Second Language Acquisition. For the study primary data was collected from a sample size of 65 and quantitative analysis was conducted. The outcome of the study showed that with reliable progress reports and a massive database of language accuracy in AI models can be achieved. The additional cost was found a major hindrance to implementing AI for natural language processing. Hence it was recommended that working on the model development's correctness is crucial to enhance pronunciation accuracy. Additionally, it would be beneficial to search for mass implications to help offset the expense.

Keywords: Artificial Intelligence, Pronunciation, Second Language Acquisition

Introduction

Second language acquisition (SLA) is one of the growing sectors of language services with the increasing globalization. As per the opinion of Noviyanti (2020) acquiring a second language helps in achieving distinctive cognitive abilities for the individual. Additionally, with the improvement in technology, such as AI, the possibility of language processing services is growing leaps and bounds. Hence, the following analysis has focused on analyzing AI for pronunciation improvement.

It was noted that there are certain issues associated with using AI to improve pronunciation. For instance, cost-effectiveness is a major problem that hinders the implication of AI in language processing models (Guo, Yang &Gan, 2019). Additionally, AI runs on data, hence data bias and accuracy of data is major factors for such models.

Figure 1: Global market size of industry related to language services. (Source: Statista, 2022)

Figure 1 of the analysis is associated with the global language services projection. In the projection, a predictive analysis can be seen where the growth of the market is illustrated. It can be seen that the global language services were 23.5 billion USD (Statista, 2022). However, in 10 years stable growth was observed and in 2019 the market was 49.6 billion USD (Statista, 2022). Thus, it can be contemplated that there is a massive chance of growth in the linguistic market. Moreover, with the implication of AI the possibilities are endless. Hence, such possibilities in the market justified the rationality of the study.
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Aim

The primary aim of the study is to analyze the importance of Artificial Intelligence for Pronunciation Improvement in Second Language Acquisition.

Research Objectives

RO1: To analyze the importance of AI for achieving improvement in pronunciation for SLA
RO2: To determine the possible challenges that can hinder the process of accuracy in pronunciation
RO3: To understand the impact of different variables that can impact the pronunciation improvement
RO4: To suggest reliable outcomes for improving pronunciation for SLA with AI

Research Questions

RQ1: What is the importance of AI for achieving improvement in pronunciation for SLA?
RQ2: How the possible challenges that can hinder the process of accuracy in pronunciation?
RQ3: What is the impact of different variables that can impact the pronunciation improvement for SLA?
RQ4: How the process of improving pronunciation for SLA with AI can be achieved?

Literature Review

Importance of AI for achieving improvement in pronunciation for SLA: During the past analysis, it was noted that with the development of technology, the possibilities of different indices are increasing. Similarly, for the language processing industry, there are specific models such as Xnet and RoBERTa that provide accuracy in the language processing models.

Challenges associated with using AI for improving pronunciation in SLA: Through the analysis of literature, it was noted that there are definite issues related to the implication of AI for natural language
processing. Moreover, such challenges hinder the process of implementing AI to improve pronunciation in SLA.

![Figure 3: Challenges related with implementing AI in NLP. (Source: Kim, Cha & Kim 2019)](image)

Figure 3 is associated with challenges associated with AI in natural language processing. Additionally, it was noted that there are some other challenges that create challenges for implementing AI in SLA. As per the opinion of Kim, Cha & Kim (2019), one of the major and general issues of implementing AI is related to the cost of AI. Therefore, the cost of AI is a major hindrance to the mass implication of AI. On the other hand, Khoshsima, Saed & Moradi (2019) stated that with the implication of AI ethical concern is a major issue. AI is still not regulated by the government or any other private body. Therefore, ethical concerns for the implementation of AI are a major concern for implementing the same for language processing. Therefore, it can be contemplated that the challenges related to AI are subjective and can vary.

**Methodology**

**Data collection:** The process of collating data has a direct impact on an empirical analysis. For the study of the role of AI in pronunciation improvement in second language acquisition, the primary source of data collection was chosen. As per the opinion of Zakiyyah, Setyaji&Ardini (2022) primary data aids in providing a relay time idea related to a topic. Moreover, the process of primary data analysis helps collect data from people related to the topic. Hence for that reason, primary sources of data were chosen. In order to achieve the goal of primary data collection a sample size of 65 persons is chosen through random sample selection. Thus, an unbiased and reliable data set was achieved for the specific study. The sample size was surveyed with the help of a questionnaire consisting of 10 variable-related questions and 3 demographic questions. Moreover, the inclusion of demographic questions allows for analysis of the impact of demographic factors on the participants (Pourhosein, Gilakjani&Rahimy, 2019). Thus, comprehensible and trustworthy data was collected through the process of primary data collection.

**Data Analysis:** After the collection of data, all the collated data set was analysed through quantitative methods of analysis. As per the suggestion of Wongsuriya (2020), the method of quantitative analysis aids in providing rational relations among the data sets. Moreover, through quantitative analysis, a reliable outcome through following the objectives can be achieved. In order to analyse the data in a quantitative manner IBM SPSS software was used. For a better contemplation of the data set regression analysis along with a table of ANOVA, officiant and model summary was presented. In addition, for understating the outliers and the nature of the dataset a table of descriptive analysis was presented in the study (Haryadi, S &Aprianoto, 2020). Thus, based on the outcome of the regression analysis hypotheses were tested and a final conclusion was formulated.

Finding and Analysis; Demographic Analysis and Gender
Table 1 and Figure 5 are associated with the gender analysis of the participants. It can be seen that the frequency of the male is 38 and, in the figure, their representation is 58.5%. Additionally, female members have a frequency of 18 and the representation of female members was 27.7%. There were 13.8% of participants who identified themselves with other gender categories. Therefore, it can be stated that the representation of the male population dominated the data set.

Table 2 of the analysis is associated with the age group of the participants. It can be seen that the age group below 20 represented 27.7% of the population and had a frequency of 18. The age group between 20 and 35 had a frequency of 38 and a representation of 58.5%. Additionally, the age group between 35 and 60 had a percentage of 13.8% and was represented by 9 participants. Hence, the young and middle age population dominated the data set.

Table 3 is associated with the income range of the participants. It can be seen that the income range below RS 18000 represented 13.8% of the population and had a frequency of 9. The income range between RS 18000 and 30000 had a frequency of 38 and a representation of 58.5%. Additionally, the income range between RS 30000 and 50000 had a percentage of 27.7% and was represented by 18 participants. Hence, the middle income range dominated the data set.
Table 3 is associated with the income range of the participants where a possible range of income is illustrated. Moreover, the percentage for the same was respectively, 13.8%, 58.5%, and 27.7%, thus it can be estimated that the model income range was present in the majority however there was diversity in the data set.

### Statistical Analysis and Descriptive Analysis

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Table 4: Descriptive analysis of different variables (Source: IBM SPSS)

Table 4 of the empirical analysis is associated with the descriptive analysis of the dataset. As per the opinion of Xu et al. (2022), descriptive analysis aids in determining the nature of the data set. In addition, outliers of a data set can be identified through the understanding of descriptive statistics. From the above table, it can be seen that the mean value for the dependent variable is 3.6923 and the standard deviation value for the same is 1.04468. Similarly, 1st, 2nd, 3rd, and 4th independent variables provide mean values of respectively, 3.4154, 3.4308, 3.4308, and 3.1385. In addition, the standard deviation values for the same independent variables are respectively 0.72656, 0.72821, 0.90085, and .98230. As per the opinion of Kholis (2021), a higher mean value indicates that the responses are clustered around the mean. Hence, it is understood that most of the participants agreed with the statement. In addition, a higher mean than standard deviation indicates that the spread of the data set is not on the higher side.

### Discussion

A primary quantitative analysis was conducted in order to determine the usefulness of AI for natural language processing. The process by which people learn and become proficient in a language other than their first or native tongue is known as second language acquisition (SLA). Thus, accuracy in the process is a major factor. As per the opinion of Visaltanachoti & Chantana (2021), fluency of reach and understanding of a base language plays a significant role in improving the accuracy of natural language processing. Therefore, based on the fluency the first hypothesis was developed. It was noted that the hypothesis was supported by a significance value of 0.004. Thus, an appropriate relationship between fluency of language and improvement in pronunciation was found. As per the opinion of (Fu, Gu& Yang, 2020), understanding a base language impacts the overall performance of pronunciation for SLA. Therefore, it also was found that understanding different languages is essential for natural language processing.

Additionally, the fourth hypothesis a relationship between feedback and improvement of language processing was described. According to the suggestion of Lan (2022) feedback is essential in order to keep learners engaged with the process of learning. Therefore, feedback was supposed to be a factor impacting the improvements for SLA. It was noticed that for the fourth hypothesis, the significance value was 0.000. Thus, the entire null hypothesis was rejected based on the signified value. Therefore, found that providing reliable feedback is important in order to improve the accuracy of natural language processing. Hence it can be recommended that in order to improve the pronunciation for SLA it is essential to work on the accuracy of the model development. Furthermore, for countering the cost of such systems looking for mass implication would be helpful.

### Conclusion
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Thus, a detailed analysis for improving pronunciation accuracy in SLA with AI is presented in the study. It was noted that in order to improve pronunciation implementing accuracy in the feedback can be beneficial. In addition, having a wide range of languages can ease the process of learning languages. In addition, challenges such as cost efficiency were noted in the past literature. It was noted that with a mass implication such issues can be resolved. Additionally, using accurate algorithms and improving the accuracy of the natural language processing modules can be beneficial for improving accuracy.

References


Kim, N. Y., Cha, Y., & Kim, H. S. (2019). Future english learning: Chatbots and artificial intelligence. Multimedia-Assisted Language Learning, 22(3). Retrieved on 29th September 2023 from: https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrn=12298107&AN=139460192&h=Xd6guAz nhgSiOo mzk0AS2XOoP%2BuVxQSJ3iLqUbQsjCgFv9jIPx9gI tEgWmqQ0b wD5BtJrcJK4HR7ugw5Chw%3D%3D&crl=c


Kim, N. Y., Cha, Y., & Kim, H. S. (2019). Future english learning: Chatbots and artificial intelligence. Multimedia-Assisted Language Learning, 22(3). Retrieved on 29th September 2023 from: https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrn=12298107&AN=139460192&h=Xd6guAz nhgSiOo mzk0AS2XOoP%2BuVxQSJ3iLqUbQsjCgFv9jIPx9gI tEgWmqQ0b wD5BtJrcJK4HR7ugw5Chw%3D%3D&crl=c


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