

CHAPTER

8

SIGN LANGUAGE APPLICATION USING LEAP MOTION

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8.1 INTRODUCTION

Sign language is becoming more prominent in today's world. In Malaysia, Malaysian Sign Language (MySL) has been officially recognised as the official language of the Malaysian deaf community since 2008 (Persekutuan Orang Pekak Malaysia, 2018). However, knowledge and skill in using MySL is low amongst the general public hence interpreters are still relied heavily on when trying to understand communication that uses sign language.

Sign language classes and translators are prohibitively expensive, making them an unattractive option for assisting the learning of MySL. Efforts to provide a technology-based solution have been proposed before, for example in the work done by Darus et al. (2012). In continuing this effort, an interactive learning application has been developed to help beginners learn how to sign in MySL. The application, built using the Unity game engine, is able to recognise hand gestures in MySL for twenty-six alphabets from A to Z, and ten numbers from 1 to 10. The hand gestures are recognised using Leap Motion Controller, a motion-sensing technology that enables hand and finger tracking in a three-dimensional space. Although the use of Leap Motion

for sign language systems has been explored (Enikeev & Mustafina, 2020), work on Leap Motion with MySL specifically is still lacking. This chapter discusses the developed application.

8.2 MALAYSIAN SIGN LANGUAGE

A concentrated effort in using sign language as a communication medium between deaf pupils in Malaysia started circa 1954, in a local school specialised for the deaf. As the vocabulary grows, the structure of the MySL language is formed, where it differs from the standard Malay and English languages, particularly in terms of grammar. MySL focuses on the message to be relayed and is not constrained to any particular grammar rules. Table 8.1 shows an example of this difference.

Table 8.1 Comparison of sentence structure between the standard Malay and English Language and the MySL
(Source: Hasuria, 2009)

English/Malay	Malaysian Sign Language (MySL)
Where does that girl live?	GIRL, THEY LIVE WHERE?
I like my coffee black.	COFFEE BLACK LIKE ME.
<i>Dia tidak hadir kuliah.</i>	DIA KULIAH KOSONG.
<i>Saya hendak ke pasar.</i>	SAYA PASAR.

The sentence structure translates into a signing sequence that is of a more relaxed pace, making it easier for signers to communicate, though there are signs for idioms, pronouns, nouns, objects, and verbs. Fingerspelling is used for things that don't have a sign to indicate them. Figure 8.1 illustrates the sign for alphabets from A to Z and numbers from one to 10 in MySL.

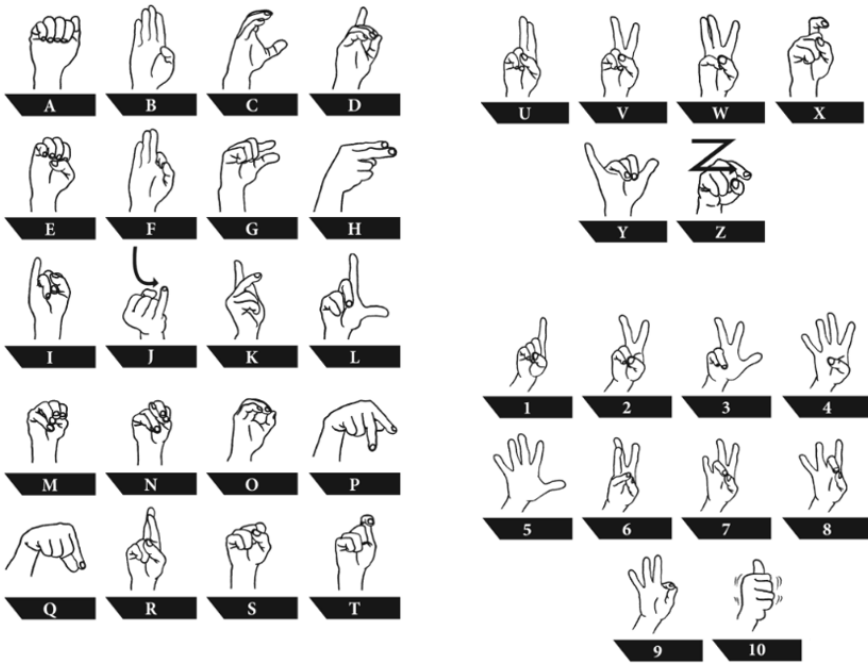


Figure 8.1 The alphabets and numbers in Malaysian sign language
 (Source: Persekutuan Orang Pekak Malaysia, 2018)

MySL and English Sign Language (ESL) are distinct languages with unique grammatical structures, vocabularies, and cultural influences. MySL is the primary sign language used by the deaf community in Malaysia. It evolved organically within the Malaysian deaf community and is influenced by local culture, customs, and linguistic influences. While, ESL encompasses various sign languages used in English-speaking countries such as American Sign Language (ASL), British Sign Language (BSL), and Australian Sign Language (Auslan). Each of these sign languages has its distinct grammar and vocabulary but shares some similarities due to the common linguistic roots of English.

Malaysian Sign Language has its unique grammar and syntax, which may differ from the grammatical structures of spoken languages like Malay or English. It uses spatial grammar, facial expressions, and body movements to convey meaning. English Sign Language also has its