Text to Sign Language Translation System: A Review of Literature

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ABSTRACT

Many machine translation systems for spoken languages are available, but the translation system between the spoken and Sign Language are limited. The translation from Text to Sign Language is different from the translation between spoken languages because the Sign Language is visual spatial language which uses hands, arms, face, and head and body postures for communication in three dimensions. The translation from text to Sign Language is complex as the grammar rules for Sign Language are not standardized. Still a number of approaches have been used for translating the Text to Sign Language in which the input is the text and output is in the form of pre-recorded videos or the animated character generated by computer (Avatar). This paper reviews the research carried out for automatic translation from Text to the Sign Language.

KEYWORDS

Avatar, HamNoSys, Indian Sign Language, Machine Translation System, Natural Language Processing, SiGML

INTRODUCTION

There are approximately 7105 known living languages in the world divided in 136 different language families. Among these 136 language families, Sign language is one and this family contains 136 sign languages all over the world depending upon the region of the world. Sign language is used by hearing impaired people to convey their message (http://www.ethnologue.com/).

Sign language is the non-spoken language which is used by deaf and hard of hearing people using hand shapes, face expressions, gestures and other parts of the body. Sign languages do not have well defined structure or grammar therefore there is no or very less acceptability of these signs outside their small world. Out of nearly 7 billion people on earth, nearly 72 million are deaf and hard of hearing. Out of such a big number approximately 4.3 million such people use Sign language. Rest of nearly 67 million deaf and hard of hearing people do not use any proper sign language to communicate. Thus nearly 90% deaf have a very limited or no access to education and other information (http://www.wfdeaf.org).

Sign Language (SL) is a visual-spatial language which is used to communicate using hands, arms, face, head, and body postures. The signer uses the three dimensional space around his body to describe an event (Zeshan, 2003). Signs are categorized as manual signs (single handed or double handed) and non manual signs or combination of both as shown in Figure 1:

Manual signs are those signs which uses the hand shapes, hand location, and hand movement where as non- manual component is the face expressions, head and body postures. A sign may have only manual part or only non- manual part or combination of both. For example, the sign “Yes” is signed by vertical head nod and it is pure non-manual component. One Handed Signs are represented
by a single dominating hand where as two handed signs are represented by using both the hands. These signs can be either static or dynamic (having movements) and may include the non-manual component also. Figure 2 and Figure 3 show some examples of this categorization.
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