



Double Handed Indian Sign Language to Speech and Text

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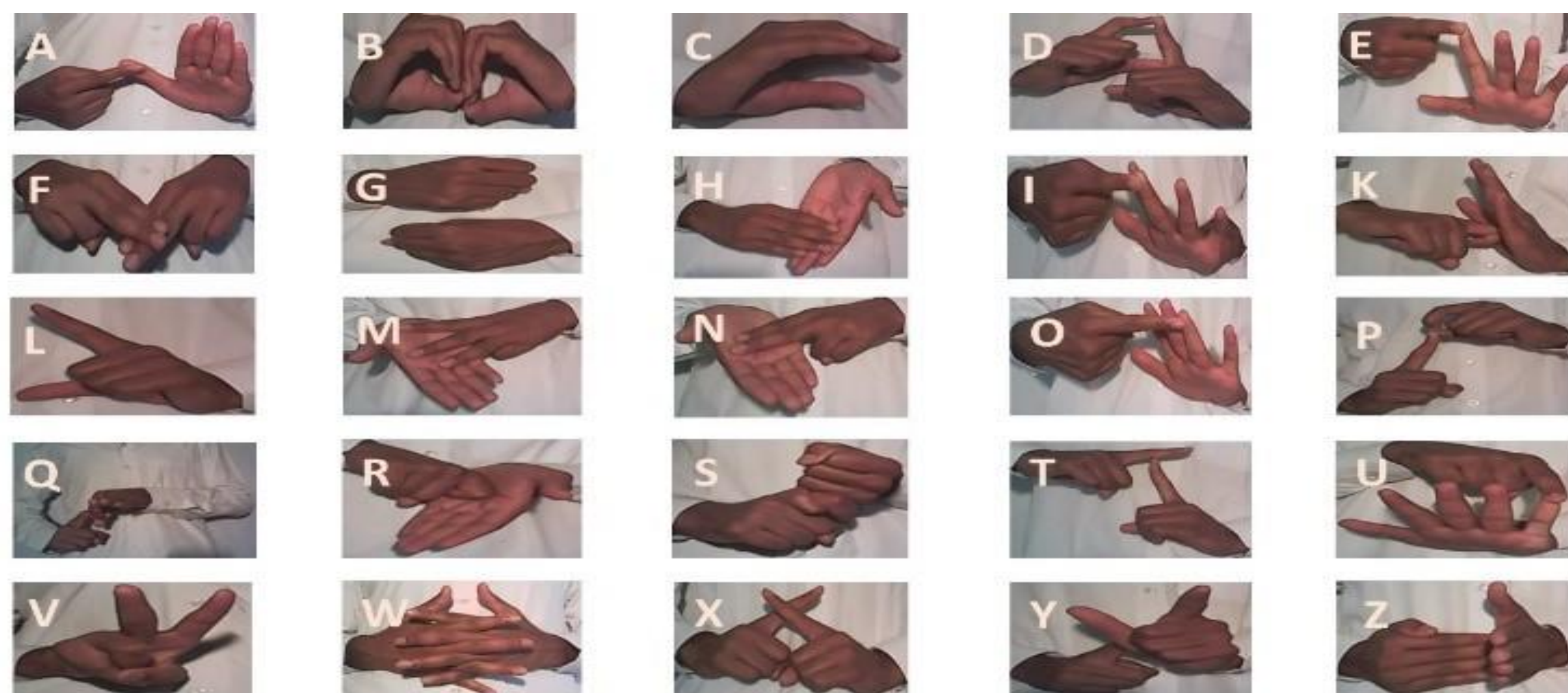
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Introduction

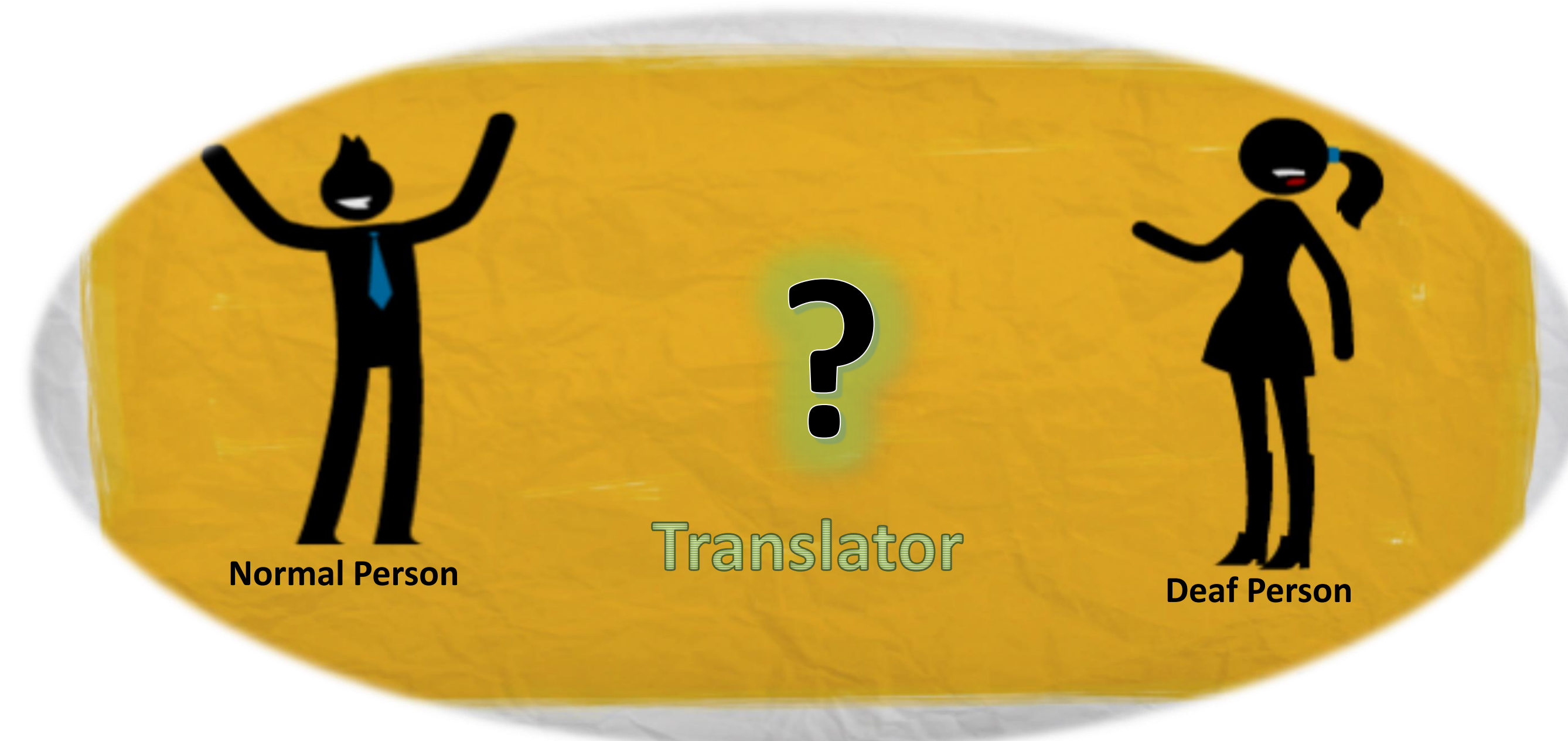
Communication is the act of transferring information from one person to another. Communication plays a vital role, without this existence of human life on earth cannot be imagined. In general people use oral or written communication to communicate but hearing impaired and mute people are not blessed with oral communicating ability and that makes them extremely isolated and lonely.

Sign language is a system of communication using visual gestures and signs, as used by deaf and mute people. It is the well-structured code gesture where every gesture has a specific meaning assigned to it. Sign Language is the only means of communication for deaf and mute people mainly illiterates. But to communicate with normal people without a human translator still is a challenge as most of the normal people in the society are not interested to learn this sign language. In India about 6.3% of its population are deaf and mute. So, Indian Sign Language becomes a means to communicate with the normal people. Indian Sign Language can be communicated using Single hand and Double hand, figure shown below shows the different gestures of double handed Indian sign language.



Double Handed Indian Sign Language

Problem Definition

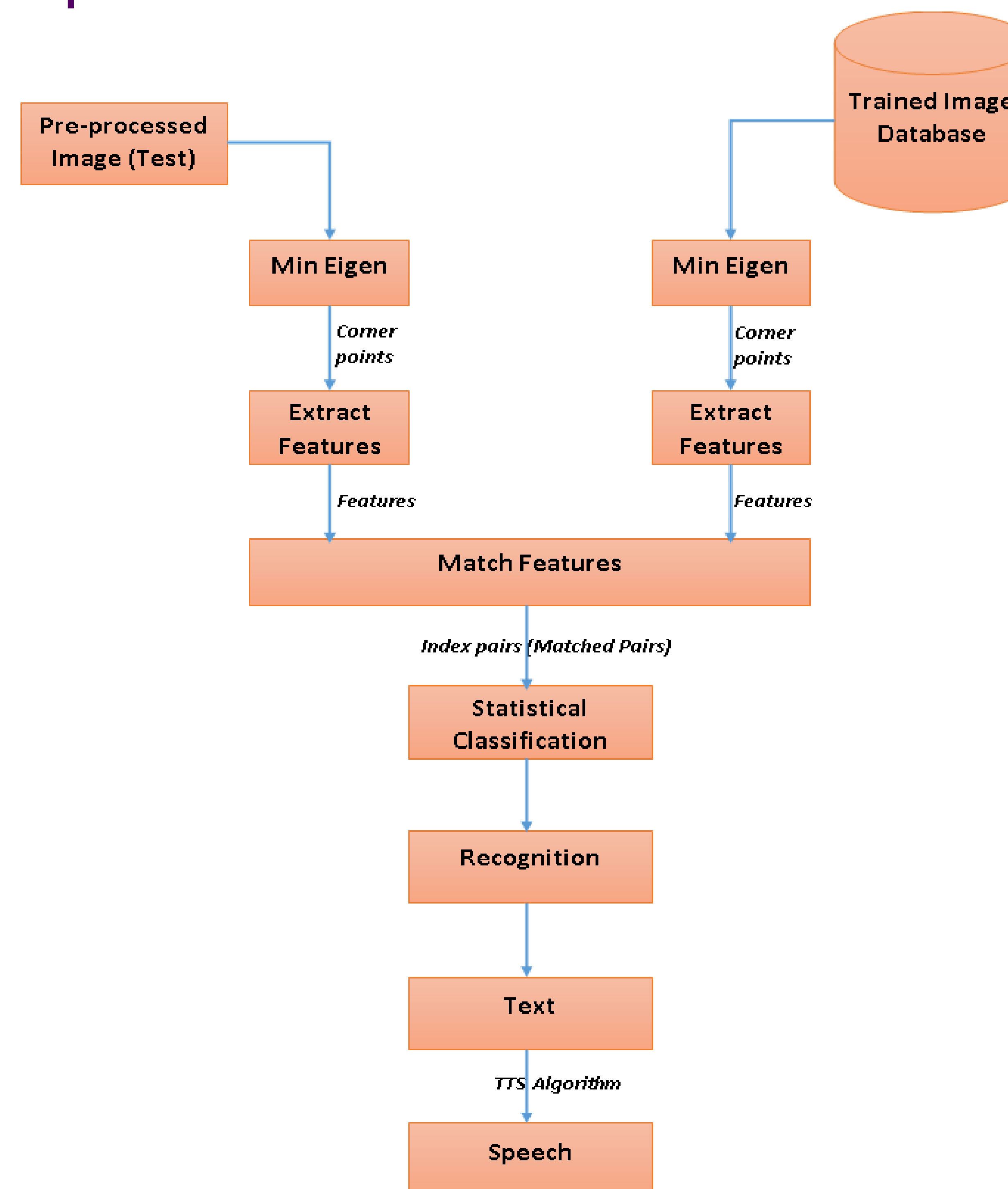


The main aim of the project is to bridge the gap between the people with speaking and hearing disabilities and the normal people.

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Implementation

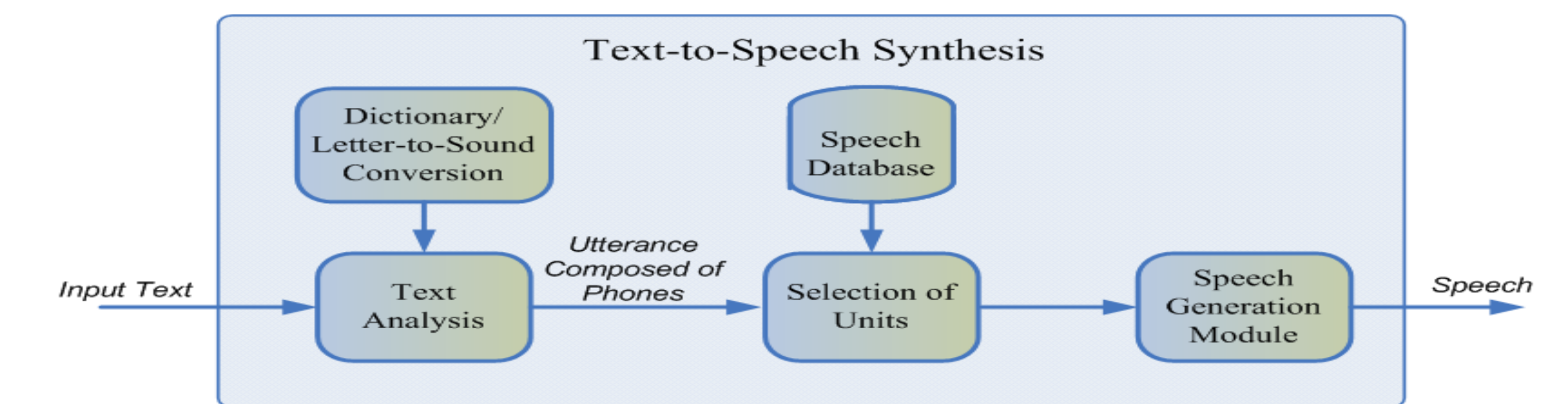


Five Images of each alphabet are taken and Min Eigen Value algorithm is applied as shown in figure 3, and interesting points are extracted. The Extracted features are stored instead of directly storing the image. This has a main advantage that it takes very less space and computational time will also be less. By this way the system is trained with image features. During real time acquisition. The image is captured by Logitech Web camera of 5MP. The image is pre-processed to reduce noise and artifacts and then its Min Eigen Value features are extracted. Now the matching is done between extracted features of real time acquired image and that of features stored in data base. The Statistical calculation is done for the matched pairs and then its recognized and equivalent text is being displayed.

Classification of Image points using eigen values

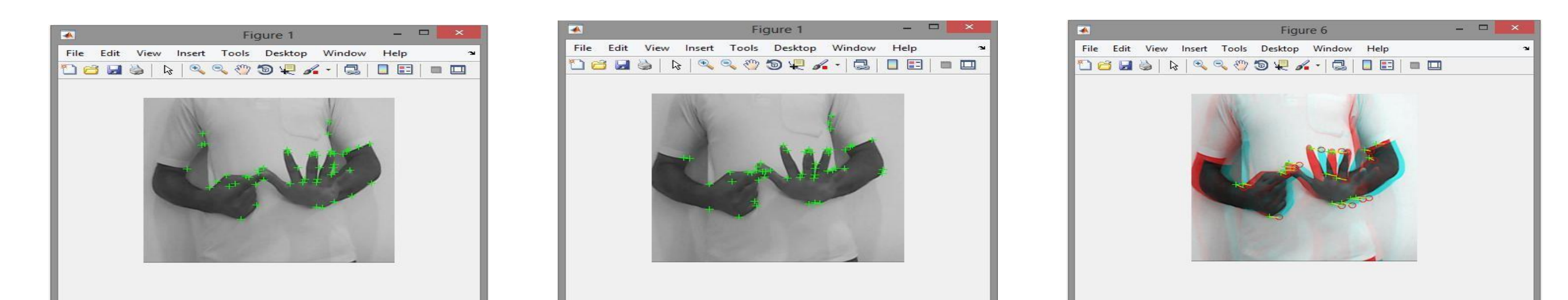
- If both λ_1 are small, then feature does not vary much in any direction which indicates uniform region.
- If the larger Eigen Value $\lambda_1 \gg \lambda_2$, then the feature represents edge.
- If both eigenvalues are large then feature varies significantly in both directions, then good features are obtained.

Text to Speech Synthesis



Results

Alphabets						
A	284	13	37	25	16	26
B	8	332	16	13	13	13
C	4	43	19	35	18	16
D	31	21	12	12	39	24
E	90	30	30	43	32	32
F	7	16	392	22	47	39
G	13	9	34	31	49	43
H	12	23	69	32	45	39
I	24	5	23	26	23	23
K	16	6	19	31	32	22
L	16	27	32	387	39	15
M	10	14	42	26	41	40
N	4	18	41	12	35	33
O	21	10	20	31	53	36
P	17	7	16	22	43	41
Q	16	15	34	38	33	50
R	12	10	32	10	29	22
S	7	9	24	17	400	36
T	20	17	34	33	38	39
U	4	16	19	23	53	12
V	2	15	16	57	20	26
W	20	7	42	34	50	68
X	24	12	40	38	28	92
Y	14	12	33	16	35	597
Z	11	5	12	27	25	34

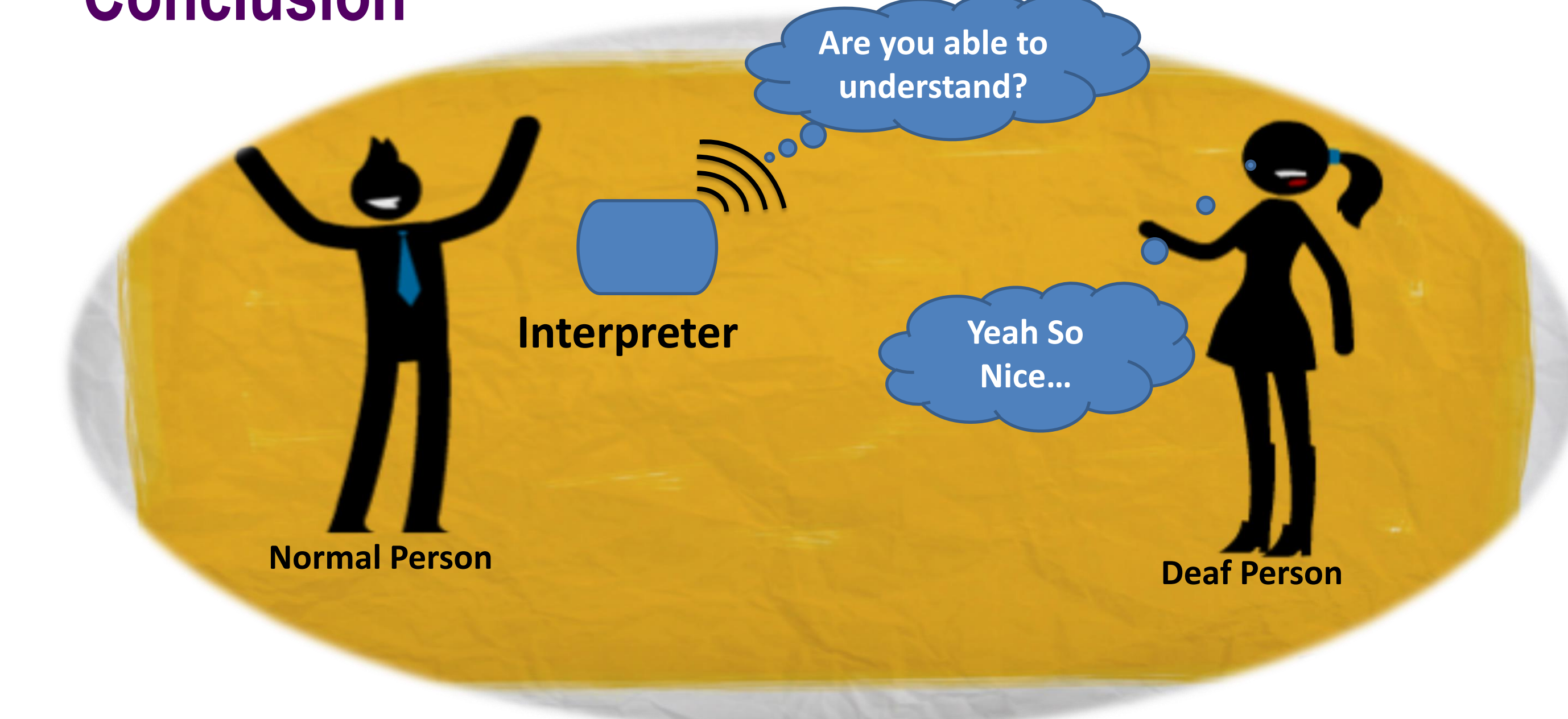


Trained Image

Test Image

Matched features

Conclusion



The main objective of the work “**Providing Speech for Speechless**” was accomplished.