Voice conversion, is the modification of the speech of one speaker (called source speaker) into the speech of another speaker (called target speaker). The quality of the synthesised speech depends upon the precise estimation of the transformation function, which is very difficult as there are many features of speech which are difficult to extract automatically, such as meaning of the passage and intention of the speaker. Although a good estimate of the transformation function may be obtained from the dynamics of the spectral envelopes of source and target speakers, the misalignment of the patterns of phonemes in the passages of the source and target may hamper the precise estimation. The quality of the transformed speech depends upon various factors such as alignment of phonemes of source and target speaker, estimation of transition segments, estimation of transformation function, and resynthesis algorithm, the quality of the speech will be further deteriorated if the transition segments are not aligned properly. The most error prone process in voice conversion is the alignment of transition segments. It means exact alignment of the corresponding speech units in the source and target passages is necessary for the accurate estimation of the transformation function. Different methods have been used for alignment. These may be based on dynamic warping, cluster mapping, HMM, speech recognition, unit selection, and adaptation models. The objective of this research is to investigate the

- Effectiveness of vector quantization based alignment on transformed speech parameters.

- Relation between phoneme dependent transformation function coefficients.

- Relation between class dependent transformation function coefficients.

- Evaluation of the quality of the transformed speech.

The thesis presents a comparison of the effectiveness of the transformation function to be used for voice conversion. Mahalanobis distance measure, an objective evaluation method, has been used for the comparison. The transformation functions were obtained using two techniques based on vector quantization (VQ) and dynamic time warping (DTW). Multivariate linear modeling (MLM) was used for estimating the transformation functions.