

## **Fast Methods For Code Search In CELP**

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### **Summary**

The code excited linear prediction (CELP) technique has the potential for producing high quality synthetic speech at bit rates as low as 4.8 kb/s. Three fast search methods for selecting an optimal excitation sequence from a code book of stochastic vectors are described. The key idea is to inverse-filter the actual speech with the formant and pitch filters to produce a residual error sequence (RES). The residual error is used to identify a neighborhood or a subset of codes for further processing. The first method, called dynamic nearest neighborhood (DNN), attempts to dynamically construct a neighborhood of the K codes of maximum correlation with the residual error. The second method, called nearest fixed neighborhood (NFN), clusters the code book into a fixed number of cells, and code search is performed on the codes of the cell nearest to the RES. The two methods achieve a reduction in the search procedure by a factor of 8-20 times. The third method combines the advantages of the first two methods to attain a reduction from 40 to 50 times. The performance of these techniques and some of their ramifications are addressed

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