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### An analysis of Humpback whale songs for individual classification

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Acoustics based tracking systems are in use for studying cetacean behaviour. Such non-invasive techniques can also prove efficient for population assessment of vocally active species. One problem in this regard is to distinguish already counted re-appearing cetaceans, even if re-appearance occurs after a brief interval. In this connection we propose development of individual identification system for humpback whales (*Megaptera novaeangliae*) based on unique acoustic features underlying a song. Earlier we analyzed recognition performance of cepstrum based voice signature in seven humpback whales. The results were based on training and test data sampled from the same song. In this work, we test our hypothesis using data from different songs (i.e. recording timings of training and test data sets do not overlap) for two different individuals. Recognition rates for two individuals are above 80% and 95% respectively. However an eight years old song gives degraded recognition rate of around 58%. The results give an insight into the effects of temporal song evolution on accuracy of our system. Our observations are followed by harmonic analysis of song units in two individuals. Cepstral coefficients and Support Vector Machine (SVM) were used for classification and signal band-crossing rate was used for segmenting song units.