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5.5 Energy Measures

To augment the spectral parameters derived from linear prediction or mel-filterbank analysis, an energy term can be appended by including the qualifier `_E` in the target kind. The energy is computed as the log of the signal energy, that is, for speech samples $\{s_n, n = 1, M\}$

$$E = \log \sum_{n=1}^M s_n^2 \quad (5.15)$$

This log energy measure can be normalised to the range $[-E_{\min}, 1.0]$ by setting the Boolean configuration parameter `ENORMALISE` to true (default setting). This normalisation is implemented by subtracting the maximum value of E in the utterance and adding 1.0. Note that energy normalisation is incompatible with live audio input and in such circumstances the configuration variable `ENORMALISE` should be explicitly set false. The lowest energy in the utterance can be clamped using the configuration parameter `SILFLOOR` which gives the ratio between the maximum and minimum energies in the utterance in dB. Its default value is 50dB. Finally, the overall log energy can be arbitrarily scaled by the value of the configuration parameter `ESCALE` whose default is 0.1.

When calculating energy for LPC-derived parameterisations, the default is to use the zero-th delay autocorrelation coefficient (r_0). However, this means that the energy is calculated after windowing and pre-emphasis. If the configuration parameter `RAWENERGY` is set true, however, then energy is calculated separately before any windowing or pre-emphasis regardless of the requested parameterisation .

In addition to, or in place of, the log energy, the qualifier `_O` can be added to a target kind to indicate that the 0'th cepstral parameter C_0 is to be appended. This qualifier is only valid if the target kind is `MFCC`. Unlike earlier versions of HTK scaling factors set by the configuration variable `ESCALE` are not applied to C_0 .

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