

| computing the onset of an emg signal can be quite tricky. in this example, we describe a pipeline for a straightforward estimation of emg onset based on the the

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[[visual3d:documentation:pipeline:signal_commands:teager_kaiser_energy|teager-kaiser energy]]
operator and [[visual3d:documentation:pipeline:event_commands:event_threshold|event_threshold]].
this is not a definitive definition, but simply a starting point for the user. teager_kaiser.jpg \ \ <code>
!apply a high pass and low pass filter assuming that the surface emg signal contains information
!from 20 to 500 hz highpass_filter /signal_types=analog /signal_names=emg_c !
/signal_folder=original ! /result_suffix= /result_folder=processed ! /filter_class=butterworth
/frequency_cutoff=20 /num_reflected=0 /total_buffer_size=100 ! /num_bidirectional_passes=1 ;
!apply the teager-kaiser operator teager_kaiser_energy /signal_types=analog /signal_names=emg_c
/signal_folder=processed ! /signal_components= ! /result_folder=processed ! /event_sequence= !
/exclude_events= ; !create events that define the resting baseline of the muscle event_explicit
/event_name=rest1 /frame=1 ! /time= ; event_explicit /event_name=rest2 /frame=150 ! /time= ;
!compute the median and standard deviation of the tko envelope during rest metric_median
/result_metric_name=_med /apply_as_suffix_to_signal_name=true /result_metric_folder=emg
/signal_types=analog /signal_names=emg_c /signal_folder=processed !
/signal_components=all_components /event_sequence=rest1+rest2 /exclude_events=
/generate_mean_and_stddev=false ! /append_to_existing_values=false ; metric_stddev
/result_metric_name=_sd /apply_as_suffix_to_signal_name=true /result_metric_folder=emg
/signal_types=analog /signal_names=emg_c /signal_folder=processed !
/signal_components=all_components /event_sequence=rest1+rest2 /exclude_events=
/generate_mean_and_stddev=false ! /append_to_existing_values=false ; !identify the event emg_c_on
based on a threshold crossing !of the median + 3 * standard deviation event_threshold
/signal_types=analog /signal_names=emg_c /signal_folder=procesed /event_name=emg_c_on
/select_x=true ! /select_y=false ! /select_z=false ! /select_residual=false
/threshold=metric::emg::emg2_med+3*metric::emg::emg2_sd ! /frame_window=8 ! /frame_offset=0
/ascending=true ! /descending=false ! /ensure_range_frames_before_threshold_crossing=false
/ensure_range_frames_after_threshold_crossing=true ! /start_at_event= ! /end_at_event=
/event_instance=1 ; </code>
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