at least one of the reference pictures stored in the DPB, and use the classification of the reference pictures in the DPB, for managing reference picture removal 424 from the DPB.

In accordance with a ninth aspect when referring back to the eighth aspect, the apparatus may be configured to read from the current AU an indication whether the decoded picture is not used for inter-picture prediction; perform the insertion of the decoded picture into the DPB, if the decoded picture is not indicated to be not used for inter-picture prediction or not directly to be output, and directly output the decoded picture without buffering same in the DPB, if the decoded picture is indicated to be not used for inter-picture prediction and directly to be output.

In accordance with a tenth aspect when referring back to the eighth or ninth aspect, the apparatus may be configured to assign a frame index to each reference picture in the DPB, classified to be a long-term picture, and use a predetermined reference picture in the DPB, classified to be a long-term picture, as the referenced reference picture in the DPB if the frame index assigned to the predetermined reference picture is referred to in the current AU.

In accordance with an eleventh aspect when referring back to the tenth aspect, the apparatus may be configured to one or more of: if the at least one command in the current AU is a first command, re-classify a reference picture in the DPB, classified to be a short-term reference picture, as an unused-for-reference picture, if the at least one command in the current AU is a second command, re-classify a reference picture in the DPB, classified to be a long-term reference picture, as an unused-for-reference picture, if the at least one command in the current AU is a third command, re-classify a reference picture in the DPB, classified to be a short-term picture, as a long-term reference picture, and assign a frame index to the re-classified reference picture, if the at least one command in the current AU is a fourth command, set an upper frame index limit according to the fourth command, and re-classify all reference picture in the DPB, classified to be a long-term picture, and having assigned thereto a frame index exceeding the upper frame index limit, as an unused-for-reference picture, if the at least one command in the current AU is a fifth command, classify the current picture as a long-term picture, and assign a frame index to the current reference picture.

In accordance with a twelfth aspect when referring back to any of the eighth to eleventh aspects, the apparatus may be configured to remove any reference picture from the DPB, which is classified as an unused-for-reference picture, and which is no longer to be output.

In accordance with a thirteenth aspect when referring back to any of the first to twelfth aspects, the apparatus may be configured to read an entropy coding mode indicator from the data stream, and decode prediction residual data from the current AU using a context adaptive variable length coding mode if the entropy coding mode indicator indicates the context adaptive variable length coding mode, and using a context adaptive binary arithmetic coding mode if the entropy coding mode indicator indicates the context adaptive binary arithmetic coding mode.

In accordance with a fourteenth aspect when referring back to any of the first to thirteenth aspects, the apparatus may be configured to derive quarter pel values in the referenced reference picture based on a motion vector in the current AU and using 6-tap FIR filter so as to derive half-pel values and averaging neighboring half-pel values.

In accordance with a fifteenth aspect when referring back to any of the first to fourteenth aspects, the apparatus may be configured to derive from the data stream information on the temporal raster by means of temporal differences between a removal of the first access unit and the removal of each of the subsequent access units.

In accordance with a sixteenth aspect when referring back to any of the first to fifteenth aspects, the apparatus may be configured to interpolate, at the selected bit rate 302, between the CPB size as indicated by the first CPB parameters $300_{i-1}$ and the CPB size as indicated by the second CPB parameters $300_i$ so as to obtain an interpolated CPB size so as to determine a minimum CPB size for the coded picture buffer 200.

In accordance with a seventeenth aspect when referring back to any of the first to sixteenth aspects, in the apparatus, the selected bitrate may be between the predetermined bitrate indicated by the first CPB parameters $300_{i-1}$ and the predetermined bitrate indicated by the second CPB parameters $300_i$.

In accordance with an eighteenth aspect when referring back to any of the first to seventeenth aspects, the apparatus may be configured to operate in units of buffering periods with the first access unit in the coding order being the first access unit of a current buffering period.

In accordance with a nineteenth aspect, an apparatus for encoding a video into a data stream wherein the data stream is ought to be decoded by being fed to a decoder comprising a coded picture buffer (CPB), may be configured to encode, into a data stream, pictures of a video encoded in a coding order as a sequence of access units (AU), determine

first CPB parameters relating to a first operation point and second CPB parameters relating to a second operation point, each of the first and the second CPB parameters being indicative of a CPB size, a predetermined temporal offset, a predetermined temporal removal delay and a predetermined bitrate, wherein the first CPB parameters differ from the second CPB parameters at least with respect to the predetermined bitrate, and perform the determining such that interpolating between the predetermined temporal offset of the first CPB parameters and the predetermined temporal offset of second CPB parameters at each of a plurality of selected bitrates yields an interpolated temporal offset and an interpolated temporal removal delay so that feeding the data stream to the decoder via the CPB by feed the sequence of AUs sequentially into the CPB using the respective selected bitrate with halting the feeding with respect to access units for which a virtual time of availability according to a temporal frame removal raster preponed by, for a first access unit in the coding order, an interpolated temporal removal delay and, for subsequent access units in coding order, a sum of the interpolated temporal removal delay and an interpolated temporal offset has not yet been reached, until the virtual time of availability is reached; remove the AUs from the CPB AU-wise using the temporal raster, does not lead to any underflow and any overflow, and encode the CPB parameters into the data stream.

In accordance with a twentieth aspect when referring back to the nineteenth aspect, in the apparatus, the interpolating may be parametrized using interpolation parameters, and the apparatus may be configured to encode, into the data stream, the interpolation parameters.

In accordance with a twenty-first aspect when referring back to the nineteenth or twentieth aspect, in the apparatus, the interpolating is to be performed using a weighted sum of the predetermined temporal offset indicated by the first CPB parameters, weighted by a first weight, and the predetermined temporal offset indicated by the second CPB parameters, weighted by a second weight.

In accordance with a twenty-second aspect when referring back to the twenty-first aspect, in the apparatus the first and second weights are determined based on the selected bitrate, the predetermined bitrate indicated by the first CPB parameters, and the predetermined bitrate indicated by the second CPB parameters.

In accordance with a twenty-third aspect when referring back to the twenty-first aspect, in the apparatus, a linear interpolation weight which is determined by dividing a difference between the selected bitrate and the predetermined bitrate indicated by the first CPB parameters by a difference between the predetermined bitrate indicated by the first CPB

parameters and the predetermined bitrate indicated by the second CPB parameters, may be used to determine the first and second weights.

In accordance with a twenty-fourth aspect when referring back to the twenty-third aspect, in the apparatus, the first weight may be determined so that the first weight is the linear interpolation weight or a product one factor of which is the linear interpolation weight, and the second weight may be determined so that the second weight is a difference between the linear interpolation weight and one or a product one factor of which is the difference between the linear interpolation weight and one.

In accordance with a twenty-fifth aspect when referring back to the twenty-third aspect, in the apparatus, the first weight may be determined so that the first weight is a product a first factor of which is the linear interpolation weight, and a second factor of which is the predetermined bitrate indicated by the first CPB parameters divided by the selected bitrate, and the second weight may be determined so that the second weight is a product one factor of which is the difference between the linear interpolation weight and one, and a second factor of which is the predetermined bitrate indicated by the second CPB parameters divided by the selected bitrate.

In accordance with a twenty-sixth aspect when referring back to any of the nineteenth to twenty-fifth aspects, the apparatus may be configured to, in encoding the AUs, encode a current picture using inter-picture prediction from a referenced reference picture stored in a DPB into a current AU, and insert a decoded version of the current picture in the DPB into the DPB, assign to each reference picture stored in the DPB a classification as one of a short-term reference picture, a long-term reference picture and an unused-for-reference picture, write DPB mode information into the current AU, if the DPB mode information indicates a first mode, remove one or more reference pictures classified as a short-term picture, according to a FIFO strategy, from the DPB, if the DPB mode information indicates a second mode, write memory management control information comprising at least one command into the current AU, the command being instructive to change the classification assigned to at least one of the reference pictures stored in the DPB, wherein the classification of the reference pictures in the DPB, is used for managing reference picture removal from the DPB.

In accordance with a twenty-seventh aspect when referring back to the twenty-sixth aspect, the apparatus may be configured to write into the current AU an indication whether the decoded picture is not used for inter-picture prediction; wherein the decoded picture is to be inserted into the DPB, if the decoded picture is not indicated to be not used for inter-

picture prediction or not directly to be output, and the decoded picture is to be directly output without buffering same in the DPB, if the decoded picture is indicated to be not used for inter-picture prediction and directly to be output.

In accordance with a twenty-eighth aspect when referring back to the twenty-sixth or twenty-seventh aspect, in the apparatus, a frame index is to be assigned to each reference picture in the DPB, classified to be a long-term picture, and a predetermined reference picture in the DPB, classified to be a long-term picture, is to be used as the referenced reference picture in the DPB if the frame index assigned to the predetermined reference picture is referred to in the current AU.

In accordance with a twenty-ninth aspect when referring back to the twenty-eighth aspect, in the apparatus, one or more of: if the at least one command in the current AU is a first command, a reference picture in the DPB, classified to be a short-term reference picture, is to be re-classified as an unused-for-reference picture, if the at least one command in the current AU is a second command, a reference picture in the DPB, classified to be a long-term reference picture, is to be re-classified as an unused-for-reference picture, if the at least one command in the current AU is a third command, a reference picture in the DPB, classified to be a short-term picture, is to be re-classified as a long-term reference picture, and a frame index is to be assigned to the re-classified reference picture, if the at least one command in the current AU is a fourth command, an upper frame index limit is to be set according to the fourth command, and all reference picture in the DPB, classified to be a long-term picture, and having assigned thereto a frame index exceeding the upper frame index limit, are to be re-classified as an unused-for-reference picture, if the at least one command in the current AU is a fifth command, the current picture is to be classified as a long-term picture, and assign a frame index to the current reference picture.

In accordance with a thirtieth aspect when referring back to any of the twenty-sixth to twenty-ninth aspects, in the apparatus, any reference picture, which is classified as an unused-for-reference picture, and which is no longer to be output, is to be removed from the DPB.

In accordance with a thirty-first aspect when referring back to any of the nineteenth to thirtieth aspects, the apparatus may be configured to write an entropy coding mode indicator into the data stream, encode prediction residual data into the current AU using a context adaptive variable length coding mode if the entropy coding mode indicator indicates the context adaptive variable length coding mode, and using a context adaptive binary