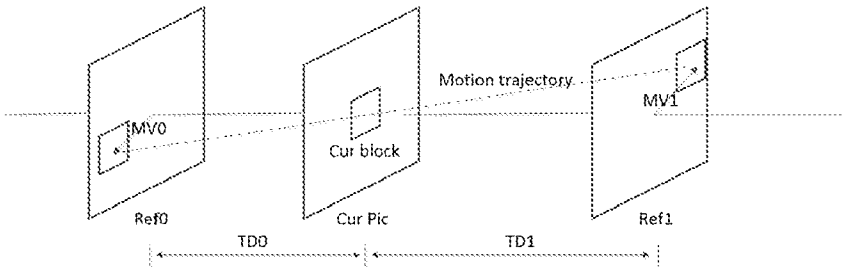
Motion trajectory
MV1
MV0
Cur block
Ref0
Cur Pic
Ref1
TD0
TD1

FIG. 1

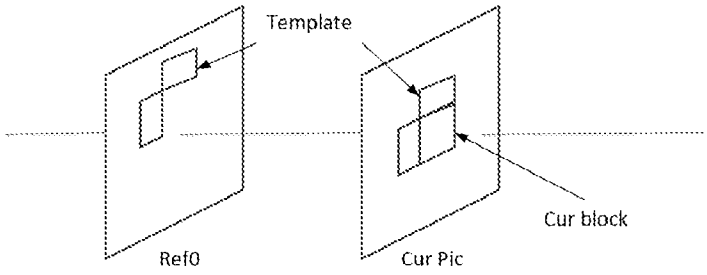
Template
Cur block
Ref0
Cur Pic

FIG. 2

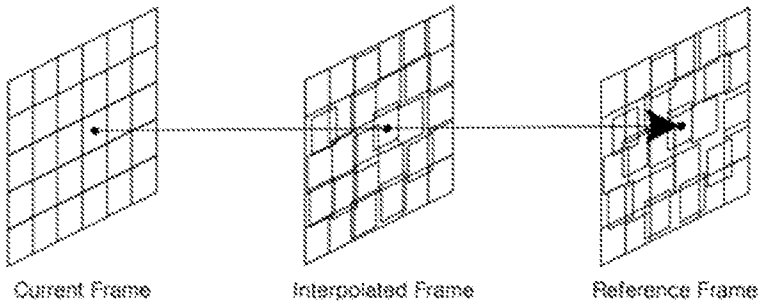
Current Frame
Interpolated Frame
Reference Frame

FIG. 3

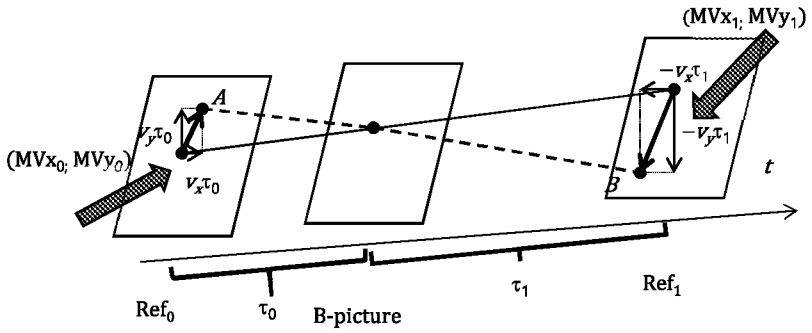
(MVx1, MVy1)
A
B
(MVx0, MVy0)
t
Ref0
τ0
B-picture
τ1
Ref1

FIG. 4

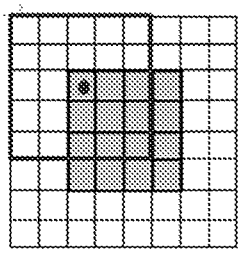

FIG. 5a

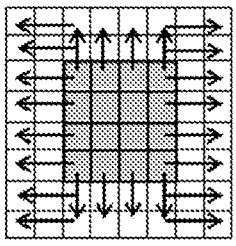

FIG. 5b

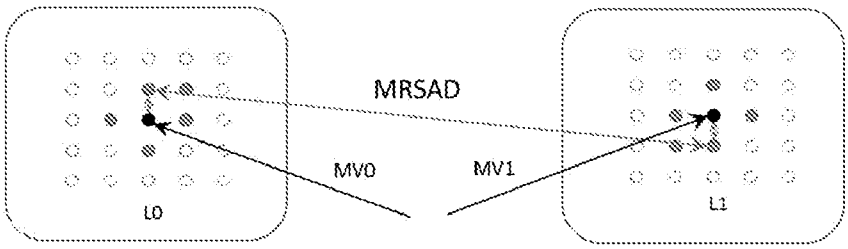

FIG. 6

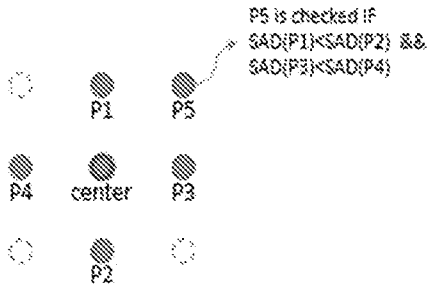
P5 is checked IF
SAD(P1)<SAD(P2) &&
SAD(P3)<SAD(P4)
P1
P5
P4
center
P3
P2

FIG. 7a

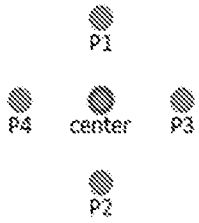
P1
P4
center
P3
P2

FIG. 7b

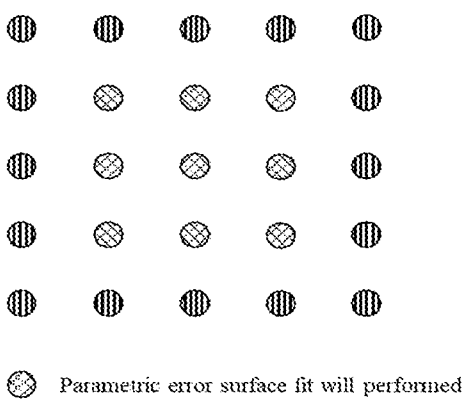
Parametric error surface fit will performed

FIG. 8

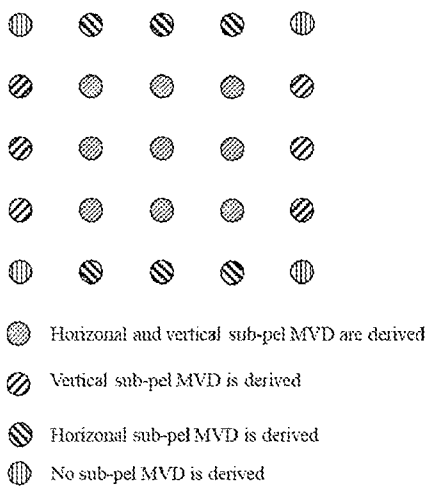
Horizonal and vertical sub-pel MVD are derived
Vertical sub-pel MVD is derived
Horizonal sub-pel MVD is derived
No sub-pel MVD is derived

FIG. 9

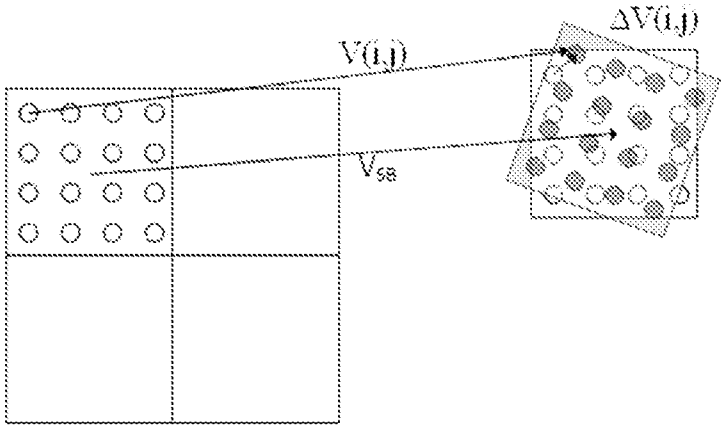

FIG. 10

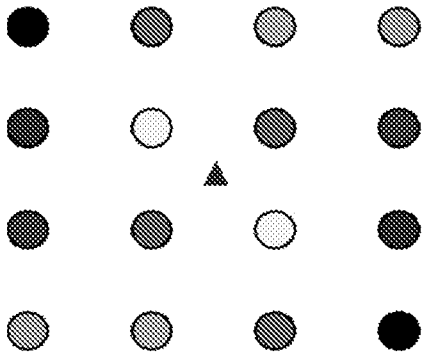

FIG. 11

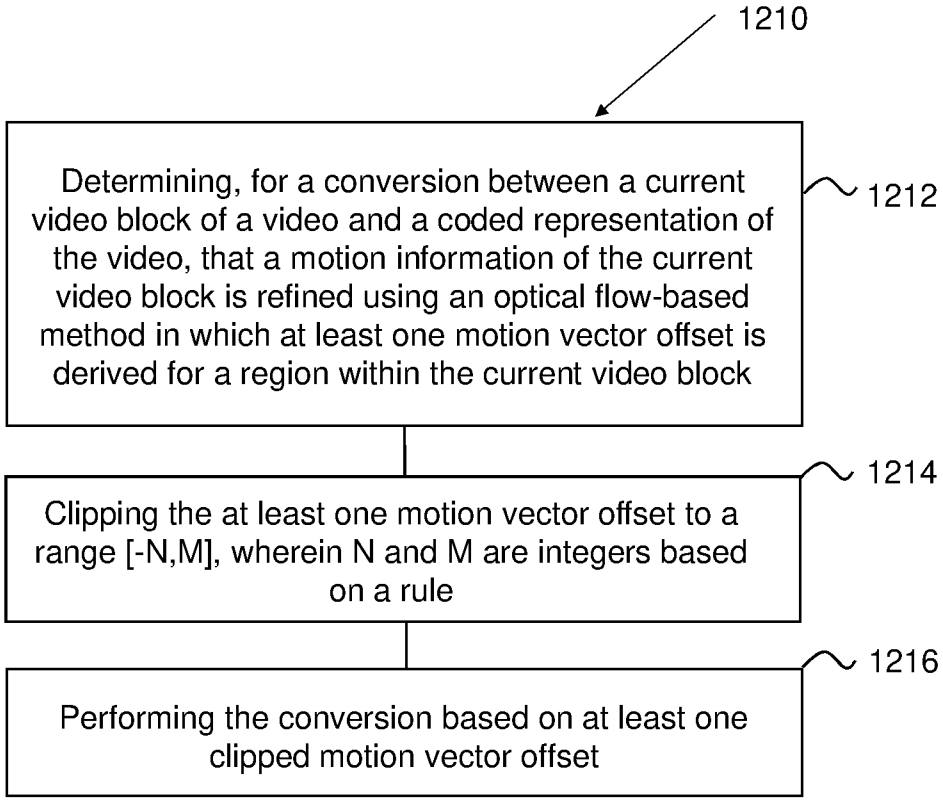
1210
Determining, for a conversion between a current video block of a video and a coded representation of the video, that a motion information of the current video block is refined using an optical flow-based method in which at least one motion vector offset is derived for a region within the current video block
1212
Clipping the at least one motion vector offset to a range [-N,M], wherein N and M are integers based on a rule
1214
Performing the conversion based on at least one clipped motion vector offset
1216

FIG. 12A

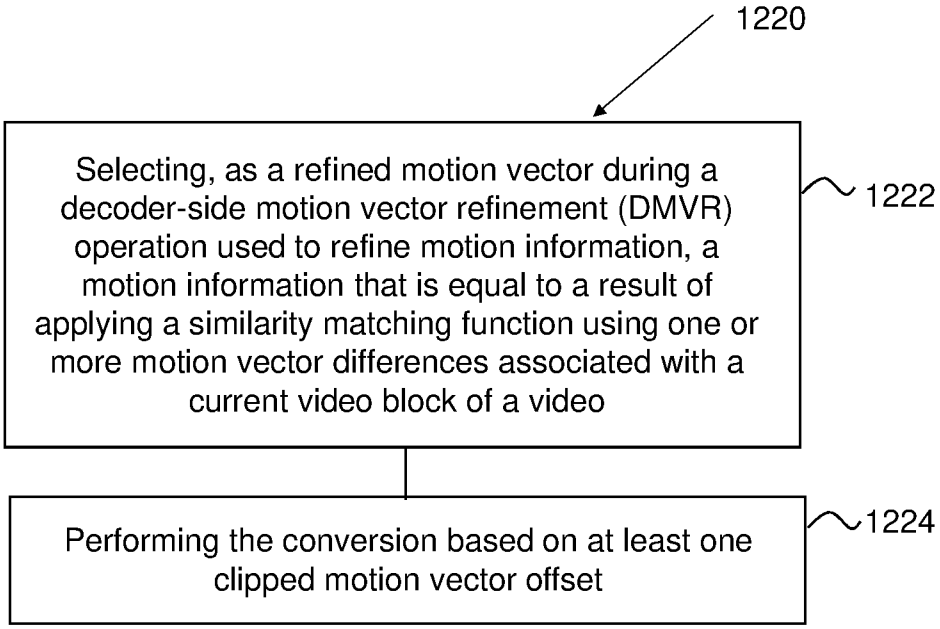
1220
Selecting, as a refined motion vector during a decoder-side motion vector refinement (DMVR) operation used to refine motion information, a motion information that is equal to a result of applying a similarity matching function using one or more motion vector differences associated with a current video block of a video
1222
Performing the conversion based on at least one clipped motion vector offset
1224

FIG. 12B

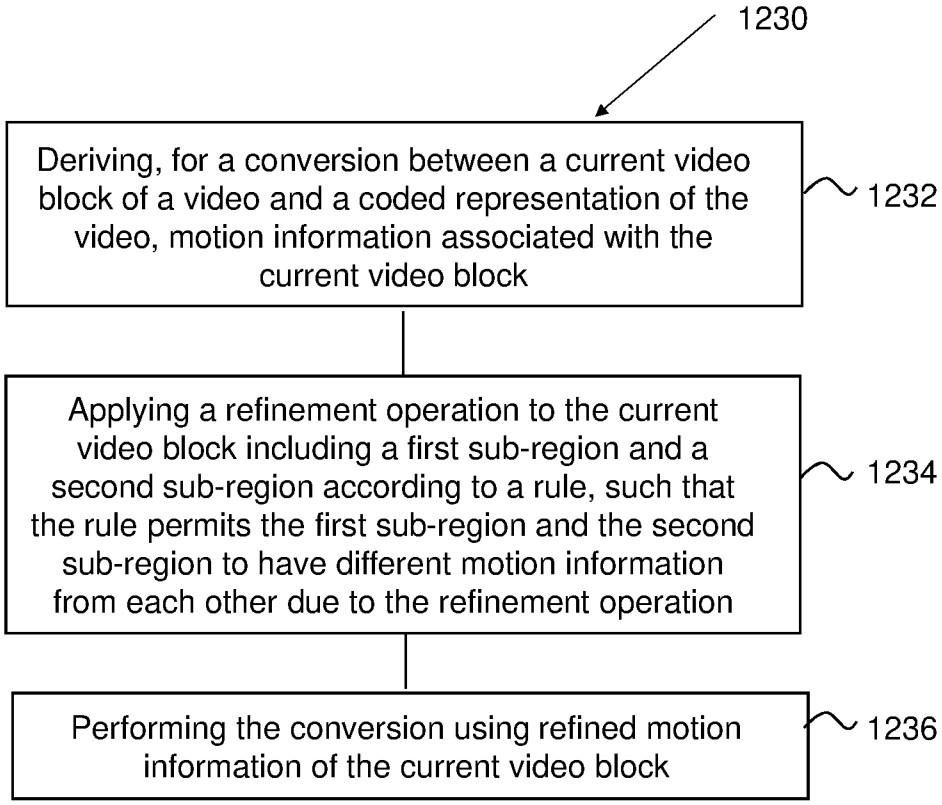
1230
Deriving, for a conversion between a current video block of a video and a coded representation of the video, motion information associated with the current video block
1232
Applying a refinement operation to the current video block including a first sub-region and a second sub-region according to a rule, such that the rule permits the first sub-region and the second sub-region to have different motion information from each other due to the refinement operation
1234
Performing the conversion using refined motion information of the current video block
1236

FIG. 12C

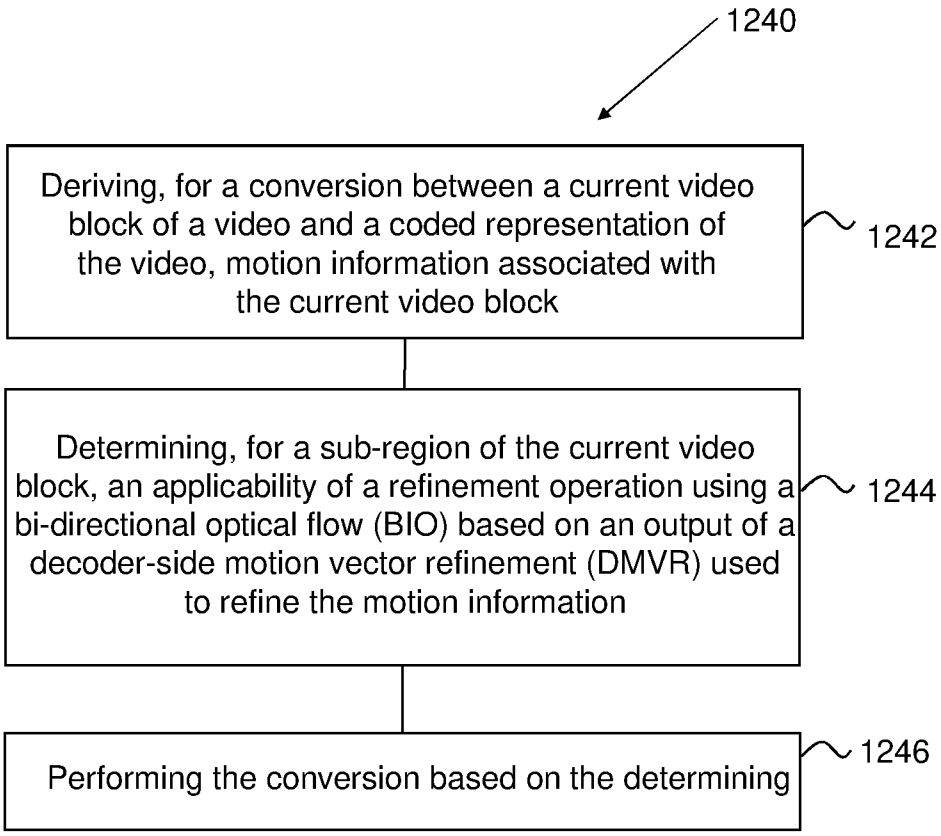
1240
Deriving, for a conversion between a current video block of a video and a coded representation of the video, motion information associated with the current video block
1242
Determining, for a sub-region of the current video block, an applicability of a refinement operation using a bi-directional optical flow (BIO) based on an output of a decoder-side motion vector refinement (DMVR) used to refine the motion information
1244
Performing the conversion based on the determining
1246

FIG. 12D

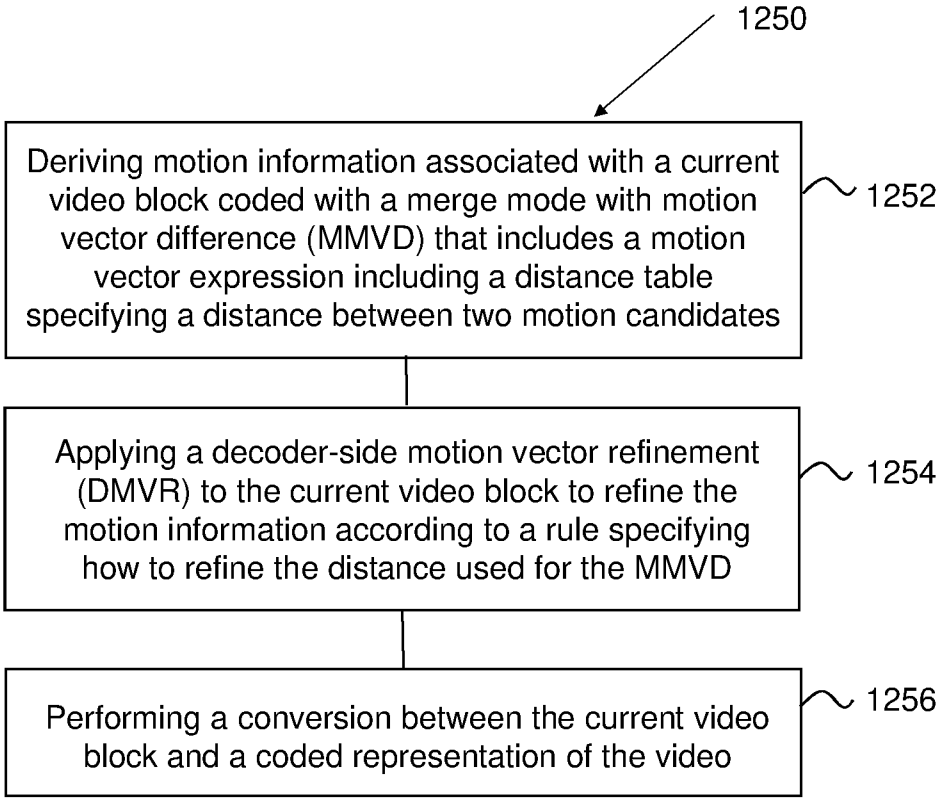
1250
Deriving motion information associated with a current video block coded with a merge mode with motion vector difference (MMVD) that includes a motion vector expression including a distance table specifying a distance between two motion candidates
1252
Applying a decoder-side motion vector refinement (DMVR) to the current video block to refine the motion information according to a rule specifying how to refine the distance used for the MMVD
1254
Performing a conversion between the current video block and a coded representation of the video
1256

FIG. 12E

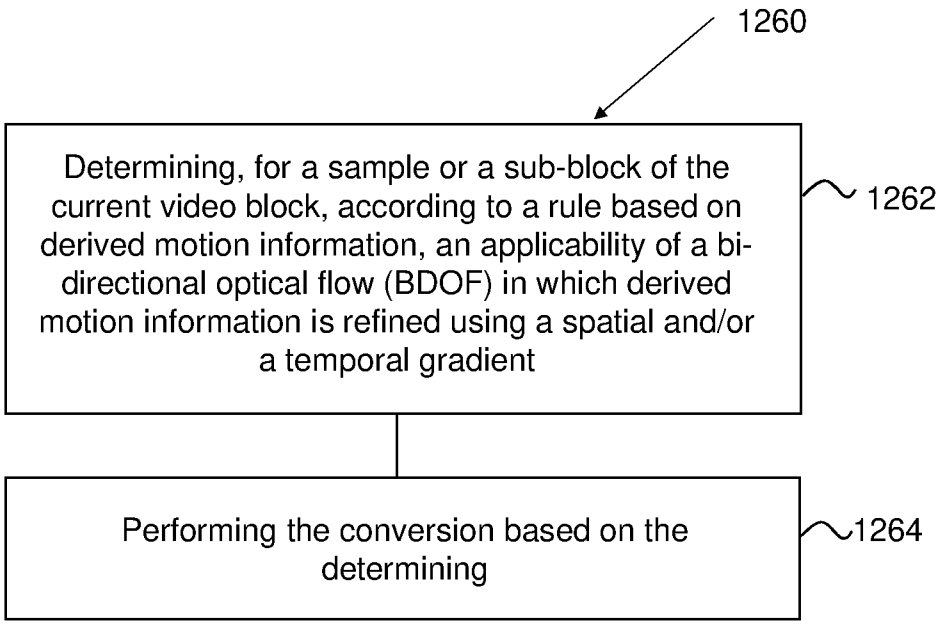
1260
Determining, for a sample or a sub-block of the current video block, according to a rule based on derived motion information, an applicability of a bi-directional optical flow (BDOF) in which derived motion information is refined using a spatial and/or a temporal gradient
1262
Performing the conversion based on the determining
1264

FIG. 12F

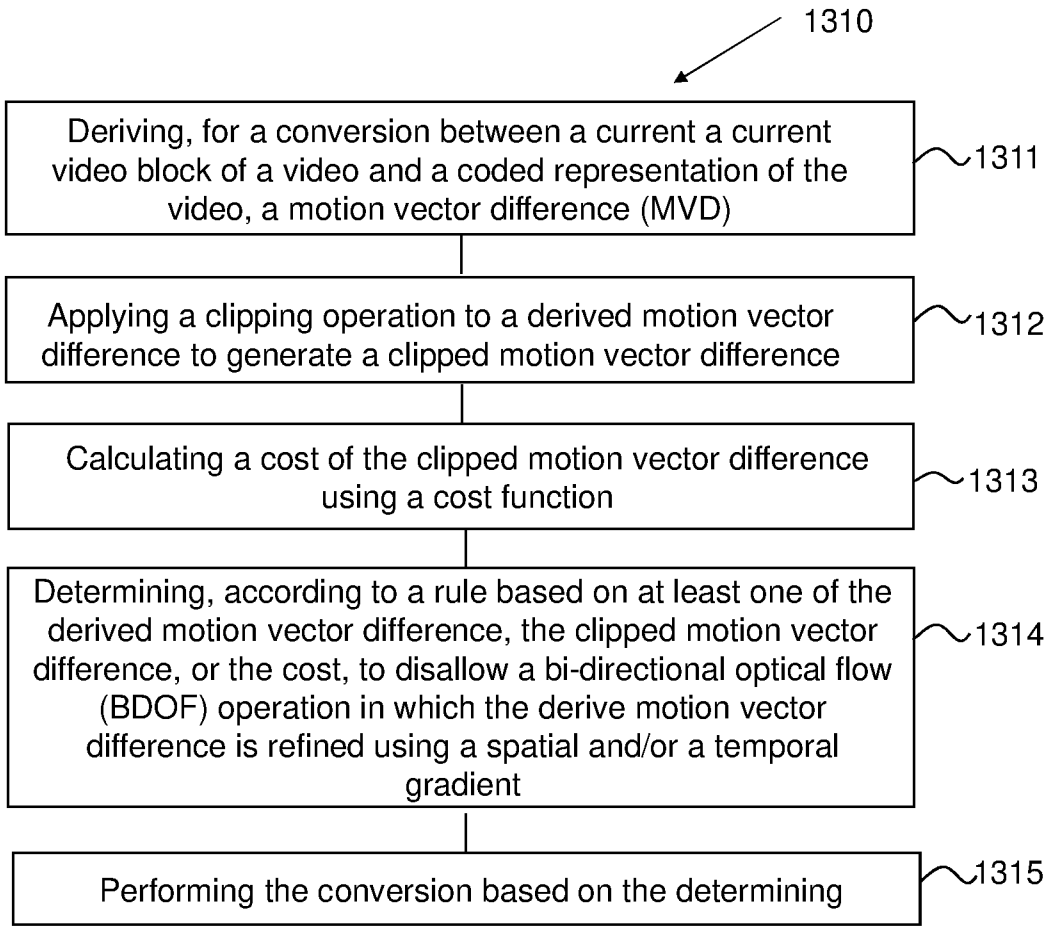
1310
Deriving, for a conversion between a current a current video block of a video and a coded representation of the video, a motion vector difference (MVD)
1311
Applying a clipping operation to a derived motion vector difference to generate a clipped motion vector difference
1312
Calculating a cost of the clipped motion vector difference using a cost function
1313
Determining, according to a rule based on at least one of the derived motion vector difference, the clipped motion vector difference, or the cost, to disallow a bi-directional optical flow (BDOF) operation in which the derive motion vector difference is refined using a spatial and/or a temporal gradient
1314
Performing the conversion based on the determining
1315

FIG. 13A

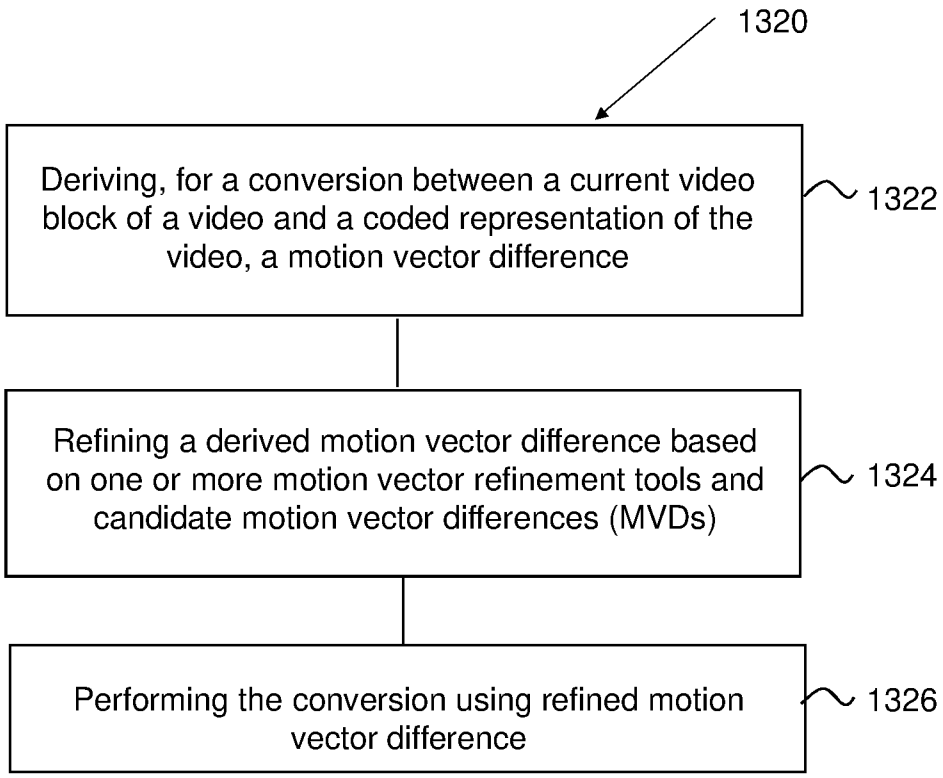
1320
Deriving, for a conversion between a current video block of a video and a coded representation of the video, a motion vector difference
1322
Refining a derived motion vector difference based on one or more motion vector refinement tools and candidate motion vector differences (MVDs)
1324
Performing the conversion using refined motion vector difference
1326

FIG. 13B

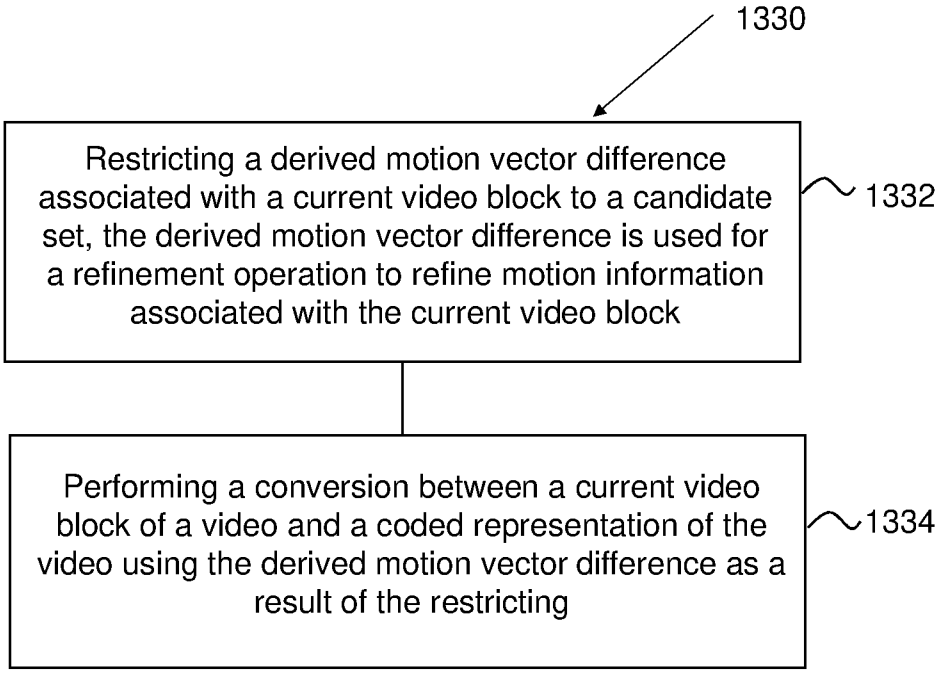
1330
Restricting a derived motion vector difference associated with a current video block to a candidate set, the derived motion vector difference is used for a refinement operation to refine motion information associated with the current video block
1332
Performing a conversion between a current video block of a video and a coded representation of the video using the derived motion vector difference as a result of the restricting
1334

FIG. 13C

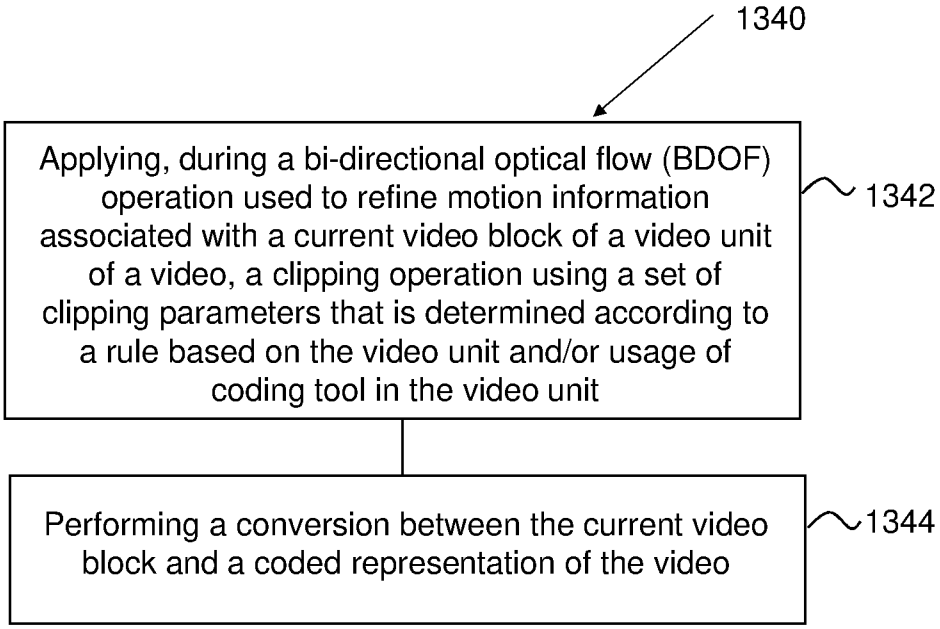
1340
Applying, during a bi-directional optical flow (BDOF) operation used to refine motion information associated with a current video block of a video unit of a video, a clipping operation using a set of clipping parameters that is determined according to a rule based on the video unit and/or usage of coding tool in the video unit
1342
Performing a conversion between the current video block and a coded representation of the video
1344

FIG. 13D

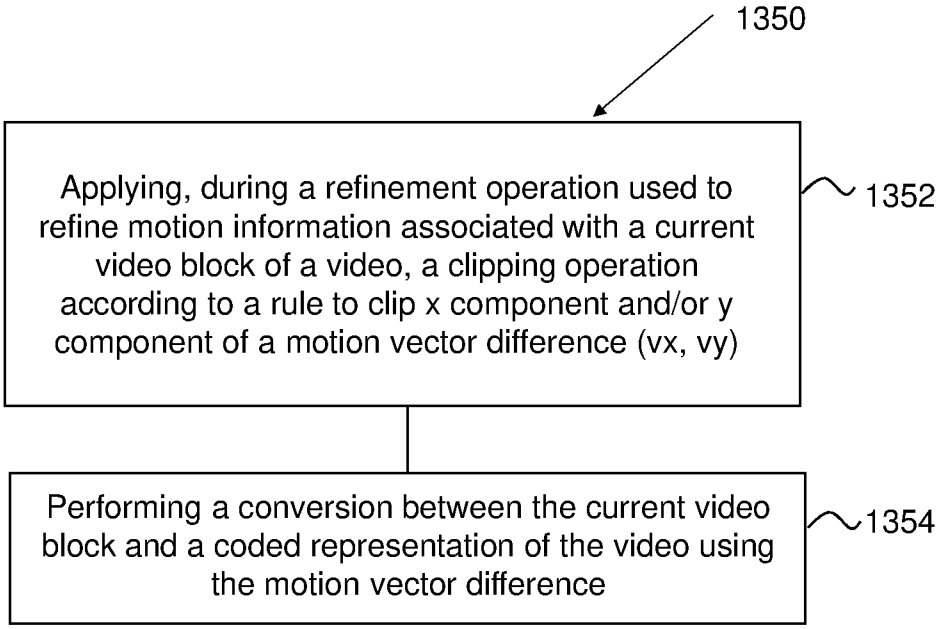
1350
Applying, during a refinement operation used to refine motion information associated with a current video block of a video, a clipping operation according to a rule to clip x component and/or y component of a motion vector difference (vx, vy)
1352
Performing a conversion between the current video block and a coded representation of the video using the motion vector difference
1354

FIG. 13E

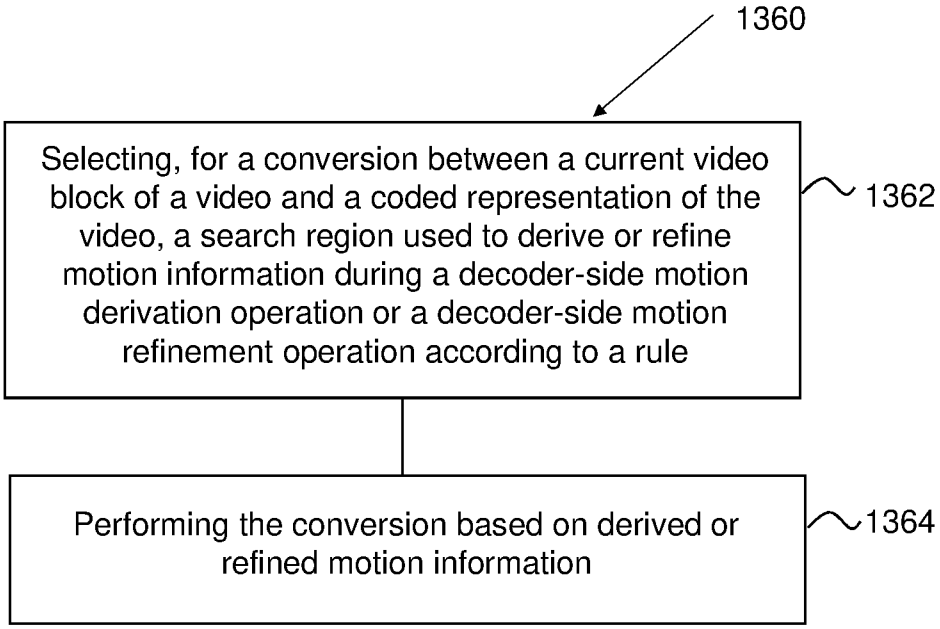
1360
Selecting, for a conversion between a current video block of a video and a coded representation of the video, a search region used to derive or refine motion information during a decoder-side motion derivation operation or a decoder-side motion refinement operation according to a rule
1362
Performing the conversion based on derived or refined motion information
1364

FIG. 13F

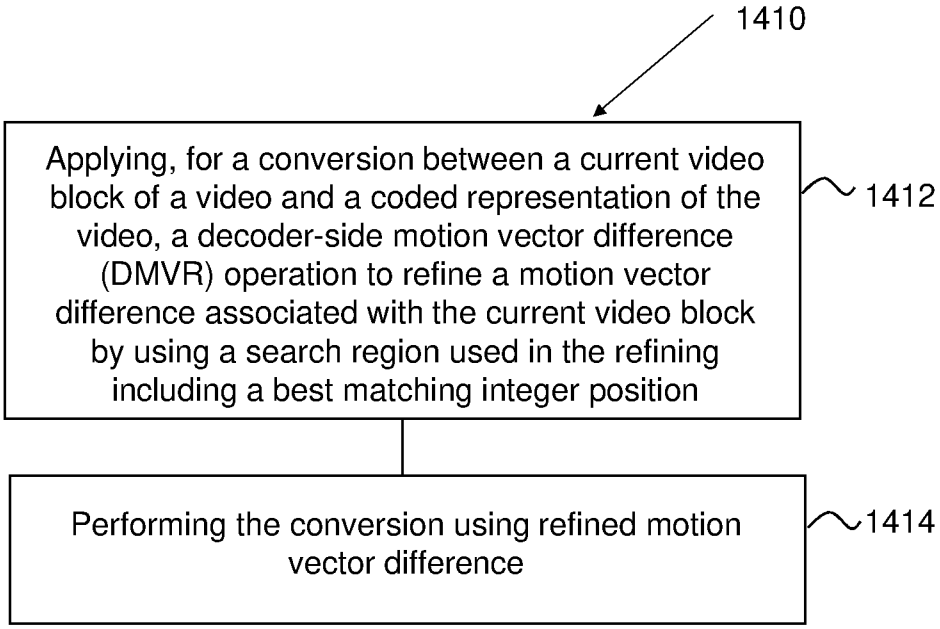
1410
Applying, for a conversion between a current video block of a video and a coded representation of the video, a decoder-side motion vector difference (DMVR) operation to refine a motion vector difference associated with the current video block by using a search region used in the refining including a best matching integer position
1412
Performing the conversion using refined motion vector difference
1414

FIG. 14A

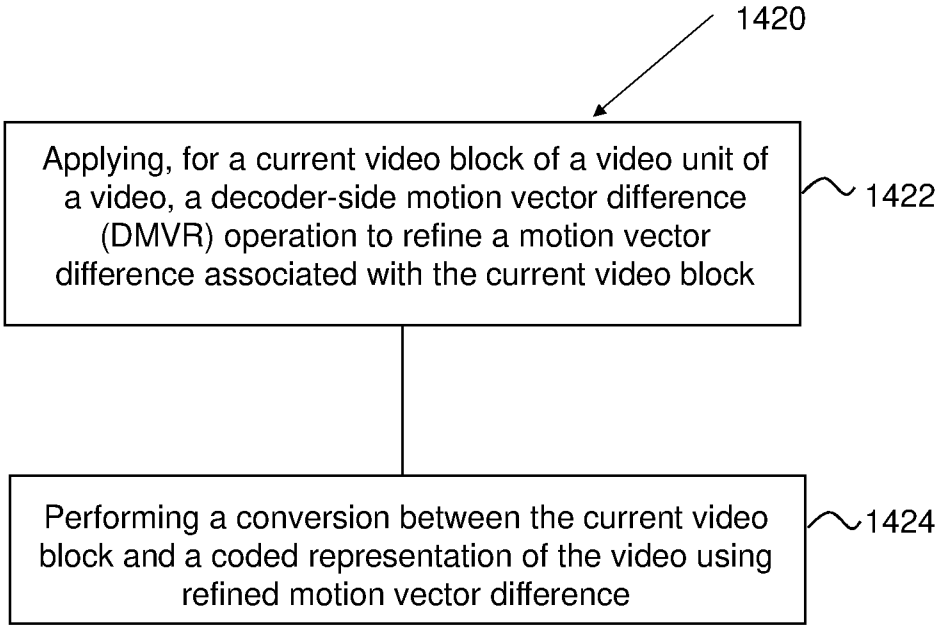
1420
Applying, for a current video block of a video unit of a video, a decoder-side motion vector difference (DMVR) operation to refine a motion vector difference associated with the current video block
1422
Performing a conversion between the current video block and a coded representation of the video using refined motion vector difference
1424

FIG. 14B

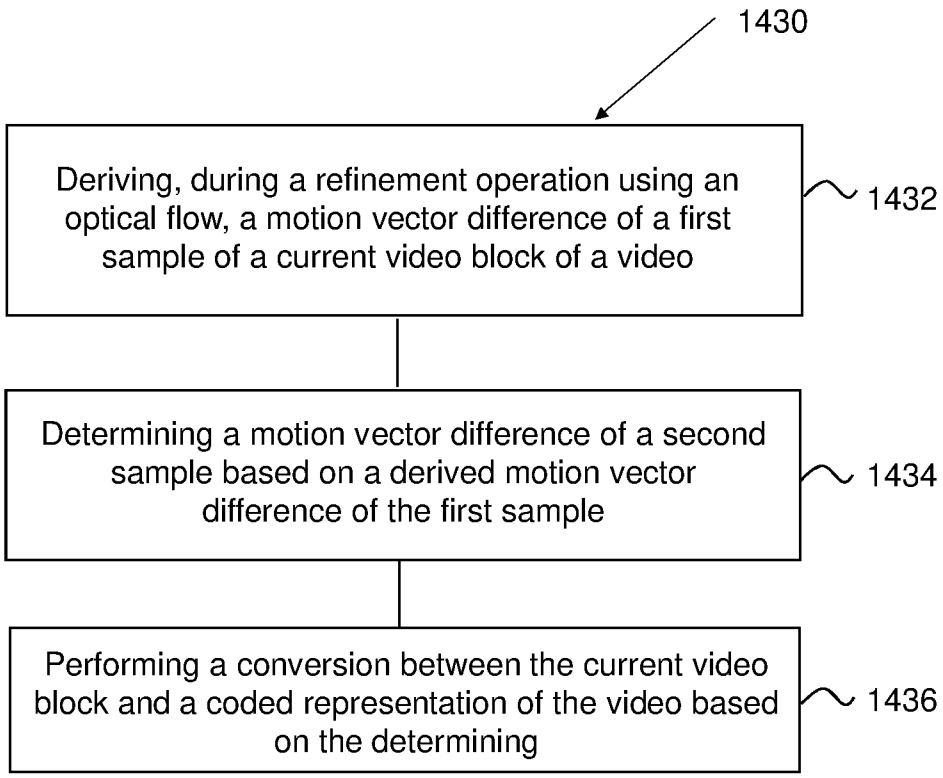
1430
Deriving, during a refinement operation using an optical flow, a motion vector difference of a first sample of a current video block of a video
1432
Determining a motion vector difference of a second sample based on a derived motion vector difference of the first sample
1434
Performing a conversion between the current video block and a coded representation of the video based on the determining
1436

FIG. 14C

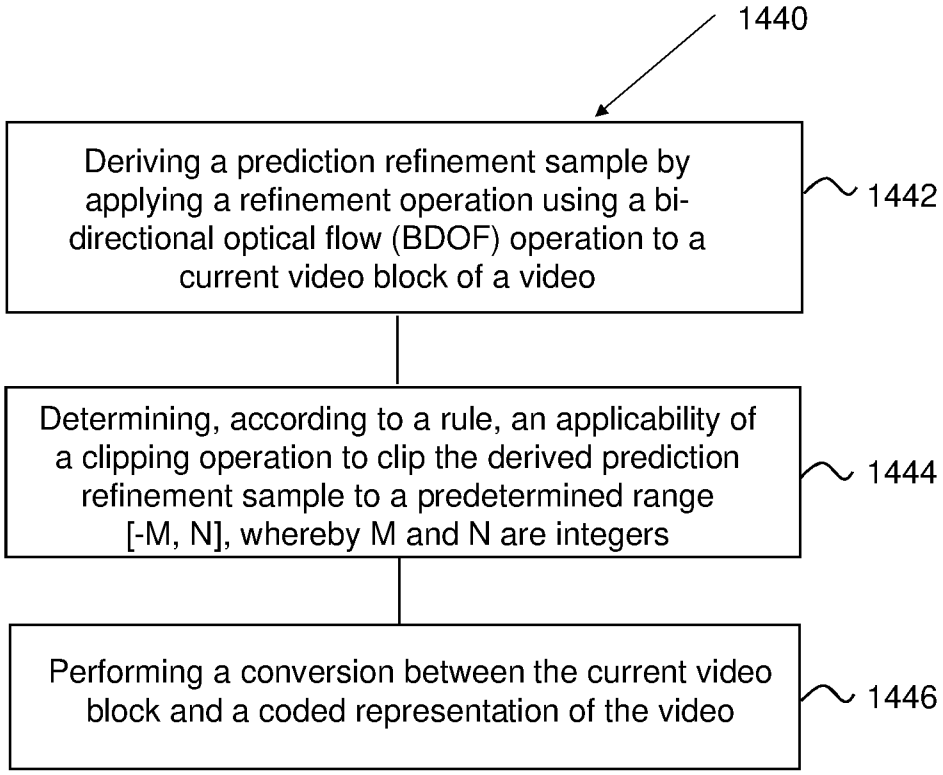
1440
Deriving a prediction refinement sample by applying a refinement operation using a bi-directional optical flow (BDOF) operation to a current video block of a video
1442
Determining, according to a rule, an applicability of a clipping operation to clip the derived prediction refinement sample to a predetermined range [-M, N], whereby M and N are integers
1444
Performing a conversion between the current video block and a coded representation of the video
1446

FIG. 14D

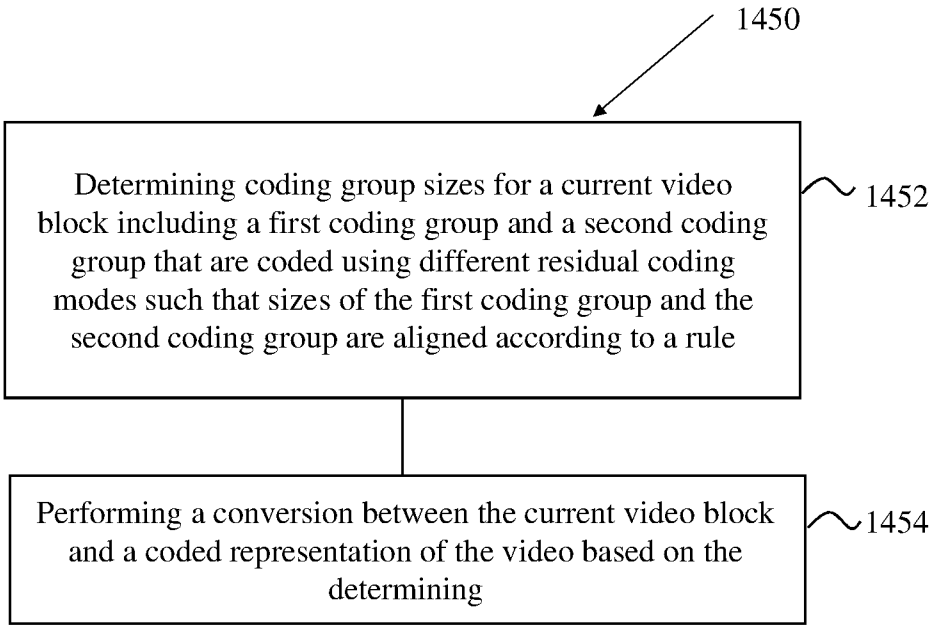
1450
Determining coding group sizes for a current video block including a first coding group and a second coding group that are coded using different residual coding modes such that sizes of the first coding group and the second coding group are aligned according to a rule
1452
Performing a conversion between the current video block and a coded representation of the video based on the determining
1454

FIG. 14E

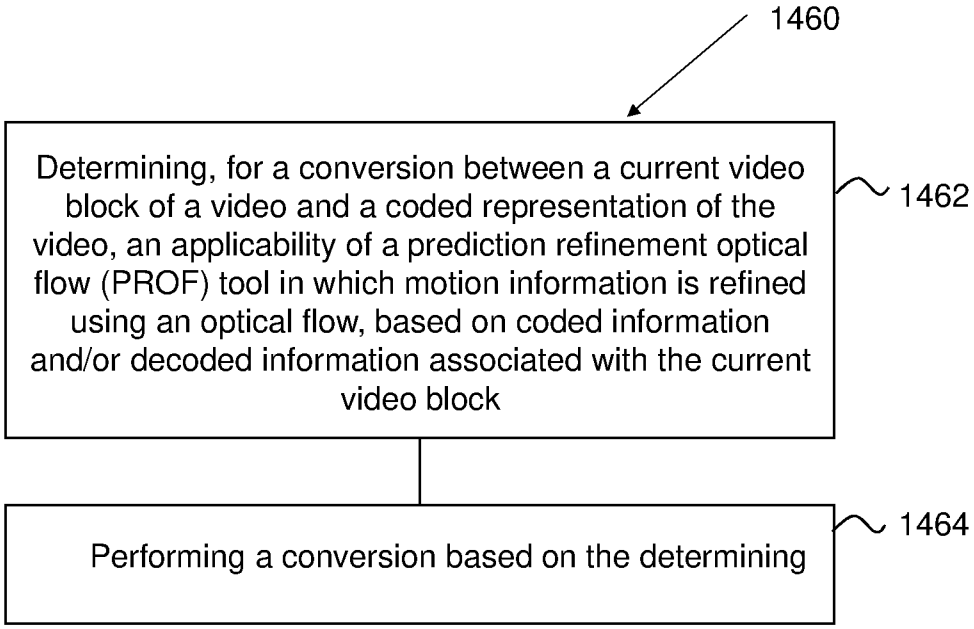
1460
Determining, for a conversion between a current video block of a video and a coded representation of the video, an applicability of a prediction refinement optical flow (PROF) tool in which motion information is refined using an optical flow, based on coded information and/or decoded information associated with the current video block
1462
Performing a conversion based on the determining
1464

FIG. 14F

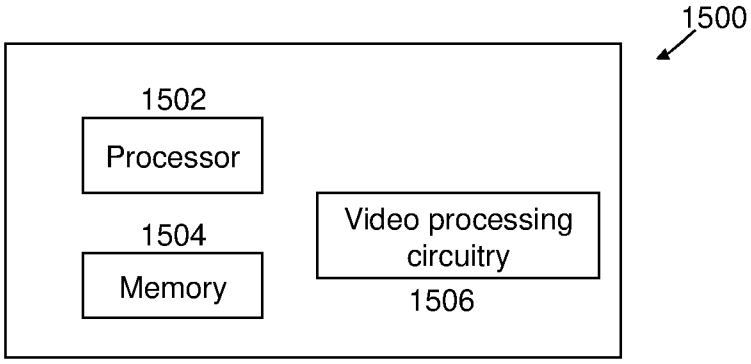
1500
1502
Processor
1504
Memory
Video processing circuitry
1506

FIG. 15

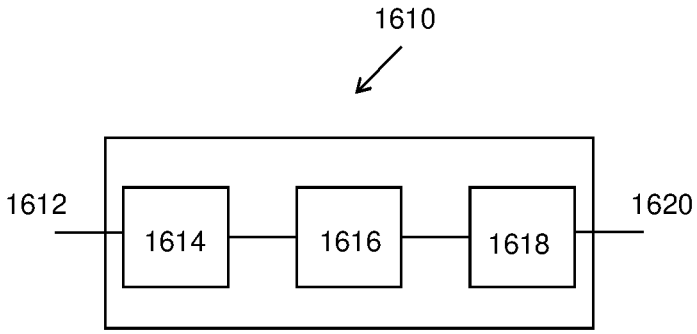

FIG. 16