

## METHODS OF ESTIMATING MOTION IN IMAGE DATA AND APPARATUS FOR PERFORMING SAME

### Abstract of the Disclosure

5       Methods of estimating motion in image data include the steps of producing a first frame of image data from a received video signal containing information of an image data frame of higher predetermined resolution (e.g., 352x244 pixels) and producing a second image data frame of coarser resolution (e.g., 88x61 pixels) relative to the first image data frame. An estimate of motion in the second image data frame is then produced and used to determine a estimate of motion in the first image data frame of higher resolution. The estimate of motion in the first image data frame is then used to obtain an estimate of motion in the received image data frame of predetermined full resolution. The estimate of motion in the second image data frame can be determined by reading a plurality of motion vectors from an image block in a previous version of the second image data frame and reading image data in a reference block in a current version of the second image data frame. To obtain this estimate, an optimum motion vector is determined by predicting a plurality of motion vectors based on a corresponding plurality of motion models and selecting the best model and vector which yields the smallest difference signal. Once an optimum motion vector has been predicted, the plurality of motion vectors previously read are adjusted relative to the optimum motion vector. Then a determination is made as to which one of the plurality of vectors yields the smallest relative motion error so that this vector can be used as an estimation of motion from the previous version of the second image data frame to the current version of the second image data frame. These steps are then performed again for the first image data frame of higher resolution, using the estimation obtained from the second image data frame, and then performed again so that a highly accurate estimation of motion in the image data frame of predetermined resolution can be achieved.

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