BRIEF DESCRIPTION

According to a first aspect of the present invention, there is provided a method comprising: receiving reference image information, the reference image information defining a grid of multiple elements at a given resolution; receiving compensation information for an image element in a compensated image, settings of display elements in the compensated image derived at least in part from the reference image information; processing the received compensation information to produce a set of coordinates indicating a corresponding off-grid location of the image element in the grid; calculating a value for the corresponding off-grid location of the image element based on a group of multiple elements in the grid; and assigning the value to the image element in the compensated image.

According to a second aspect of the present invention, there is provided a method comprising: via computer processor hardware: receiving settings information for a first image, the first image including a set of multiple display elements; receiving motion compensation information for a given display element in a second image, the motion compensation information indicating a coordinate location within a particular display element in the first image to which the given display element pertains; utilizing the coordinate location as a basis from which to select a grouping of multiple display elements in the first image; and generating a setting for the given display element in the second image based on settings of the multiple display elements in the grouping.

According to a third aspect of the present invention, there is provided computer-readable hardware storage having instructions stored thereon, the instructions, when carried out by at least one processing device, causes the at least one processing device to perform operations of: receiving reference image information, the reference image information defining a grid of multiple elements at a given resolution; receiving compensation information for an image element in a compensated image, settings of display elements in the compensated image derived at least in part from the reference image information; processing the received compensation information to produce a set of coordinates indicating a corresponding off-grid location of the image element in the grid; calculating a value for the corresponding off-grid location of the image element based on a group of multiple elements in the grid; and assigning the value to the image element in the

compensated image.

According to a fourth aspect of the present invention, there is provided computer-readable hardware storage having instructions stored thereon, the instructions, when carried out by at least one processing device, causes the at least one processing device to perform operations of: receiving settings information for a first image, the first image including a set of multiple display elements; receiving motion compensation information for a given display element in a second image, the motion compensation information indicating a coordinate location within a particular display element in the first image to which the given display element pertains; utilizing the coordinate location as a basis from which to select a grouping of multiple display elements in the first image; and generating a setting for the given display element in the second image based on settings of the multiple display elements in the grouping.

According to a fifth aspect of the present invention, there is a computer system comprising: computer processor hardware; and a hardware storage resource coupled to the computer processor hardware, the hardware storage resource storing instructions that, when executed by the at computer processor hardware, causes the computer processor hardware to perform operations of: receiving reference image information, the reference image information defining a grid of multiple elements at a given resolution; receiving compensation information for an image element in a compensated image, settings of display elements in the compensated image derived at least in part from the reference image information; processing the received compensation information to produce a set of coordinates indicating a corresponding off-grid location of the image element in the grid; calculating a value for the corresponding off-grid location of the image element based on a group of multiple elements in the grid; and assigning the value to the image element in the compensated image.

Embodiments herein deviate with respect to conventional systems and methods, providing novel methods to estimate, encode and leverage motion information so as to generate a suitable prediction of a current image (or "target image") based on motion compensation of a reference image, hence supporting methods such as motion estimation, motion compensation, signal encoding, signal quality enhancement (e.g., denoising, super-resolution, etc.), signal interpolation (e.g., increase of frame-rate),

special effects, computer graphics, medical imaging, computer vision, augmented reality applications, etc.

One embodiment herein includes a method for calculating or predicting the value of an element of a target image based on the value of an arbitrary location of a reference image, whereby such arbitrary location is expressed with fractional coordinates (such as floating point numbers, high-precision fixed-point numbers, real numbers, non-integer numbers, etc.) independent of the actual sample grid (i.e., resolution) of the reference image used as a basis to reconstruct a rendition of the image. In contrast to pre-calculating and producing a supersampled reference image at a higher resolution and then performing motion compensation by means of an integer coordinate system based on the supersampled grid, certain embodiments illustrated herein do not need to pre-calculate any supersampled rendition of the reference image and instead calculate reference elements on-the-fly at any arbitrary location in the reference image (e.g., without limitation, via on-the-fly resampling techniques).

According to embodiments herein, motion compensation can be effectively implemented using a substantially continuous coordinate system and effectively supporting motion compensation of very subtle movements (e.g., if necessary, even smaller than $1/10^{th}$ of a pel) with relatively limited buffer memory cost and computational cost. Essentially, motion compensation according to embodiments herein allows for extremely high precision (e.g., capturing movements of less than $1/100^{th}$ of a pel) and may leverage resampling operations performed on the fly, without the need of storing large reference images at higher resolutions.

Embodiments herein may be useful in conjunction with traditional motion compensation