US 20230232006A1

(54) **VIDEO DECODING IMPLEMENTATIONS FOR A GRAPHICS PROCESSING UNIT**

(71) Applicant: **Microsoft Technology Licensing, LLC**, Redmond, WA (US)

(72) Inventors: **Daniel Dinu**, Redmond, WA (US); **Juan Carlos Arevalo Baeza**, Bellevue, WA (US); **Barry Friemel**, Redmond, WA (US); **William Chen**, Issaquah, WA (US)

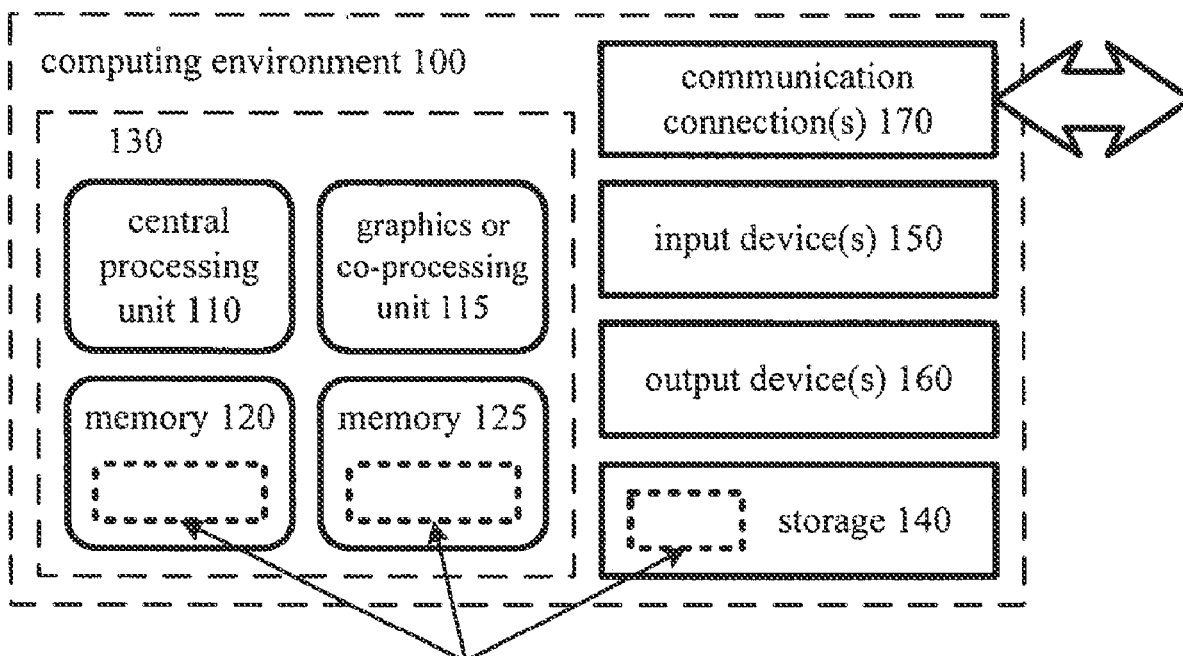(73) Assignee: **Microsoft Technology Licensing, LLC**, Redmond, WA (US)

Publication Classification

(57) **ABSTRACT**

Video decoding innovations for multithreading implementations and graphics processor unit ("GPU") implementations are described. For example, for multithreaded decoding, a decoder uses innovations in the areas of layered data structures, picture extent discovery, a picture command queue, and/or task scheduling for multithreading. Or, for a GPU implementation, a decoder uses innovations in the areas of inverse transforms, inverse quantization, fractional interpolation, intra prediction using waves, loop filtering using waves, memory usage and/or performance-adaptive loop filtering. Innovations are also described in the areas of error handling and recovery, determination of neighbor availability for operations such as context modeling and intra prediction, CABAC decoding, computation of collocated information for direct mode macroblocks in B slices, reduction of memory consumption, implementation of trick play modes, and picture dropping for quality adjustment.

computing environment 100

130

central processing unit 110

graphics or co-processing unit 115

memory 120

memory 125

communication connection(s) 170

input device(s) 150

output device(s) 160

storage 140

software 180 implementing one or more multithreaded decoding innovations or other decoding innovations