



- (51) **International Patent Classification:**
H04N 19/80 (2014.01)
- (21) **International Application Number:**
PCT/CN2020/080827
- (22) **International Filing Date:**
24 March 2020 (24.03.2020)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
PCT/CN2019/079395
24 March 2019 (24.03.2019) CN
- (71) **Applicants:** **BEIJING BYTEDANCE NETWORK TECHNOLOGY CO., LTD.** [CN/CN]; Room B-0035, 2/F, No. 3 Building, No. 30, Shixing Road, Shijingshan District, Beijing 100041 (CN). **BYTEDANCE INC.** [US/US]; 12655 West Jefferson Boulevard, Sixth Floor, Suite No. 137, Los Angeles, California 90066 (US).
- (72) **Inventors:** **ZHANG, Li**; 12655 West Jefferson Boulevard, Sixth Floor, Suite No. 137, Los Angeles, California 90066 (US). **ZHANG, Kai**; 12655 West Jefferson Boulevard, Sixth Floor, Suite No. 137, Los Angeles, California 90066 (US). **LIU, Hongbin**; Jinritoutiao Post Office, China Satellite Communications Tower, No. 63, Zhichun Road, Haidian District, Beijing 100080 (CN). **WANG, Yue**; Jinritoutiao Post Office, China Satellite Communications Tower, No. 63, Zhichun Road, Haidian District, Beijing 100080 (CN).
- (74) **Agent:** **LIU, SHEN & ASSOCIATES**; 10th Floor, Building 1, 10 Caihefang Road, Haidian District, Beijing 100080 (CN).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,

(54) **Title:** NONLINEAR ADAPTIVE LOOP FILTERING IN VIDEO PROCESSING

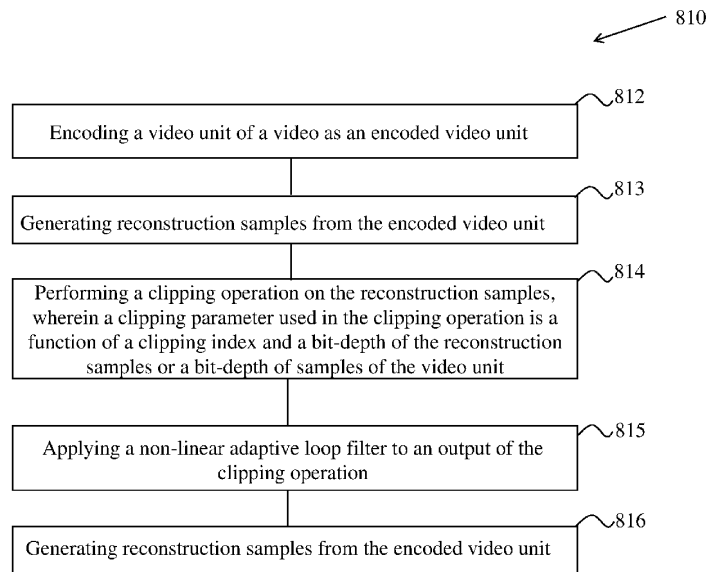


FIG. 8A

(57) **Abstract:** Devices, systems and methods for video processing are described. In an exemplary aspect, a method for video processing includes encoding a video unit of a video as an encoded video unit; generating reconstruction samples from the encoded video unit; performing a clipping operation on the reconstruction samples, wherein a clipping parameter used in the clipping operation is a function of a clipping index and a bit-depth of the reconstruction samples or a bit-depth of samples of the video unit; applying a non-linear adaptive loop filter to an output of the clipping operation; and generating a coded representation of the video using the encoded video unit.

DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*