



(51) International Patent Classification:
Not classified

(21) International Application Number:
PCT/US2021/018910

(22) International Filing Date:
19 February 2021 (19.02.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/979,414 20 February 2020 (20.02.2020) US
17/180,542 19 February 2021 (19.02.2021) US

(71) Applicant: **ILLUMINA, INC.** [US/US]; 5200 Illumina Way, San Diego, California 92122 (US).

(72) Inventors: **DUTTA, Anindita**; 5200 Illumina Way, San Diego, California 92122 (US). **VESSERE, Gery**; 5200 Illumina Way, San Diego, California 92122 (US). **KASHEFHAGHIGHI, Dorna**; 5200 Illumina Way, San Diego, California 92122 (US). **JAGANATHAN, Kishore**; 5200 Illumina Way, San Diego, California 92122 (US). **KIA, Amirali**; 811 N El Camino Real, Apt. 302, San Mateo, 94401 (US).

(74) Agent: **BEFFEL, Ernest J., Jr.** et al.; Haynes Beffel & Wolfeld LLP, P.O. Box 366, 637 Main Street, Half Moon Bay, California 94019 (US).

(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, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,

(54) Title: ARTIFICIAL INTELLIGENCE-BASED MANY-TO-MANY BASE CALLING

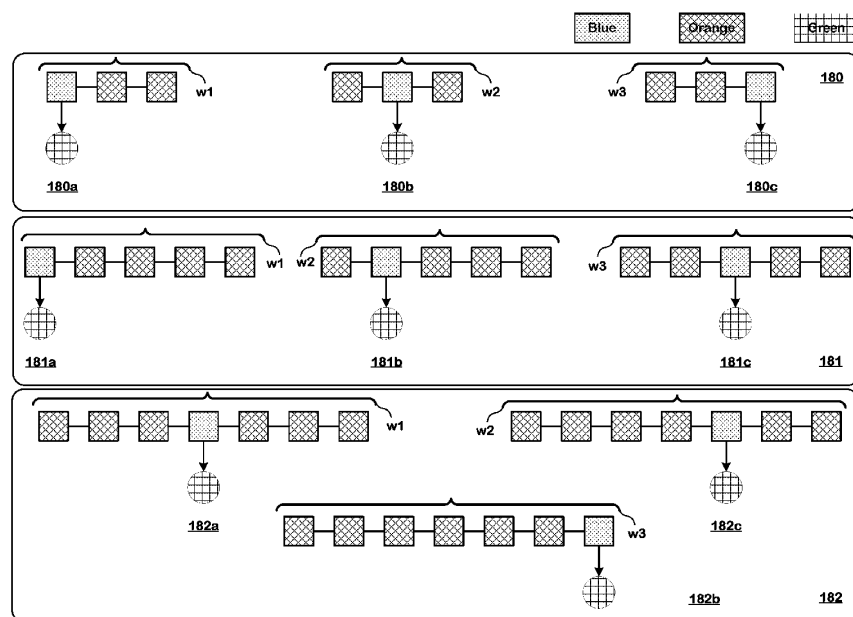


Figure 1D

(57) Abstract: The technology disclosed relates to artificial intelligence-based base calling. The technology disclosed relates to accessing a progression of per-cycle analyte channel sets generated for sequencing cycles of a sequencing run, processing, through a neural network-based base caller (NNBC), windows of per-cycle analyte channel sets in the progression for the windows of sequencing cycles of the sequencing run such that the NNBC processes a subject window of per-cycle analyte channel sets in the progression for the subject window of sequencing cycles of the sequencing run and generates provisional base call predictions for three or more sequencing cycles in the subject window of sequencing cycles, from multiple windows in which a particular sequencing cycle appeared at different positions, using the NNBC to generate provisional base call predictions for the particular sequencing cycle, and determining a base call for the particular sequencing cycle based on the plurality of base call predictions.

[Continued on next page]

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).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*
