



(51) International Patent Classification:
G01N 15/14 (2006.01) *G06N 20/20* (2019.01)

(21) International Application Number:
PCT/EP2023/069629

(22) International Filing Date:
14 July 2023 (14.07.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/386,476 07 December 2022 (07.12.2022) US

(71) Applicant: **MELIO HEALTHCARE LIMITED** [GB/G-B]; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB).

(72) Inventors: **LAING, Adam**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB). **HAYDAY, Thomas**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB). **YANG, Jennie**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB). **MASON, Jeremy**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB). **ALVES, Eduardo**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB). **ULLBERG, Per**; c/o Mark Davies & Associates Ltd, City Tower, 40 Basinghall Street, London Greater London EC2V 5DE (GB).

(74) Agent: **MEWBURN ELLIS LLP**; Aurora Building, Counterslip, Bristol BS1 6BX (GB).

(54) Title: SYSTEMS AND METHODS FOR COMPREHENSIVE AND STANDARDIZED IMMUNE SYSTEM PHENOTYPING AND AUTOMATED CELL CLASSIFICATION

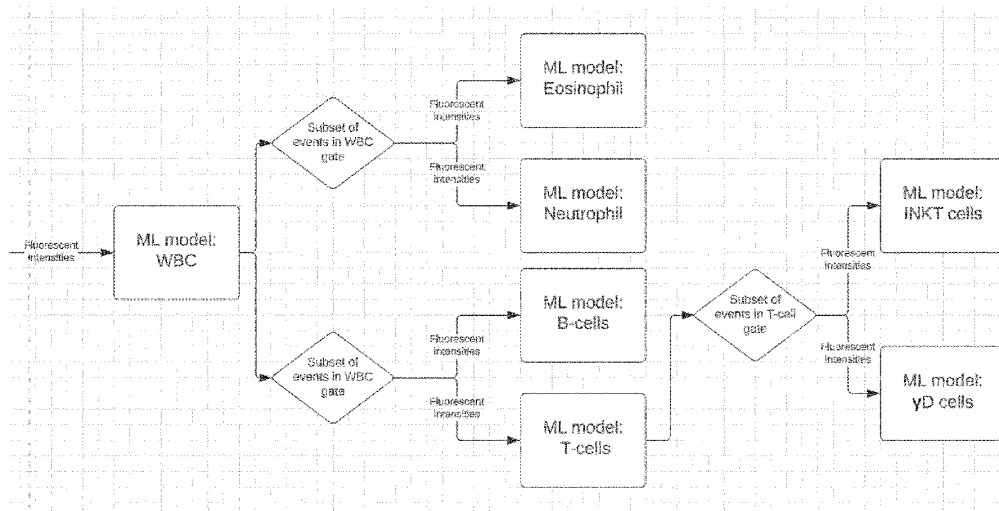


FIG. 12

(57) Abstract: Method and systems for generating an immune profile for a subject are described. In some instances, the methods comprise contacting at least a first aliquot of a sample from the subject with at least a first immunophenotyping panel to fluorescently-label cells contained within the sample; processing the fluorescently-labeled cells using a full spectrum flow cytometer to generate fluorescence intensity data, or data derived therefrom, for fluorescently-labeled cells from the sample; providing at least a subset of the fluorescence intensity data, or data derived therefrom, for the fluorescently-labeled cells as input to an ensemble machine learning model configured to process the data and classify individual cells as belonging to one of a plurality of distinct immune cell sub-populations; and outputting a total cell count or cell frequency for each of the plurality of distinct immune cell sub-populations in the sample

[Continued on next page]

(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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, ME, 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:

- with international search report (Art. 21(3))
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE

as part of an immune profile for the subject.