



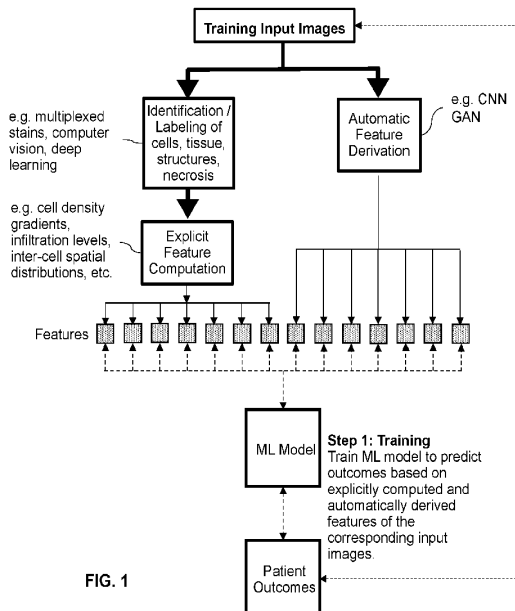
- (51) **International Patent Classification:**
C12N 5/02 (2006.01) G01N 1/40 (2006.01)
- (21) **International Application Number:**
PCT/US2021/038974
- (22) **International Filing Date:**
24 June 2021 (24.06.2021)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
63/044,148 25 June 2020 (25.06.2020) US
63/050,342 10 July 2020 (10.07.2020) US
17/357,411 24 June 2021 (24.06.2021) US
- (71) **Applicant: ARRIVE PTE LTD.** [US/SG]; 1 Maritime Square, #09-57B, Harbourfront Centre, Singapore 099253 (SG).
- (72) **Inventors: SZU, Evan;** 1819 Mezes Ave, Unit B, Belmont, California 94002 (US). **BORUDE, Nishant;** 1355 Post Street, Apartment 104, San Francisco, California 94103 (US). **SURESH, Nivedita;** 299 Fremont Street, Apartment 1106, San Francisco, Colorado 91405 (US). **CHU, Michael H.;** 5701 W. Slaughter Lane, Suite A130-248, Austin, Texas 78749 (US). **ZAPOL, David G.;** 1256 4th Avenue,

San Francisco, California 94122 (US). **BHATHIA, Vinona;** 1710 Noe Street, San Francisco, California 94131 (US). **TONG, Darick M.;** P.O. Box 14034, San Francisco, California 94114 (US). **TONG, Noriko Y.;** P.O. Box 14034, San Francisco, California 94114 (US). **CHENG, John;** 150 Pomona Ave., El Cerrito, California 94530 (US). **SZU, Clifford;** P.O. Box 11662, Zephyr Cove, Nevada 89448 (US). **SUBA, Eric J.;** 2295 Vallejo Street #508, San Francisco, California 94123 (US).

- (74) **Agent: DYKEMAN, David J.;** Greenberg Traurig, LLP, One International Place, Suite 2000, Boston, Massachusetts 02110 (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, 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.

- (54) **Title: SYSTEM AND METHODS FOR CHARACTERIZING CELLS AND MICROENVIRONMENTS**



- (57) **Abstract:** Cell identification and classification is a well-known problem in the pathology domain that help identify microenvironments. In addition to the characteristic of each cell, its interactions with the neighboring regions or other cells is also important. This involves correct identification of neighboring elements and analytically representing the interactions between them. This disclosure presents a system that combines many such features, some hand engineered and some machine derived through training of Deep Learning algorithms that can be used to study the microenvironments.

(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:

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