



- (51) **International Patent Classification:**  
Not classified
- (21) **International Application Number:**  
PCT/SG2022/050657
- (22) **International Filing Date:**  
15 September 2022 (15.09.2022)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
10202110176U 15 September 2021 (15.09.2021) SG
- (71) **Applicant:** **NANYANG TECHNOLOGICAL UNIVERSITY** [SG/SG]; 50 Nanyang Avenue, Singapore 639798 (SG).
- (72) **Inventors:** **WANG, Dan Wei**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG).  
**WU, Zhenyu**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG).
- (74) **Agent:** **AMICA LAW LLC**; 77 Robinson Road, #22-01 Robinson 77, Singapore 068896 (SG).

(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, 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).

(54) **Title:** SENSOR ARRAY, SYSTEMS AND METHODS FOR BUILDING A MAGNETIC MAP, AND FOR LOCALIZING A MOBILE DEVICE BASED ON A MAGNETIC MAP

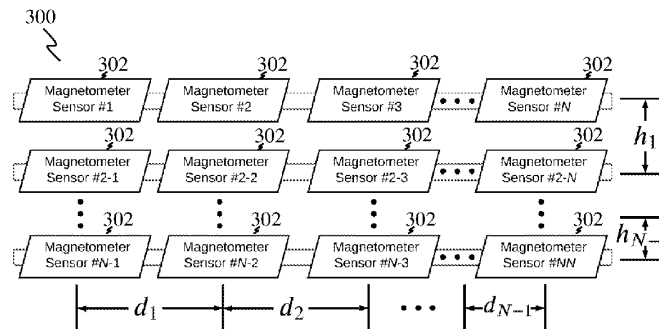


FIG. 3A

(57) **Abstract:** According to embodiments of the present invention, a sensor array is provided. The sensor array includes a plurality of magnetic field sensors configured to operate substantially simultaneously for building a magnetic map representative of an environment. Each magnetic field sensor may be configured to measure an ambient magnetic field at a position of the magnetic field sensor, the position being within the environment or within a working distance of the magnetic field sensor from an edge boundary of the environment. Each magnetic field sensor may be arranged spaced apart from a neighbouring magnetic field sensor at a distance such that the respective ambient magnetic fields measured by the magnetic field sensor and the neighbouring magnetic field sensor are disambiguated. According to further embodiments of the present invention, a magnetic map as well as systems and methods for building a magnetic map and for localizing a mobile device are also provided.

[Continued on next page]

**Published:**

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