

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国际局



(10) 国际公布号
WO 2022/062432 A1

(43) 国际公布日
2022 年 3 月 31 日 (31.03.2022)

(51) 国际专利分类号:
G06Q 50/26 (2012.01) *G06K 9/00* (2006.01)
G01D 21/02 (2006.01)

(21) 国际申请号: PCT/CN2021/094495

(22) 国际申请日: 2021 年 5 月 19 日 (19.05.2021)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
202011029942.4 2020 年 9 月 27 日 (27.09.2020) CN

(71) 申请人: 中南大学 (CENTRAL SOUTH UNIVERSITY) [CN/CN]; 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410083 (CN)。

(72) 发明人: 刘辉 (LIU, Hui); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。段铸 (DUAN, Zhu); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。秦进 (QIN, Jin); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。吴海平 (WU, Haiping); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。尹诗 (YIN, Shi); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。陈超 (CHEN, Chao); 中国湖南省长沙市岳麓区麓山南路 932 号, Hunan 410017 (CN)。

(74) 代理人: 长沙正奇专利事务所有限责任公司 (CHANGSHA ZONEKEY PATENT LAW FIRM); 中国湖南省长沙市岳麓区枫林二路 188 号向日葵广场 7 楼, Hunan 410205 (CN)。

(54) Title: PASSENGER DISTRIBUTION PREDICTION MODEL TRAINING METHOD AND SYSTEM, AND PASSENGER GUIDANCE METHOD AND SYSTEM

(54) 发明名称: 乘客分布预测模型训练方法与系统、乘客诱导方法与系统

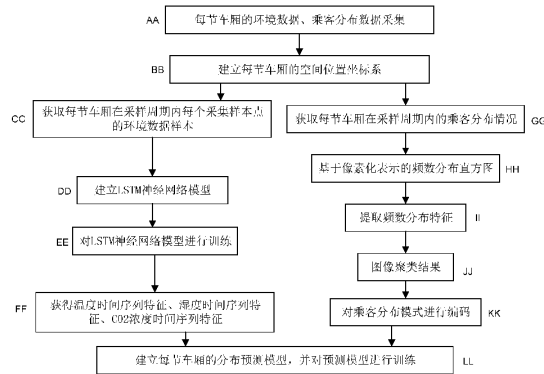


图 1

AA COLLECT ENVIRONMENTAL DATA AND PASSENGER DISTRIBUTION DATA OF EACH CARRIAGE
BB ESTABLISH A COORDINATE SYSTEM OF SPATIAL POSITIONS OF EACH CARRIAGE
CC ACQUIRE ENVIRONMENTAL DATA SAMPLES OF EACH COLLECTED SAMPLE POINT OF EACH CARRIAGE IN A SAMPLING PERIOD
DD ESTABLISH AN LSTM NEURAL NETWORK MODEL
EE TRAIN THE LSTM NEURAL NETWORK MODEL
FF OBTAIN TEMPERATURE-TIME SEQUENCE FEATURES, HUMIDITY-TIME SEQUENCE FEATURES AND CO2 CONCENTRATION-TIME SEQUENCE FEATURES
GG ACQUIRE A PASSENGER DISTRIBUTION SITUATION OF EACH CARRIAGE IN THE SAMPLING PERIOD
HH FREQUENCY DISTRIBUTION HISTOGRAM BASED ON PIXELATED REPRESENTATION
II EXTRACT FREQUENCY DISTRIBUTION FEATURES
JJ IMAGE CLUSTERING RESULTS
KK CODE PASSENGER DISTRIBUTION MODES
LL ESTABLISH A DISTRIBUTION PREDICTION MODEL OF EACH CARRIAGE, AND TRAIN THE PREDICTION MODEL

(57) Abstract: A passenger distribution prediction model training method and system, and a passenger guidance method and system. By using the characteristics of passenger density changes causing distribution changes of temperature, humidity and CO₂ concentration in carriages, passenger distribution situations are intelligently perceived, the problems of crowd flowing and shielding during passenger distribution detection by using images are avoided, and the problem of floor intrusive transformation during passenger distribution detection by using pressure

[见续页]

(81) 指定国 (除另有指明, 要求每一种可提供的国家保护): 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。

(84) 指定国 (除另有指明, 要求每一种可提供的地区保护): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (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)。

本国际公布:

— 包括国际检索报告 (条约第21条(3))。

sensors is avoided. By adjusting the brightness of illumination lamp tubes in the carriages, passengers are guided to flow, for example, the brightness of illumination lamp tubes in regions with high passenger distribution densities is decreased, and the brightness of illumination lamp tubes in regions with low passenger distribution densities is increased, so as to guide passengers to flow orderly to the regions with low passenger densities, thereby avoiding the interference of noisy environments of the carriages. In addition, the illumination guidance manner has the advantages of being simple and direct and having high acceptance.

(57) 摘要: 一种乘客分布预测模型训练方法与系统、乘客诱导方法与系统, 利用乘客密度变化引起车厢内温度、湿度和CO₂浓度分布变化的特点, 实现乘客分布情况的智能感知, 避免了采用图像进行乘客分布检测所面临的人群流动和遮挡问题, 以及避免了采用压力传感器进行乘客分布检测所面临的地板侵入式改造难题; 采用调整车厢内照明灯管的亮度方式引导乘客流动, 例如调暗乘客分布密度大的区域的照明灯管, 调亮乘客分布密度小的区域的照明灯管, 引导乘客向乘客密度小的区域有序流动, 避免了车厢嘈杂环境的干扰, 并且照明引导方式具有简单、直接、接受度高的优势。