

(51) International Patent Classification:
G05B 23/02 (2006.01)(21) International Application Number:
PCT/US2014/068121(22) International Filing Date:
2 December 2014 (02.12.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/919,854 23 December 2013 (23.12.2013) US
14/556,458 1 December 2014 (01.12.2014) US

(71) Applicant: EXXONMOBIL RESEARCH AND ENGINEERING COMPANY [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(72) Inventors: LI, Weichang; 15 Pinehurst Circle, Annandale, NJ 08801 (US). O'CONNOR, Thomas, F.; 440 12th Street, Apt. 2, Washington, DC 20002 (US). DASH, Sourabh, K.; 6550 Lexington Drive, Apt. 221, Beaumont, TX 77706 (US). SOMMERS, Jeffrey, J.; 4103 Hazelwood Court, Fairfax, VA 22030 (US).

(74) Agents: WARD, Andrew, T. et al.; Exxonmobil Research and Engineering Company, 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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:

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

(54) Title: SYSTEMS AND METHODS FOR EVENT DETECTION AND DIAGNOSIS

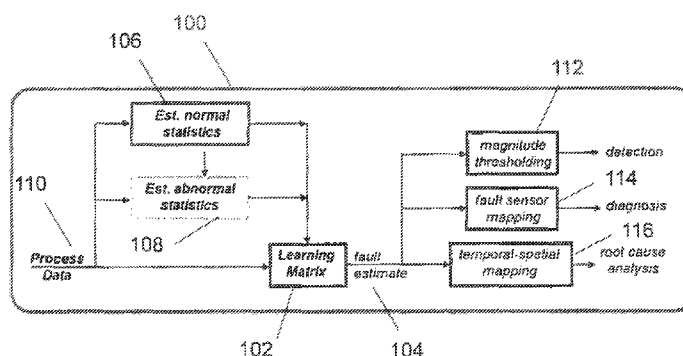


FIG. 1

(57) Abstract: Detection of event conditions in an industrial plant includes receiving process data corresponding to one or more sensors, estimating normal statistics from the process data, estimating abnormal statistics from the process data with potential abnormal operation of the one or more components, determining a fault model from the estimated normal and abnormal statistics, the fault model including a learning matrix, one or more fault indices indicating a likelihood of an occurrence of one or more fault events, and a fault threshold corresponding to the one or more sensors, determining one or more further fault indices from the further process data: applying the fault threshold to the one or more further fault indices, and indicating a further occurrence of the one or more fault events when a magnitude of the one or more further fault indices exceeds the fault threshold corresponding to the one or more sensors.