

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
17 April 2003 (17.04.2003)

PCT

(10) International Publication Number
WO 03/032248 A1

(51) International Patent Classification⁷: **G06N 3/02**

(21) International Application Number: PCT/US02/26548

(22) International Filing Date: 20 August 2002 (20.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/328,674 11 October 2001 (11.10.2001) US

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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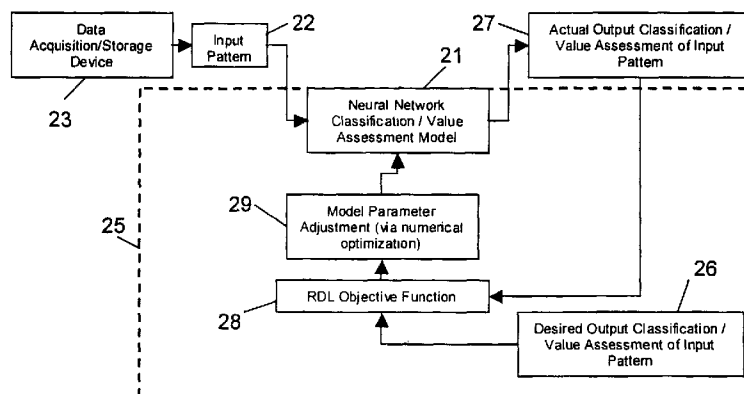
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Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR LEARNING TO CLASSIFY PATTERNS AND ASSESS THE VALUE OF DECISIONS



(57) **Abstract:** An apparatus and method for training a neural network model (21) to classify patterns (26) or to assess the value of decisions associated with patterns by comprising the actual output of the network in response to an input pattern with the desired output for that pattern on the basis of a Risk Differential Learning (RDL) objective function (28), the results of the comparison governing adjustment of the neural network model's parameters by numerical optimization. The RDL objective function includes one or more terms, each being a risk/benefit/classification figure-of-merit (RBCFM) function, which is a synthetic, monotonically non-decreasing, anti-symmetric/asymmetric, piecewise-differentiable function of a risk differential (Fig. 6), which is the difference between outputs of the neural network model produced in response to a given input pattern. Each RBCFM function has mathematical attributes such that RDL can make universal guarantees of maximum correctness/profitability and minimum complexity. A strategy for profit-maximizing resource allocation utilizing RDL is also disclosed.



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