(12) UK Patent Application (19) GB (11) 2552577 (13) A

(43) Date of Reproduction by UK Office 31.01.2018

(21) Application No: 1708045.8

(22) Date of Filing: 13.10.2015

Date Lodged: 19.05.2017

(30) Priority Data:
(31) 1419355 (32) 30.10.2014 (33) GB

(86) International Application Data:
PCT/IB2015/057824 En 13.10.2015

(87) International Publication Data:
WO2016/067139 En 06.05.2016

(71) Applicant(s):
International Business Machines Corporation (Incorporated in USA - New York)
New Orchard Road, Armonk, New York 10504, United States of America

(72) Inventor(s):
Evangelos Stavros Eleftheriou
Angeliki Pantazi
Abu Sebastian
Tomas Tuma

(74) Agent and/or Address for Service:
IBM United Kingdom Limited
Intellectual Property Department, Hursley Park, Winchester, Hampshire, SO21 2JN, United Kingdom

(51) INT CL:
G06N 3/063 (2006.01)

(56) Documents Cited:
US 20140310216 A1 **US 20130159229 A1**
US 20100299297 A1 **US 20090076993 A1**

(58) Field of Search:
INT CL **G06N**
Other: **CNPAT, CNKI, EPODOC, WPI**

(54) Title of the Invention: **Neuromorphic synapses**
Abstract Title: **Neuromorphic synapses**

(57) A neuromorphic synapse (11) comprises a resistive memory cell (15) connected in circuitry having first and second input terminals (21,22).These input terminals (21,22) respectively receive pre-neuron and post-neuron action signals, each having a read portion and a write portion, in use. The circuitry also has an output terminal (23) for providing a synaptic output signal which is dependent on resistance of the memory cell (15).The circuitry is operable such that the synaptic output signal is provided at the output terminal (23) in response to application at the first input terminal (21) of the read portion of the pre-neuron action signal,and such that a programming signal,for programming resistance of the memory cell (15), is applied to the cell (15) in response to simultaneous application of the write portions of the pre-neuron and post-neuron action signals at the first and second input terminals (21,22) respectively. The synapse (11) can be adapted for operation with identical pre-neuron and post-neuron action signals.

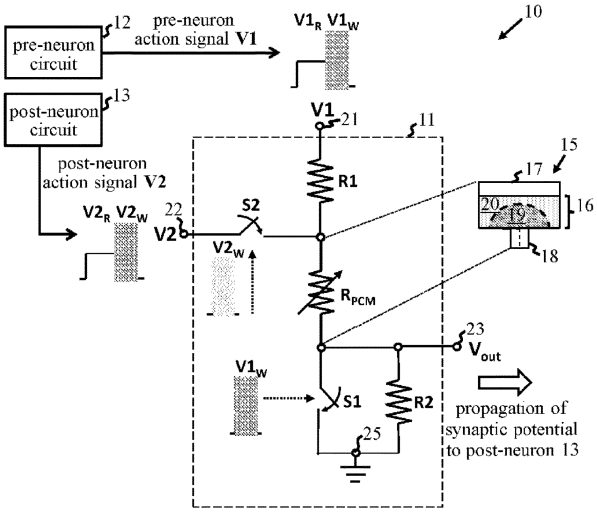

Figure 2

GB 2552577 A