



8 December 2021



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Examination report No. 1 for your standard patent application

IIP Group Pty Ltd
168 Stirling Highway
Nedlands WA 6009
Australia

Application number 2019372063
Applicant name BrainChip, Inc.
Earliest priority date 01 November 2018
Your reference P10135AU_exam

Final date for acceptance: 8 December 2022
Date of this report: 8 December 2021
Examination request date: 15 October 2021

Dear Applicant,

Your application has been examined under [section 45 of the Patents Act 1990](#). I consider that the application does not meet the requirements of the Act for the reasons indicated below.

What you need to do now

- Understand this examination report** – read through this report carefully to understand the issues identified.
- Overcome the issues** – you have until **8 December 2022** (12 months from the date of this report) to overcome all of the objections identified by the examiner in this examination report. If your response to this examination report does not overcome all of the examiner's objections, further adverse report(s) will be issued. If all objections in this (and any subsequent further reports) are not resolved by **8 December 2022**, your application will lapse and you will lose the opportunity to progress this application further.

Your progress

- Filed**
Application is filed
- Examination**
Application is being examined
- Acceptance**
Application is accepted
(enters an opposition period lasting 3 months)
- Grant**
Patent is granted
(patent is now enforceable)
- Continuation/Renewal**
Fees required to maintain application/patent
(fees are due annually – please refer to the 'paid to' date in AusPat for your next due date)

Need help?

Talk to Alex, our virtual assistant.

If you need further help, contact your examiner Olutope Omogbenigun on +61 2 6283 2876.

Make an enquiry or provide feedback on our [website](#).



3. **File your response promptly** – if you believe you can overcome the objections raised by the examiner in this (and any subsequent) examination report(s), please respond as soon as you are able. For more information on how to respond, see [Responding to an examination report](#) on our website. Please ensure that during the examination process you file your response(s) to allow sufficient time for IP Australia to consider it before the final date for acceptance. IP Australia will endeavour to either write another report, or accept your application, within 20 working days of receiving a response.

Things to be aware of

- **Monitor and pay your continuation fees** – fees are due annually. Your next continuation fee is due on **31 October 2023**. Information about fees may be obtained by visiting [time and costs](#) page on our website.
- **If you need to file a divisional application** – the divisional must be filed while the present application is in force (i.e. it is not lapsed, withdrawn or refused). If the present application is in force and has also been accepted, you must file your divisional application no later than 3 months from the date we advertised the acceptance of the present application. For more information on divisional applications, please see [Divisional applications](#) on our website.

You may like to know

- You may submit your response using [online services](#) or post.

Details of your patent application can be viewed on [AusPat](#), our Australian patent search database.

Yours sincerely,

Olutope Omogbenigun
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Report details

Basis of the report

In examining your application I have considered:

- the PCT pamphlet as originally filed
- allowed and/or proposed amendment/s under S104 including amendment item number 1, filed on 15 October 2021.

Summary of novelty, inventive step and patentable subject matter

| | <i>Satisfy requirements?</i> | <i>Claim numbers</i> |
|---------------------------|----------------------------------|--------------------------|
| Novelty/inventive step | Yes | NONE |
| | No | 1-16 |
| Patentable subject matter | Yes | 1-16 |
| | No | NONE |

Detailed objections on issues that have been identified

Documents cited or considered relevant

D1 : US 2018/0197075 A1 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 12 July 2018 ^[1]
Category: **X** Claims: 1-16

D2 : US 2018/0189645 A1 (INTEL CORPORATION) 05 July 2018 ^[1]
Category: **X** Claims: 1-16

D3 : US 2016/0358067 A1 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 08 December 2016 ^[1]
Category: **X** Claims: 1-16

^[1] Document found in an original search. See attached Search Information Statement for details.

Special categories of cited documents:

X: The claimed invention cannot be considered novel under [subsection 7\(1\)](#) in light of the document and/or cannot be considered to involve an inventive step under [subsection 7\(2\)](#) of the Act in light of the common general knowledge considered together with the document.

Novelty and inventive step

- 1 The invention defined in claim 1 is not novel (and does not involve an inventive step) when compared with prior art documents D1-D3 each of which discloses all the essential features of the invention claimed.

Regarding claim 1, D1 discloses a neuromorphic integrated circuit (abstract), comprising:

a spike converter configured to generate spikes from input data (paras 12, 16);

a neuron fabric comprising a neural processor comprising a plurality of spiking neuron circuits configured to perform a task based on the spikes and a neural network configuration (para 4; crossbar and router [i.e. fabric], see paras 14, 16, 24);

a memory comprising the neural network configuration, wherein the neural network configuration comprises a potential array and a plurality of synapses, the neural network configuration defines connections between the plurality of spiking neuron circuits and the plurality of synapses, the potential array comprising membrane potential values for the plurality of spiking neuron circuits, and the plurality of synapses having corresponding synaptic weights (paras 16, 22, 35, 45, 49); and

a processor configured to modify the neural network configuration based on a plurality of configuration parameters (para 4).

The essential features of claim 1 are also disclosed in each of D2, D3 in the following passages:

D2: abstract, paras 40-47, 50-52, 58, 69, 70, 85, 86, 98

D3: abstract, paras 34, 36, 48, 56, 64-70, 78, Tables 4 & 5, where neuron reconfiguration control threshold [for a plurality of neurons] corresponds to potential array as claimed.

- 2 Furthermore, I have considered each of the appended claims. Each of these claims are not considered to make any patentable contribution over the teachings of the above cited documents D1-D3. The relevant features of these claims are either disclosed in D1-D3 or are common general knowledge in the art/mere design choices and which therefore cannot contribute to providing novelty or an inventive step. For example, D1 discloses the feature of claims 3 and 4 (paras 4, 13, 50).

Search information statement

The search information statement outlines the search the examiner carried out for your patent application. This statement shows the search databases, keywords, chemical structures and patent classification marks (IPC and CPC) searched during the examination process.

Search details

Application number: 2019372063
Additional members of the search team: N. Chowdhury, B. Lam
Earlier search results available: Yes
Search completion date: 08 December 2021

Search strategy

EPOQUE

| PATENW | SS Status | Results | Query |
|--------|-----------|---------|--|
| 1 | | 4.245 | /C/IC/LOW G06N3/0635 |
| 2 | | 4.288 | SPIKING_NEURAL_NETWORK? OR (SNN? AND (NEURAL OR NEUROMORPHIC)) |
| 3 | | 8.309 | 1 OR 2 |
| > 4 | | 14.754 | *XT {..FAMEX -LIM SS 3 FROM PATENW} |
| 5 | Lim SS 4 | 2.353 | (ANALOG?? OR NEUROMORPHIC+ OR +SYNAPTRONIC+ OR ELECTRONIC_NEURON? OR NEURO_SYNAPTIC) AND SPIK+ AND OPD<=20181101 |
| 6 | Lim SS 5 | 1.387 | (REPROGRAM+ OR RECONFIGUR+ OR RESTRUCTUR+ OR CHANG+ OR MODIF+ OR ALTER+ OR ADJUST+ OR CUSTOM+) 3D (SNN? OR NETWORK? OR TOPOLOG+ OR ARCHITECTUR+ OR CONNECTION? OR LINK? OR CONFIGURATION?) |
| 7 | Lim SS 6 | 664 | ((MEMBRANE? OR SYNAP+) 4D (POTENTIA+ OR THRESHOLD?)) OR (NEURON+ 1D STATE?) |
| 8 | Lim SS 6 | 876 | (STOR+ OR SAV+ OR RECORD+ OR ARRAY? OR SET? OR VALUES) 3D (POTENTIAL? OR STATE? OR POTENTIATION? OR THRESHOLD?) |
| 9 | Lim SS 6 | 872 | (STOR+ OR SAV+ OR RECORD+ OR FILE? OR MEMOR+) 3D (CONFIGURATION? OR SETTING? OR STRUCTURE? OR TOPOLOG+) |
| 10 | Lim SS 6 | 536 | (CHANG+ OR MODIF+ OR ALTER+ OR ADJUST+ OR REPROGRAM+ OR RECONFIGUR+ OR RESTRUCTUR+ OR CUSTOM+) 3D (RUNTIME OR DYNAMIC+ OR ONLINE) |
| 11 | Lim SS 6 | 644 | (SNN OR NETWORK OR NEUROMORPHIC) 2D (CIRCUIT? OR IC OR CHIP?) |
| 12 | Lim SS 6 | 467 | FABRIC OR CROSSBAR? |
| 13 | Lim SS 6 | 679 | SYNAP+ 3D WEIGHT? |
| 14 | Lim SS 6 | 48 | 7 AND 8 AND 9 AND 12 AND 13 |

Results of search statement 14 viewed

Cluster: \$NPL2 (Databases: MEDLINE, INSPEC, NPL)

| \$NPL2 | SS Status | Results | Query |
|--------|-----------|---------|--|
| 1 | | 6.318 | SPIKING_NEURAL_NETWORK? OR (SNN? AND (NEURAL OR NEUROMORPHIC)) |
| 2 | Lim SS 1 | 3.768 | PD<=20181101 |
| 3 | Lim SS 2 | 3.423 | SPIK+ |
| 4 | Lim SS 3 | 176 | (REPROGRAM+ OR RECONFIGUR+ OR RESTRUCTUR+ OR CHANG+ OR |

| | | | |
|---|----------|----|---|
| | | | MODIF+ OR ALTER+ OR ADJUST+ OR CUSTOM+) 4D (SNN? OR NETWORK? OR TOPOLOG+ OR ARCHITECTUR+ OR CONNECTION? OR LINK? OR CONFIGURATION?) |
| 5 | Lim SS 4 | 1 | (STOR+ OR SAV+ OR RECORD+ OR ARRAY? OR SET? OR VALUES OR MEMOR+) 4D (POTENTIAL? OR STATE? OR POTENTIATION? OR THRESHOLD?) |
| 6 | Lim SS 4 | 3 | (STOR+ OR SAV+ OR RECORD+ OR FILE? OR MEMOR+) 4D (CONFIGURATION? OR SETTING? OR STRUCTURE? OR TOPOLOG+) |
| 7 | Lim SS 4 | 12 | (CHANG+ OR MODIF+ OR ALTER+ OR ADJUST+ OR REPROGRAM+ OR RECONFIGUR+ OR RESTRUCTUR+ OR CUSTOM+) 4D (RUNTIME OR DYNAMIC+ OR ONLINE) |
| 8 | Lim SS 4 | 16 | OR 5-7 |

Results of search statement 8 viewed

ESPACENET

Inventor name Search:

Search Query:

VAN DER MADE Peter, MANKAR Anil Shamrao as the inventor

GOOGLE PATENTS & GOOGLE SCHOLAR

Keywords: snn, neuromorphic, processor, chip, computing, circuit, store, record, save, write, file, memory, array, threshold, reconfigure, reprogram, restructure, modify, change, alter, custom, neural, network, topology, architecture, connection, link, configuration, spike, membrane, potential, synapse & like terms

Applicant(s)/Inventor(s) name searched in internal databases provided by IP Australia

END OF REPORT