NEUROMORHPIC COMPUTING: LAWS AND REGULATIONS

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ABSTRACT

This article focuses on need and challenges that is required for upcoming technology, especially in artificial intelligence. Neuromorphic computing will be more commonly used on coming days as currently many companies are busy in filling patent over the technology. However, the need to form of laws to regulate cannot be underestimated. The paper starts with introducing the concept and further moves to briefly talk about challenges in allocating blame or holding the concerned authority responsible for product failure, the status of privacy infringement and intellectual properties rights associated with technological inventions.

KEYWORDS: Neuromorphic computing, artificial intelligence, privacy infringements, data usage, data sets, product liability, technology laws, Negligence

INTRODUCTION

Neuromorphic computing is introducing new possibilities in *brain inspired algorithms*. The algorithm aims to shift the paradigm from traditional method of "bit processing" to faster and low energy consuming technology based in a sophisticatedly architectural device. The highlighting feature of this mechanism is that its working is similar to the way a brain works, only with far vast memory. Neuromorphic computing first coined by scientist *Carver Mead* in 1980s is making a slow come-back. Loosely speaking, the system has the ability to work as a brain model in hardware devices. Neuromorphic computing mimics the neural network system of the human brain and thus this is step closer to Artificial General Intelligence (AGI) where the usage of the technology will be beyond mere problem solving and more towards placing commands based on vast generalised knowledge[1]. It is regarded by some as the next generation of Artificial intelligence (AI). Previously, artificial intelligence has faced backlash for its inability to construct bots to be self-aware and more conscious of its actions (commands), the neuromorphic engineering might prove to be successful in filling the gap.

As expressed by *Nayef Al-Rodhan*, in the 'Global Policy Journal', neuromorphic computers work on three basic, yet distinctive features of human brain, namely lower power consumption, fault intolerance and self-learning ability while avoiding supervision and re-programming by the manufacturer[2]. A research project called, the 'Human Brain Project' is conducting experiments in collaboration with neuroscientist in analysing the dynamic learning structure of the brain and applying the same patten in genetic cognitive computing. The development will bring a huge boost in the field of artificial intelligence. Many organisations are rushing to patent technologies using this algorithm. *Intel*, for one, in 2018 patented *Lohil*, a chip that uses spiking neural networks to indemnify different kinds of smell.

However, this evolutionary concept harbours many legal implications that demands attention. The paper makes an attempt to understand few of these challenges that neuromorphic computing might dawn upon us.

MITIGATING PRODUCT LIABILITY IN THE FIELD OF TECHNOLOGY

[1] Ben Dickson, 'What Is Neuromorphic Computing?' (*Tech Talks*, 2020) <https://bdtechtalks.com/2019/10/28/neuromorphic-chips-artificial-intelligence/#:~:text=One%20example%20is%20Intel's%20Loihi,energy%20efficient%20than%20equivalent%20GPUs.> accessed 17 December 2020.

[2] Nayef Rodhan, 'Neuromorphic Computers: What Will They Change? | Global Policy Journal' (*Globalpolicyjournal.com*, 2016) <https://www.globalpolicyjournal.com/blog/18/02/2016/neuromorphic-computers-what-will-they-change> accessed 21 August 2020.

Where there is a product in the market, there is a probability, no matter how less, to have few faults in it, at least in the rarest of rare cases of mass production. Assigning defect often arise in products, which raises the question, who shall take the blame? Should it be the user for whom the product is ultimately created, as believed by the 'United Nations convention on the use of electronic communications in international contracts', or should it be on the programmers, the entity holding position of controlling and training of data, a principle well established in the legal theory of agency? The defect needs to be defined in terms of negligence and the extent of applying principles of strict liability to mishaps. The mechanism used by artificial intelligence in order to make real-time decisions is still unknown to programmers. Neuromorphic computing working in medical sector can be a boom, but treatment of our bodies would highly depend on the algorithms with unprecedent access. The advanced computing would not require constant supervision by programmers. The result can be detrimental if the data used configuration is poorly curated.

The black box effect makes the inventions vulnerable for accidents, making it difficult to pinpoint blame among manufacturers (programmers) or users or designers, either independently or as joint actors.

The other lacuna often faced is how to allocate faults caused by neuromorphic computing? Should it be considered as a product or services. Where the principle of strict liability applies to defective products, theory of negligence is administered for deficient services. If courts proceed with theory of negligence for computing damages, even then defining qualifications for "reasonable standard of care" and "reasonable person" will be arduous. Corporations in order to control liability risks, must constantly upgrade their contract documents, specifically indemnity and warranty clauses, explaining whether the programming instructions were set as per the industry standards; whether the decisions made by machines were reasonably forceable and to what extent.

PRIVACY INFRINGEMENT AND PROTECTION

Artificial intelligence work by processing and mining datasets. This requires extraction of consumer data in large quantity and that brings up the question, how safe is our data? Privacy rights can be said to be infringed when an individual loses control over the storage, exchange and manipulations of its personal data. Neuromorphic computing violates user's privacy rights by tracking their steps of the user, exploiting data by oversharing with various actors and profiling users by various categories without their consent. India has declared the right to privacy as a fundamental right of citizens in the recent landmark case of *Justice K.S. Puttaswamy vs Union of India*. The judgement was followed up by proposing the 'Personal data protection bill 2019' in the parliament. The bill is received with open arms in the country. The PDP bill contains many noteworthy provisions that respect citizen's privacy, such as, 'Right to be forgotten', 'Data Anonymisation', 'Right of informed consent' and the like. Data anonymisation defined by the government is irreversible process of

transformation of data in a form which can not be traced back to the concerned individual. The right to be forgotten is a raving debate among legal experts around the world. Nevertheless, India took its stand to allow citizens to restrict or discontinue their disclosure of data, for which previous permission was obtained by data fiduciaries.

However, the bill also suffers from certain faults and might look up to the EU's GDRP act for broader rights for citizens, like Clause 14 of the bill, allowing authorities can process individuals data without their explicit consent for any "reasonable purpose". The bill is very vague in defining what constituents as reasonable. The bill also fails to define non-personal data and any provisions for processing this data by the officials.

Intellectual property challenges in Metamorphic application

Copyright issues emerge in deciding who owns the work created by computing systems. Intellectual property promotes granting exclusive right of exploiting original work by owner but assigning the same right in machine learning era, especially with little to no human intervention will be difficult. On general oversight, the key programmer(s) would be considered as the true and accurate owners of the algorithm but on closer analysis, neuromorphic computing and other machine learning codes can also be considered as the owner of the work. The work created by the machine is processed with independent working of the neurons, with producing results resonate the reactions of a human mind and also without any repetitions. However, that is not a practical stand from the economical point of view. Where humans mind can be credited with 'arranging' the necessary details for execution of work, neuromorphic computing will still present a lose nexus between mechanical arrangements and the actual output produced. Some would argue that nobody, neither a human mind nor machines should be granted the copyrighted ownership of machine-created work.

Similar difficulties will arise when neuromorphic applications will apply for patents. One of the heavy criteria required for obtaining patents is establishing the true inventor. With neuromorphic computations, generating new solutions or beyond the input of logic presented by programmer, technology can claim to be owner of the work. Neuromorphic computing might even change, more like, broaden the definition of "skill of a reasonable person" in the relevant field. The reasonableness ground is a necessary condition for patent eligibility. Neuromorphic computing is much high in speed, sharp accuracy and vast memory which might later in future be compared as the reasonable standard for further invention. Thus, impeding the advancement of technologies.

Legal researchers argue that if technology is esteemed with the status of legal person, the confusion in granting intellectual benefits can b removed, both in copyright as well as patent sectors.

GOVERNANCE AND REGULATING

Neuromorphic engineering and other machine learning developments need to be aggressive regulations and governance, nationally and even internationally. The usage of data in any platform will automatically attract principles of "data ethics". Ethical framework ensures governance policy for data usage, by keeping focus on principles of auditing, transparency and minimizing bias in the system. The neuromorphic engineering is like a black box, the consumer or any receiving end party is not aware of the "process" used by the machine to reach certain result, it is all the more impertinent to hold some party answerable.

Because it is understood that neuromorphic engineering mimic human thinking, the implications of bias can be assumed to erupt, as humans themselves possess discrimination and biasness in their thinking to some extent. What would be the impact when machines do the same? Amazon's experimental recruitment app using artificial intelligence is an example how technology can be

mishandled with human prejudice. The app miserably failed as it was proved to be discriminatory in hiring women.

CONCLUSION

Outreach of technology cannot and should not be curtailed. The law needs to be match the speed of technology and it needs to do it soon. The Information technology act is not sufficient to adhere with upcoming inventions like neuromorphic computation, its use and misuse. Personal data protection act can be a start but there are still many vulnerable sectors which needs legal codifications and regulation.

REFERENCES

1) Calimera A, Macii E, and Poncino M, 'The Human Brain Project And Neuromorphic Computing' (PubMed Central (PMC), 2017)
2) Deane M, 'AI and The Future Of Privacy' (Medium, 2018)
3) Fulton S, 'What Neuromorphic Engineering Is, And Why It'S Triggered An Analog Revolution | Zdnet' (ZDNet, 2019)
4) Johnson S, Yates D, and Rozario M, 'Liability for AI (Artificial Intelligence): Considering The Risks - Technology - Australia' (Mondaq.com, 2020)
5) Magrani E, 'New Perspectives on Ethics and The Laws Of Artificial Intelligence' (2019) 8 Internet Policy Review
6) Rodhan N, 'Neuromorphic Computers: What Will They Change? | Global Policy Journal' (*Globalpolicyjournal.com*, 2016)
7) Vincent M, and Zalta E, 'Ethics Of Artificial Intelligence And Robotics (Stanford Encyclopaedia Of Philosophy)' (Plato.stanford.edu, 2020)