



SIGMA

SUMMING UP TALENTS



Editorial

Summer, that time of the year when the Spring season abdicates and makes way for the blistering sun. Although we don't love the weather around after the pleasing spring, it gets along a lot of good stuffs with the likes of the fests all over the even semesters which are a great opportunity for everyone, both in the context of fun and learnings.

The moment you have a glimpse at the magazine, you realize that the theme of the design is water centric. This is to promote the idea of "water conservation" citing widespread shortage of water in parts of Karnataka and across the country.

The weather is changing rapidly, and so is the IT Industry. The skills and perseverance that was enough a few years back may not be able to sustain now. Fields like Data Science are on a boom and the legacy of older platforms is still standing strong. The questions that we need to ask as computer science engineers is: "How much knowledge and hands-on experience is enough to make it big in the Software Industry?". That answer would be that it's never enough. The more a person learns apart from the academics, the more projects he/she has done, the better the fundamentals, the better it is.

India has always been on the receiving end of products, i.e. we consume much more from the rest of the world than we produce for them, the same is applicable to software products. From google to amazon to WhatsApp and Instagram, we've always been at the receiving end. Although the scenario is slowly changing now, but there's still a long way to go. India is among the biggest hubs for cheap IT employees, and maybe that's why we are one of the leading service providers to the world. But the level of innovation to be a leading software producer needs to be enhanced multi-fold.

The contents in this Browse edition have been put up to encourage new technologies in the field of computer science. Be it the 'Neuromorphic computing' in which is inspired by the design of neurons or the 'Blue Brain' which is a project to create a virtual brain by IBM and Brain Mind or Empowered edge which is transforming the way internet works today.

The cover story takes the reader into a deep dive towards the aspect of the imaginations among computers, crosswords and Hunting in C and C++ are lined up as a to do exercise for the readers. The sci-fi section explores the possibilities of the fictional world and the DIY section is for the braves who love to build.

We hope that this edition brings a lot of informative content and we have lived up to the expectations of one and all reading this. Let's end this editorial to a quote by Jim Rohn: "Formal education will make you a living, Self-education will make you a fortune".

I encourage all the readers to take up self-learning as a priority in their career and enjoy the Summer/Browse Edition of Sigma.

THE IMAGINATION OF MACHINES

Possibly, one of the most famous criticisms that old sci-fi movies usually that a machine, no matter how advance they go, will never be human. It will never have a consciousness or in a more simpler expectation, an imagination. It is believed that imagination of an individual is one of the most basic elements of a sentience.

Google maybe has worked towards the initial stages of developing an imagination for the computers, the deep dream. What google has accomplished here, is for computers to create and recreate images of it's own liking, without much human interaction. The concept might not be explained well without an example. Let's take a picture, now notice the individual details for the said picture. Maybe the colors of the corners and shapes, now let's take the shapes, the depth, the sharpness, the brightness and take notice of details you could think of to the most basic of approach of recognition. What the application does make its own alterations to those pictures with a reference picture. Some minor details that the application recognized from the picture, take its most ignorant yet important element of the picture. But this won't make sense explaining in a few sentences, so let us take an example. Let's head back to our picture. Notice the colors, we can possibly divide them into three components, RGB, Black and White, and depth of shades. These three details will be saved in three specific neurons. Which add up to make the color neuron. Now let us take the RGB assigned neuron, and that can noticeably be divided into three more neurons, Red, Green and Blue obviously. But it does not end there. There are components for the Red color itself, like the Hex code and lot more, specific components that is ignored by the human eye but digitally holds a huge value to recognize for a computer. Details that as humans we definitely ignore. When was the last time you tried to analyze the depth of shade of the red color in some picture? We don't, we have the understanding that the color we see in front of us is Red. We don't really have to separate the components to realize what we are looking at. So neurons taken in one image by analyzing its separate components. What is the next step? Now the application finds a similarity of the first picture to the reference picture by comparing the neurons that matches from the two pictures. Could be the color, maybe the texture or maybe some shape and its components that could match. Basically the neurons play among themselves and try to recreate an image by making interchanges of combinations of those details, those neurons and create an entirely of a new image of its own. This sounds petty, and small to almost all of us, but this is the first basic and ignorant yet important detail to be worked on to one day successfully call the stage "imagination".

Now the wonderful aspect of this is, the imagination a computer has, is not limited to image creation. Components of every basic form of art we humans recognize can be created by a computer. Songs, movies and even video games can be created by the race of computers. Maybe the next generation of DJ's can be a MacBook connected to a speaker and playing it's own genre. It's not all bad, this is quite frankly one of the biggest accomplishments we have ever made as with this we are a step closer to make our own sentient being. The closest humanity can get to the of god, at least till as much as our understandings take us.

There are some really good applications of this technology. The ending result tries to mimic the human brain as much as it can, maybe not a hundred percent but maybe a eighty will do just fine. This technology can probably be used to replace certain parts of the human brain, as a prosthetic. Neuromorphic engineering was created on the basic principles of a neural network, and with machine learning of this extent, there is a lot to look forward to in the future. The combined intelligence of human and computers in the near future could lead to a harmonious world, a step closer to utopia. A lot of diseases, global warming, exploration of our world and beyond. All this can be achieved. Our imagination is unlimited but not always analytic, the imagination of machines might be limited, but are analytic to levels we cannot comprehend, and isn't that what we really need? A Sonny in the world, and not doubt it and limit it like the other NS-5's? Of course, Hollywood tends to differ this opinion and mostly mean otherwise. But what needs to be appreciated is, humans are probably the most stubborn of living beings in the universe, we see a challenge, we want to overcome it. So the robot uprising isn't something everyone should be afraid of in this case.

So what is next? What else can we explore in the world of technology, this virtual reality we all are studying and working towards with utmost dedication. Machines with emotion, a

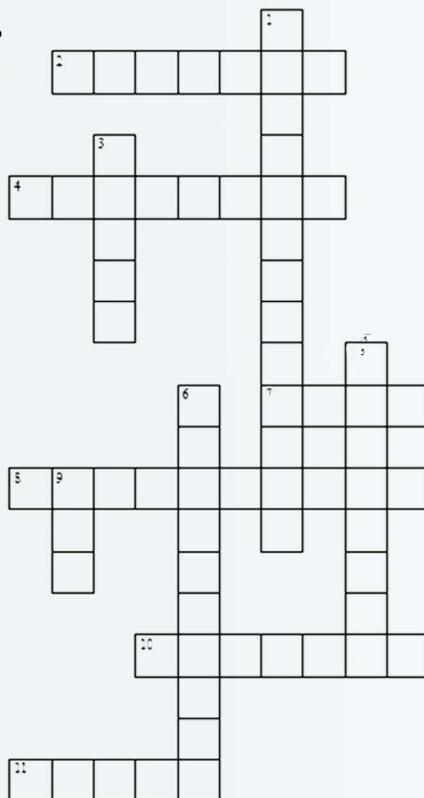
sense of humor, a reason to maybe cry? Discrimination? Will the imagination vary for different machines like us humans? What about the three laws of robotics? Does that apply here? Safeguards? It's easier to dream the bad part of the future here. But not every Artificial Intelligence turns out to be Ultron. All this sounds fictional, but until a few years ago, who would have thought of machines having a sense of imagination? Arthur C Clarke, most notably known for Clarke's three laws, one of those were quoted really at point, "Any sufficiently advanced technology is indistinguishable from magic".

What happens to us? Do we outlive our usefulness? Imagination was one of the strongest abilities humanity had. Art is till date the best way to represent this imagination, but computers taking over at this field as well does bring up the question a lot. "Is it safe for the future of humanity?" Will be a question in the minds of many, but it is the inevitable. As a species of intelligence, all humanity can do is work and explore and develop the world of technology and in theory create our own species of intelligence. The whole universe is ours to take, we can share it with the machines. Will the machines be as adaptive as humans? Probably not on their own. The beauty of he human physiology is the adaptation properties through exercise. Artificial Intelligence don't necessarily have to be in a humanoid form, that is reserved for us. So they can run their way but it is a long way to go. Probably what comes in whatever future which is in store for us all, Maybe, it is going to be the best for us all.

- Mrunalini

CROSSWORD

-PRANJAL



DOWN:

1. an HBO comedy series based on the life of competitive techies started on 2014
3. What is the oficial twitter birds name
5. network designed to allow communication within an organization is called:
6. what is the codename of Ubuntu 17.04
9. which IT company's nickname is ' The Big Blue '

ACROSS:

2. the first web based e-mail sevice
4. In JAVA When two threads are waiting each other and can't precede the program it's called
7. a website addresss is a unique name that identifies a specific _____ on the web.
8. _____ version of macOS introduced the "Dark Mode" feature?
10. What does TCP breaks data into?
11. First web browser is

- KEY
- Across
Down
1. hotmail
 2. siliconvalley
 3. larry
 4. deadlock
 5. intranet
 7. link
 8. highsterra
 6. zestzapus
 9. ibm
 10. packets
 11. nexus

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THE INCOMPLETE SECOND CHANCE SCI-FI

Yeah, I have a metal arm. Prosthetic, lost my actual left arm in some accident I am too lost to care. Now at first thought, I thought it would be cool. A metallic arm, some winter soldier vibes here really, from those Marvel movies, they looked so cool on that huge screen. What I have is something similar, a fully functional artificial arm, connected from my shoulder. Properly compatible to take instructions from my own brain works almost like a real arm. But I hide it, under this cloth sleeve I wear on top if any t-shirt, or anything. Did I mention almost? Yeah, the arm is almost perfect, and I really thank god for this arm, except, this will never be a replacement of a real arm. It's a metal rod with a mildly conductive membrane for a palm and fingers so I can use my iPhone with my other arm. Yeah, that was thoughtful, I really appreciate that, no doubt there.

I can't feel though, I can't touch anything, I can't feel the heat, the sweat. The scratch from the sharp metal door around the corner, Things, which bother me the most, seconded by the looks other people give looking at me with pity. I understand, not all are as fortunate as I am, with a replacement for my arm, unlike many others. Maybe it's true, maybe machines can never replace humans in its entirety. Some people like to joke about it for some reason, "Can you make a sonic handgun?" "Do you have a calculator installed?" "Is that thing connected to the internet?" Its a hand, why would it be connected to the internet? Seriously, This is not what I was looking forward to when I rejoined. Did I say I would not talk about the accident? Yeah, that is not how this works now does it?

This is what I know, it was not that long ago, There was some fire in the building, maybe some cylinder explosion or something. Next thing I do is push my mom, dad, and my sister Tanya away and I ran too. A second too late and the rubble fell on me, well almost. It actually fell on my arm crushing it, turning all the bones into paper or sand. I was 16 when this happened, or so I was told, now I am 18, as I said not a long time ago. Usually, in situations like this, I should have been classified as a John Doe and be declared as a hopeless case. Until I met someone, a typical cliché, a doctor in a wheelchair. This story does sound familiar, doesn't it? Isn't this the story of that failed adaptation of the flash? Harrison Wells was his name? Yeah does not matter, this doc on wheels was named Niles Caulder. Heard of him before, he has a reputation, "The magical doctor" as people called him. He provided the arm, but that was not all that I had lost, or should I say, he lost. I did not mention my name did I? My name is Michael Shaw, and I am one of the 5 personalities in this young body. The doctor tried to help, He tried to fix him back, Scott Free, That was his name. "What kind of incident splits the mind into 5 personalities?". Sounds a bit too much for building fire, but I have no idea what to say. The doc helped me a lot, he gave me a second chance in life, I am not sure what happened to Scott, maybe he is in there somewhere.

Time to meet my other friends, first there is Raiser, he is a little bit of a hot head, he does not know how to interact with society. There is David, he, likes the attention, so he likes to joke around, and is possibly the sweetest person I have noticed. Finally, there is Chris, He is an introvert. He doesn't like to talk to people, can't blame him. The society has not really been at their best of behavior. Scott is also there somewhere, but he never comes out.

Well, something interesting did happen today, I got a mail from Dr. Niles, and he said there is a way to add pain and the sense of touch in this arm. So I took the chance, went and met him. Entered his Frankensteinish lab. He has a lot of cassettes, for some reason. Maybe someone could show him cloud computing? Ehh, maybe not. Cassettes are safer.

These are cases nobody wants to disclose, and hacking is a joke anyways. Right back to why I came here, a neuromorphic chip to induce pain receptors for the metal hand. I would appreciate some of the other stuff as well but this is a start. It's a prototype though, not nearly as ready as he would like it to be, but it is something I have desired for so long. Don't judge me, why would I want to feel pain? It makes me more human, ask a guy who can't cry what he would give to cry.

So what did I do? I stole it. I was confident enough in my programming skills to try something of it. In a hurry I was. I studied neuromorphic engineering up to an extent, trained the chip to recognize pain, thought everything was ready. All I needed was three hours to upload the code, so I waited. Jimmy Falcon was throwing a party in his backyard and he invited me too, of course. Believe it or not, I have friends. My code had around two and a half hours left. So I roamed around, I met a few people. Yeah skip the boring stuff, got the notification and ran for home. The chip was ready, a few missed calls from the Doctor but doesn't matter. I put in the chip.

Five personalities, four of them screamed but not in joy. It is sometimes easy to forget that this body is shared by five of us. Scott still does not come out, but to be honest, I don't know what his story really is. A part of me likes to believe that the other four of us are there to protect him, be his replacement until he is ready. He is the real owner of the body. The real reason I want to try this chip is, I don't want him to be left out. It is some kind of trauma that splits one's mind into five. I want him to come back, want him to accept who he is now. Realize that whatever is happening to him, he has to accept so he can move on. I don't know why but a part of me blames myself for the loss of his potential to this world. A replacement, however well made, is still a replacement. So, I put in the chip. I start the hand and maybe, something good comes out.

Big mistake, should not have done that, The good news is, that well I can feel pain. The bad is, that is all I feel. Not a good idea and I fainted from the pain. Next thing I remember is lying on a bed, the doc on his wheels reading a book. The arm is fine, and so am I. Found out what happened, unconscious for three whole days and the chip was a bust. I don't know how it has affected the others, Raiser seems unaffected, so do the others I guess Scott still stays silent. All that pain and he has not reacted in any way? Well, guess I have to live with it, cannot do anything about it. But this is it, my story of our second chance I thought was incomplete, honestly speaking it is a blessing in the form of technology.

"hi", heard a voice in my sleep. Sounded like mine, so I interacted, "hi there, who are you?". There was a pause, maybe he was thinking about how to answer? Well not everyone is like David, he does not know what a mind gap is. Whatever he thinks he speaks, at least there are no awkward silences around him, could use more people like him. But this unidentified voice replied

"Thanks, your efforts were not in vain, I owe you my life, feel free as to how you want to use, for now, I will be back when I am ready". I woke up, I think I know who that was. I asked the other personalities but they haven't heard of any of this. It is weird to think that one personality does take charge even during sleep?

But, I can guarantee one thing, my efforts were not in vain, He felt my efforts, our efforts. That pain chip was worth it. I would like to believe that, my second chance is still incomplete, I might have had the best dream yet and I have to work towards it now.

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HUNTING IN C & C++

-PRANAV

```
int main()
{
    int c= - -2;
    printf("c=%d",c);
    return 0;
}

void magic(int x)
{
    if(x > 0)
    {
        magic(--x);
        printf("%d ",
            x);
        magic(--x);
    }
}

int main()
{
    class Sigma {
    public:
        Sigma () {
            cout<<"Newsletter
            Called\n";
        };
        int main()
        {
            cout<<"Start \n";
            Sigma t1();
            cout<<"End \n";
        }
    };
}

int main() {
    static int i=5;
    if(--i){
        main();
        printf("%d ",i);
    }
}
```

Answer:
c=2

Answer:
0 1 2 0 3 0 1

Answer:
Start
End

Answer:
0 0 0 0

BLUE BRAIN

-MRUNALINI

Human brain and the activity of its countless neurons and synaptic possibilities contribute to the human mind. The human mind is different from the brain: the brain is the tangible, visible part of the body; the mind consists of the intangible realm of thoughts, feelings, beliefs and consciousness. We have the unique power of forethought: the ability to imagine the future in many iterations, and then to actually create the future we visualize, to make the visible invisible. So, just imagine if we could transact these ideas and knowledge to a computer, a virtual brain which can be made to think, analyse and respond. We could upload contents of the natural brain into it and that way the intelligence, thoughts and skill of a person can be made eternal even after his demise. Things could be remembered without any effort and decisions can be made even without the presence of a person.

Sounds fascinating, isn't it? But is it really possible to create a virtual brain? Well, the answer is Yes. "Blue brain" Is the name given to the world's first virtual brain. IBM in collaboration with Brain Mind institute at EPFL in Switzerland initiated this project and aims to create digital reconstruction of brain by reverse engineering mammalian brain circuitry. And there arises a question of "how this blue brain actually works?" It takes in its input through Artificial neurons with silicon chips and electric impulses which will be interpreted by the set of bits in set of registers and processed through AI and Arithmetic and logical calculations. To build a Blue brain firstly the data should be acquired where the slices of brain are studied under microscope and its neuronal 3D morphologies are reconstructed using NeuroLucida software package. The simulation is brought about by a primary software called NEURON written in C, C++ And FORTRAN and using a set of software classes called BBP-SDK. Whereas the visualization of results is made possible by RTNeuron which is a primary application written in C++ and Open GL where animations can be stopped, started and zoomed. It employs a super computer capable of processing 228 TFLOPS called "Blue Gene" which can simulate up to 100 cortical columns, 1 million neurons and 1 billion synapses at once. Now, there is no question how the blue brain work. But the

real intriguing question is, how exactly a human brain will be uploaded into it? The uploading is possible by the use of very small robots known as "nanobots". These bots are so tiny that they can easily travel through our circulatory system. By propagating into the spine and brain, they will be able to monitor the activity and structure of our central nervous system. They will be able to provide an interface with computer while we still reside in our biological form. Nanobots could also carefully scan the structure of our brain, providing a complete readout of the connection. This information, when entered into a computer, could then continue to function as us. Thus the data stored in the entire brain will be uploaded into the computer thereby clearing the ambiguity of updating of human brain into the blue brain. This project will search for insights into how human beings think and remember. Also, scientists think that the blue brain could help to cure the Parkinson's disease. It can be a good remedy towards human disability like a deaf can get the information via direct nerve stimulation. Business analysis, attending conferences, reporting can be done consistently without any delay. Just like the two faces of a coin it has its own merits and demerits. Now talking about the other side of it which is susceptible to a new form of harm. We become dependent upon the computer systems and Others may use technical knowledge against us. Computer viruses will pose an increasingly critical threat. The real threat, however, is the fear that people will have of new technologies and that fear may culminate in a large resistance. Clear evidence of this type of fear is found today with respect to human cloning.

Within span of few years, we will be able to scan ourselves into the computers. Is this the beginning of eternal life? If it is, then the secrets of functioning of our brain would finally be revealed and any data could be accessed from the knowledge of the virtual brain irrespective of time. It would be a revolutionary change in both biological as well as digital technologies. However, the arguments regarding outcome of this project is controversial and can contribute to the betterment of human's society, if successful else the repercussions would be catastrophic.

EMPOWERED EDGE

-PRANJAL

Planet Earth is experiencing an evolution in technology which is paramount for the improvement in quality of life. Smart cities are evolving at rapid pace with the interconnectivity digging deeper into our lives. In an era of smart environment "Empowered Edge" is making its breakthrough.

An edge device is a type of networking device that connects an internal Local Area Network (LAN) with an external wide area network (WAN) or the Internet. It provides interconnectivity and traffic translation between different networks on their entering edges or the network boundaries. Hence, it is a term in IT which basically talks about putting more computing transactions and data transfers towards the edge of a network. It is also known as device democracy across the tech landscape. Decentralization removes single point of failure with increased robustness.

Let us divert to a different topic "IOT" to get a better understanding of edge technology. Think of all the daily work devices like vehicles, home appliances that are comprised of software, sensors and connectivity. . So, extending the reach of internet to traditionally dumb, physical device and everyday object.

As a result, technology embedded devices can interact within the web. The connected device will generate over 40 trillion gigabytes of data by 2025. This is a good news as IOT devices remain as collectors and not processor.

So, the edge collects the contents and processes the information by keeping all this task done within a local area. The main aim of this strategy is to reduce the amount of data that is transmitted to be understood through greater machine learning performance. Instead on a centralized cloud server, in the near term the edge is being driven by IoT. Edge computing, and cloud computing also, will so be managed by distributed servers and on the edge devices themselves.

Hence, empowered edge is keeping the traffic local and reduce latency. Enabling device autonomy in IOT transaction and marketplace will lead to foundational functions of decentralized IOT. Autonomous device coordination empowers owners of devices to define and manage their own interaction. Edge device will become more advanced in the next upcoming years, with specialized AI chips, 5G technology etc.

TIPS AND TWEAKS

- Kasthuri

1. How to use Dropbox, OneDrive, Google Drive or iCloud as your main storage

With firms such as Google, Microsoft, Apple and Dropbox offering gigabytes or even terabytes of online storage, sticking everything in the cloud is an appealing idea - especially if you use lots of devices or need to access PC stuff on your mobile on tablet.

While you can't really use cloud services as your main storage on your primary PC or Mac - they merely copy what you're saving to your local hard disk or portable SSD - you can use their folder(s) as your default storage for documents, photos and other kinds of files - and you can then access some or all of those files from other computers, mobiles and tablets by opening individual files or syncing specific folders.

2. Window snapping and multiple monitor control:

Pressing the Windows Key + Arrow Keys will cause a window to quickly snap to each side of either monitor. Alternatively, hitting Shift + Windows Key + Arrows will cause the window to jump to the other monitor. While pressing Windows + P will allow you to quickly set up a second display or projector.

3. Laptop slow? formatting might not always be the solution, here is a better one

Search for disk defragmentation and run every disk you have through a defrag, this should cluster out all the data and make the laptop faster and your life smoother to note, maintain the fragmentation at 0% always, if it even hits 1% or more? Apply for a defrag immediately.

4. How to Recover Deleted Files Using File History

If you are not doing backups, hopefully you have turned on File History Backup. If you're running Windows* 10, select the Start button, select Settings > Update & security > Backup > Add a drive, and then choose an external drive or network location for your backups.

5. Hide a folder with CMD commands, fire up CMD in your computer and type the following "attrib + s +hD : ABC", ABC is the directory of the folder you want to hide.

To unhide, "attrib - s - hD : ABC"

6. Hitting the space bar will scroll you down a webpage, hitting the spacebar + Shift let's u scroll back up.

DO IT YOURSELF WIRELESS EARPHONES

~SHRUTI

Materials Required:

- Earphones
- Copper wire
- Aluminium foil
- Bluetooth Receiver

Follow the steps:

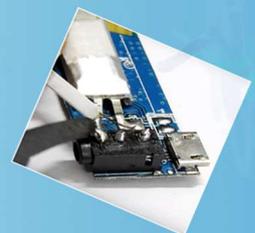
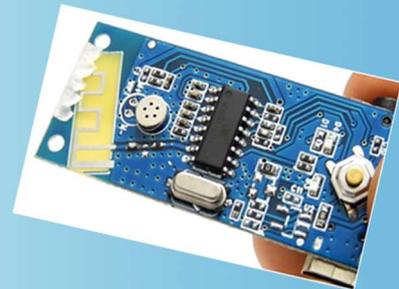
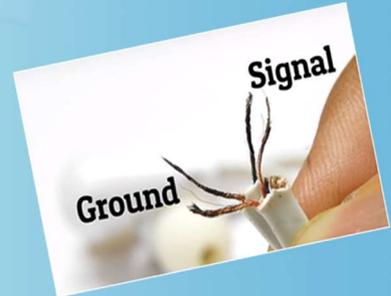
• Cut out the speaker pods and audio jack of earphones and divide the wires into two parts as shown in the picture.

• Burn them a bit to make it harden.

• Dismantle the Bluetooth receiver and take the internal circuitry of it.

• Solder the Signal and Ground of earphone wires with Signal and Ground of circuit of Bluetooth receiver.

• Arrange the circuit of Bluetooth receiver and enjoy your wireless earphones.



NEUROMORPHIC COMPUTING

- Eeshan

All human activities and movements are controlled and coordinated by the brain. The brain is the center of our thoughts, the interpreter of our external environment, and the origin of control over body movements. So what if we could create something like an "Artificial Brain" which would exactly emulate the functions of our brain? Yes, it is possible with the technology called Neuromorphic Computing. Made from digital or analog circuitry, it is used to mimic the human nervous system. This concept has two main goals: a tool in neuroscience which will let us know how the brain works and applying this mechanism in cognitive computing. From the time when computers were only able to tabulate data and then would do nothing beyond what they were programmed to do, we have strived toward creating computing systems that can find solutions to problems without human assistance. Traditional computers transfer data and perform computations in binary form, which had only two options 0 and 1. But in neuromorphic computing, the computer neurons can talk to each other similar to the biological nervous system which results in faster computations. Human brains can accept and store huge volumes of data in different forms such as text, visuals, sound, numbers, and conversations. When required, the human brain can process the inputs and find solutions to situations and problems. Neuromorphic computing systems can perform similar tasks.

Neuromorphic semiconductors are powered by billions of transistors arranged to work in parallel across what is being called as inter-neuron connections. Neuromorphic chips are much more energy efficient than our normal computers, especially for really competitive tasks. Neural networks can be considered as the software part of neuromorphic computing. This model basically uses von Neumann architecture. Suppose we have a line of printed text, say 02468. Most of them can effortlessly detect it because of the primary visual cortex in our brain also known as V1, containing about 140 million neurons, with tens of billions of connections between them. We also have a series of visual cortices namely V2, V3, V4, V5 which are involved in much complex operations like image processing. But suppose we have a complex handwritten text, then it becomes difficult in understanding it. Neural networks approach the problem in a different way. The idea is to take a large number of handwritten digits, known as training examples, and then develop a system which can learn from those training examples. Also by increasing the number of training examples, we can increase the accuracy. But they generally lack features like spiking potentials, chemical and electrical signaling analogs, and bidirectional signaling, and in-synapse processing, though they do sometimes have feedback and memory integrated with neurons. This problem is solved by combining these two into a VLSI chip known as Silicon Chip.

One of the most important applications of neuromorphic computing is pattern recognition. It can also be used for speech recognition, face recognition, and object recognition. Neuromorphic computing is used in Vision systems, Cybersecurity, Financial calculations, Civil Surveillance, Casino games, Traffic Management and in Military. Developments in AI systems are influencing the growth of the global Neuromorphic chip market, according to a report by future market insights. Researchers and scientists are focusing on the development of diverse AI platforms by integrating Neuromorphic chips for improving reasoning abilities and smart functioning of machines. The worldwide neuromorphic computing market is projected to reach USD 6.48 billion by 2024 according to Grand View Research's April 2018 report. Neuromorphic computing is the future of Artificial Intelligence and computing.

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The open Source Section

- Eeshan

FreeBSD

FreeBSD is a free and open source Operating System used to power modern servers, desktops, and embedded platforms. FreeBSD contains a significant collection of server-related software in the base system and the ports collection, it is possible to configure and use FreeBSD as a mail server, web server, Firewall, FTP server, DNS server and a router, among other applications. A number of Desktop environments such as GNOME, KDE and Xfce, and lightweight window managers such as Openbox, Fluxbox, dwm, bspwm, are also available to FreeBSD. Its advanced networking, security, and storage features have made FreeBSD the platform of choice for many of the busiest web sites and most pervasive embedded networking and storage devices.

PostgreSQL

PostgreSQL is an open source object-relational database management system (ORDBMS) that uses and extends the SQL language combined with many features. It can handle workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users. It is the default database on macOS Server and is available for Microsoft Windows and Linux (supplied in most distributions). It is written in C programming language.

FluidSynth

FluidSynth is a free and open source software synthesizer which converts Musical Instrument Digital Interface (MIDI) note data into an audio signal using SoundFont technology without need for a SoundFont-compatible soundcard. FluidSynth can act as a virtual MIDI device, able to receive MIDI data from any program and transform it into audio on-the-fly. It works on operating systems like macOS, Windows, OS/2, Linux and all Unix-like systems. It is written as a C library with a large application programming interface (API). Partial bindings for Python, Ruby, Haskell, and .NET Framework are available.

Redmine

Redmine is a free and open source, web-based project management and issue tracking tool. It allows users to manage multiple projects and associated subprojects. It features per project wikis and forums, time tracking, and flexible, role-based access control. It includes a calendar and Gantt charts to aid visual representation of projects and their deadlines. Redmine integrates with various version control systems and includes a repository browser and diff viewer. Programming language used in developing it is Ruby on Rails. It supports multiple LDAP authentication, allows user self-registration, supports 34 languages, allows multiple databases, allows for plugins and provides a REST API

Zabbix

Zabbix is an open-source monitoring software tool for diverse IT components, including networks, servers, virtual machines (VMs) and cloud services. Zabbix provides monitoring metrics, among others network utilization, CPU load and disk space consumption. Its backend is written in C and the web frontend is written in PHP. It works on almost all operating systems. Zabbix monitoring configuration can be done using XML based templates which contains elements to monitor.

Wings 3D

Wings 3D is a free and open-source subdivision software. Wings 3D is named after the winged-edge data structure it uses internally to store coordinate and adjacency data, and is commonly referred to by its users simply as Wings. It is written in Erlang language. Wings 3D is available for most platforms, including Windows, Linux and Mac OS X. It can be used to model and texture low to mid-range polygon models. Wings 3D uses context-sensitive menus as opposed to a highly graphical, icon-oriented interface. Modeling is done using the mouse and keyboard to select and modify different aspects of a model's geometry in four different selection modes: Vertex, Edge, Face and Body.

TensorFlow

Krita is a free-software and an open-source raster : TensorFlow is an open source machine learning framework that is easy to use and deploy across a variety of platforms. It is one of the most well-maintained and extensively used frameworks for machine learning. TensorFlow was developed by the Google Brain team for internal Google use. It was released under the Apache 2.0 open-source license on November 9, 2015. It is written in programming languages like Python, C++ and CUDA. TensorFlow is supported on platforms like Windows, Linux, macOS, Android, Javascript. TensorFlow computations are expressed as stateful dataflow graphs. The name TensorFlow derives from the operations that such neural networks perform on multidimensional data arrays, which are referred to as tensors. It is now widely used by several companies, including Dropbox, eBay, Intel, Twitter, and Uber.

TestDisk

TestDisk is a free and open-source data recovery utility. It is primarily designed to help recover lost data storage partitions and/or make non-booting disks bootable again when these symptoms are caused by faulty software, certain types of viruses or human error (such as accidentally erasing a partition table). TestDisk can be used to collect detailed information about a corrupted drive, which can then be sent to a technician for further analysis. It is written in C language. It is supported on operating systems like DOS, Windows, Linux, macOS, etc. TestDisk queries the BIOS or the operating system in order to find the data storage devices and their characteristics. Its main features are: recover deleted partition, rebuild partition table and rewrite the master boot record

MantisBT

MantisBT is a free and open source web-based bug tracking system. The most common use of MantisBT is to track software defects. However, MantisBT is often configured by users to serve as a more generic issue tracking system and project management tool. It is available in 45 languages. Built on PHP and supports Linux, Windows and macOS on the server side. Compatible with Chrome, Firefox, Safari, Opera and IE 10+. Released under the terms of the GNU General Public License (GPL).