TechTime

A Newsletter Published by Department of Information Technology

**Himadri Bhattacharya, IT 4th Semester**

Vision :

To produce competent IT Professionals who will contribute towards the advancement of engineering, science and technology for the benefit of society, industry and academia.

Mission :

- To impart quality and value based education towards excellence in teaching-learning and inculcate research environment.

- To produce successful graduates with professional ethics, responsibilities and commitment towards society.

- To enable graduate for providing effective solutions to real life engineering problems and thereby incorporate self-development entrepreneurship skills.

IP ROUTER

Subrata De, Asst. Prof., IT

The life cycle of a router can be represented by a simple do-repeat loop i.e. find a path to the destination and then forward multiple packets to that destination. This is repeated until the router gets powered off.


Basic Architectural Components of a Router
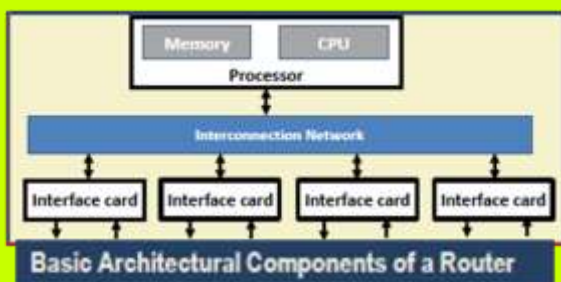
Router have two basic components. i)Route processor which contains memory and CPU. ii) Then we have an internal interconnection network bus with which individual interface cards are connected. These interface cards work as the input/output for the Router.

The entire router architecture is actually divided into two parts i)Control part and ii)Datapath part. In router control part we have different routing functions or routing protocols which are implemented. Those routing functions or routing protocols help us in construct-

ing the routing table. In general in a typical router, control part is implemented as a part of the routing operating system.
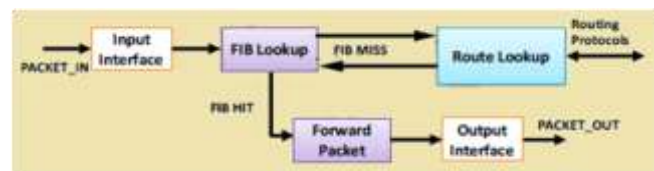
Then at the *datapath* level, whenever we have an input packet, the packet header is looked into for destination ip address. Based on the destination ip address routing table is searched for finding out the next hop and accordingly the packet is forwarded to the next hop. This *datapath* need to be very fast because every second around 1000 and even much more packets(for high speed network) need to be processed. That is why the datapath is normally implemented in a faster hardware using TCAM memory architecture. TCAM (Ternary Content Addressable Memory) is a specialized high speed memory which searches its entire content in a single clock cycle.

Data Analysis

Ashmita Basu Mazumdar

IT, 6th semester

Data analysis is a procedure of inspecting , cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusions and supporting decision-making .Data analysis is basically a process for obtaining raw data and converting it into information useful for decision-making by users. The data is necessary as inputs to the analysis, which is specified based upon the requirements of those directing the analysis. Data is collected from a variety of sources. The requirements may be communicated by analysts to custodians of the data, such as information technology personnel within an organization. The data may also be collected from sensors in the environment, such as traffic cameras, satellites, recording devices, etc. It may also be obtained through interviews, downloads from online sources, or reading documentation. The benefits of data analysis are almost too numerous to count but some of the most rewarding benefits include getting the right information for business, getting more value out of IT departments, creating more effective marketing campaigns, gaining a better understanding of customers and so on.

Programmable neural silicon, Neuromorphic chip

Neuromorphic technology aims to mimic the neural network architecture of the brain. Neuromorphic computers could accentuate social problems as the very notion of human potential would become less relevant. It consists of the artificial synapses made from silicon germanium, each synapse measuring about 25 nanometers across. Voltage is applied to each synapse and found that all synapses exhibited more or less the same current, or flow of ions, with about a 4 per cent variation between synapses. **This 'brain-on' chip introduced, works on analogue fashion** (unlike the previously fabricated computer chips which worked on digital signals) so that it can process multiple parallel computations, like our brain does.

Scientists have developed "neuristor" circuits which can perform complex computations using an incredibly small amount of power. More recently, a vital component of this neuristor circuit was created using niobium dioxide (NbO_2), which replicates the switching behavior observed in ion channels within biological neurons. These NbO_2 devices are created by applying a large voltage across a non-conductive niobium pentoxide (Nb_2O_5) film, causing the formation of conductive NbO_2 filaments which are responsible for the important switching behavior. Unfortunately, this high-voltage and time-consuming post-fabrication process makes it near impossible to create the dense circuits needed for complex computer processors.

Instead of designing different electronic circuits, we came up with a versatile analog that emulates the range of behavior they display. Some open when the voltage across the membrane is high, others open when the voltage is low, and everything in between. Nevertheless, the fraction that opens always follows a sigmoid-curve, and the time it takes always follows a bell-curve. As few as eight transistors sufficed to replicate this behavior—thanks to the common physical forces—allowing millions of distinct ion-channel populations to be modeled with a single chip. After it is fabricated, its sigmoid- and bell-curves are tailored to fit any desired ion-channel type by computer-controlled bias voltages.

Whereas simulation refers to software, emulation refers to hardware—a physical realization of a neural model that operates

Bidisha Das

IT, 4th semester

Google Fuchsia OS - The Future of IoT Devices

Kishan Biswakarma,
IT, 4th semester

Google has introduced a new Operating System called Fuchsia OS. As Google already has two of its operating system i.e Android and ChromeOS, you must think that what is the need of new operating system rather than to concentrate and increase the functionality of the Android and Chrome OS.

The peak point to be noted among these two Operating System is the restriction of the application on its respective platform only. For better understanding, in nearly all Operating System there is a special store that contains all the apps that run on that platform only, like Apple Store in iOS, Play Store in Android, Microsoft Store in Windows Operating System. But as the world is more concentrated towards developing the IoT devices, here comes the Fuchsia OS by Google in the limelight.

The Fuchsia OS is basically the cross-device, open source operating system, optimized for both personal computing and running low-power devices such as the Internet of Things (IoT) equipment. The OS is based on the Zircon (formerly Magenta) kernel, written by a combination of C, C++, Dart, Go, Python, Rust, Shell, Swift, and Futter SDK. As Fuchsia OS is a hybrid, that offers mobile-**designed views "Armadillo" and traditional desktop interfaces "Capybara". Users will be able to interact with apps designed on Armadillo and Capybara that are** displayed as cards on a home screen. This framework will enable multitasking, allowing you to collapse different apps into each other and work on them using a split-screen interface.

Fuchsia would enable developers to code apps, programs, and tools that could work on all of Google's platforms, without the need for the time-consuming process of optimization. That means coders would be able to create a messaging app that would work on smartphones, tablets, laptops, desktops, and even smart home devices.

But still, the OS is under alpha-phase, so we can expect Fuchsia OS ruling over the global market due to its power of optimization and compatibility of accommodating into the IoT devices.

Artificial Intelligence and its current development

Aditya Halder
IT, 4th Semester

Artificial Intelligence or AI is the current hot commodity in market. As far as we can see people with skills in AI are highly sought after. The idea of making machines that can think and act like humans from Sci-Fi **movies isn't very far off from becoming reality. We** have already made some notable achievements in this field.

Goals for AI:

- **To Create Expert Systems – The systems which** exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.
- To Implement Human Intelligence in Machines **– Creating systems that understand, think,** learn, and behave like humans.

Now let us talk about one of the great masterpiece work in this field:

Google's AlphaGo zero, the bot that has learned from itself by playing against its own self rather than studying moves of players ranging from noob to pro. After just three days of self-play training, AlphaGo Zero emphatically defeated the previously published version of AlphaGo - which had itself defeated 18-time world champion Lee Sedol - by 100 games to 0. After 40 days of self training, AlphaGo Zero became even stronger, outperforming the version of AlphaGo known as **"Master", which has defeated the world's best players** and world number one Ke Jie. Even though the AI bot has defeated the world champion many people would **say that it's just a game, but if we think about it a bit** more thoroughly we can see the fact that AI has already crossed the threshold beyond which it can affect our daily life. Be it for the greater good or something
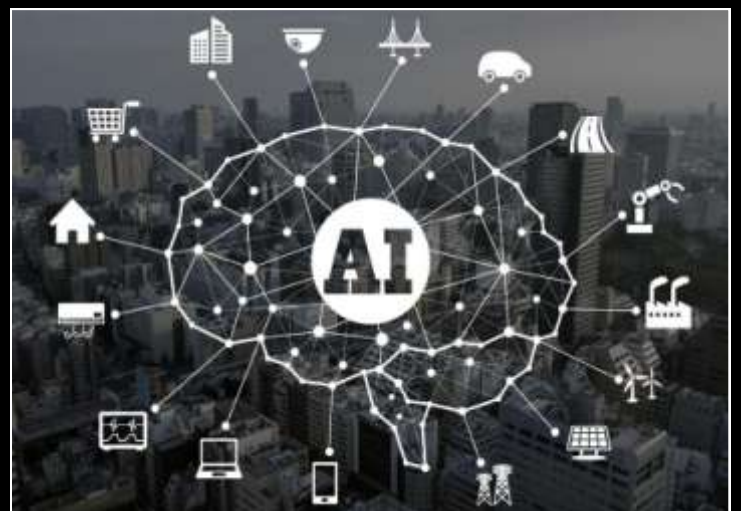
Departmental Achievements

Faculty Level

⇒ Mr. Asit Barman, Registered for Ph.D degree at Calcutta University.

⇒ Asit Barman and Paramartha Dutta. ;Facial expression recognition using distance and texture signature relevant features." Applied Soft Computing, Vol. 77, Pages: 88-105, Elsevier, 2019. Doi: https://doi.org/10.1016/j.asoc.2019.01.011.

⇒ Asit Barman and Paramartha Dutta. ;Facial expression recognition using distance and shape signature features. ; Pattern Recognition Letters, Elsevier, (2017). Doi: https://doi.org/10.1016/j.patrec.2017.06.018.

⇒ Prasanta Kumar Roy, Sathi Ball, Krittibas Parai ; Secure Anonymous Session Key Agreement Between Trusted Users in Global Mobility Network , Springer, Contemporary Advances in Innovative and Applicable Information Technology(2018).

⇒ Prasanta Kumar Roy, Krittibas Parai ,Sathi Ball; A New Enhanced Secure Anonymous Communication with Authentication and Session Key Agreement in Global Mobility Network, Third IEEE International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN), (2017).

⇒ Aniruddha Dey, Satadal Chakraborty, Debaditya Kundu**, Manas Ghosh, "Elastic Window for Multiple Face Detection and Tracking from Video", CIPR**-2019 (International Conference on Computational Intelligence in Pattern Recognition), at IIEST, Shibpur, West Bengal, India on 19th-20th JAN, 2019

⇒ Mr. Subrata De enrolled for Ph.D degree at Techno India University.

Students Level

⇒ Adrija Roy got selected in BOSCH.

⇒ Gargi Bhattacharjee got selected in Capgemini.

⇒ MD Mukhlesur Rahaman got selected in TCS.

⇒ Arzu Das got selected in CGI.

⇒ Arindam saha, Aijura Kshiar got selected in Extra Marks.

EVENTS ROADMAP

Freshers' welcome on
1st September, 2018

Hands-**on Workshop on "Internet of Things (IoT) & Machine Learning"**
on 3rd and 4th February , 2018

Image processing & Pattern Recognition on 27th and 28th April , 2018

Two days workshop on "Data Analysis using Python" on 28th and 29th September, 2018

Two days Seminar on **"Cryptography & Network Security"** on 13th and 14th August, 2018

Sudoku Competition conducted by CES on 2nd February, 2019