Maratha Vidya Prasarak Samaj's
Karmaveer Adv. Baburao Ganapatrao Thakare College Of Engineering
Nashik-13.
( NAAC ACCREDITED INSTITUTE WITH 'A' GRADE )

DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGG.

Departmental TeChronicle

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***Department Vision:-***

*To be recognized as an excellent department offering competent technical education to create competent electronics & telecommunication engineers for the benefit of the common masses.*

***Department Mission:-***

*Committed to serve the needs of society through innovative teaching learning processes, promoting industry-institute interaction to provide competent and cultured electronics and telecommunication engineers.*

***Program Educational Objectives:-***

1. *To impart state of art technical education in the Electronics & Telecommunication Engineering.*
2. *To promote society beneficial projects and activities.*
3. *To develop soft skill, team work, professional ethics and multidisciplinary approach for the carrier enhancement.*
4. *To bridge the gap between Industry-Institute through collaboration with Industries, Institutions and Universities.*
5. *To provide suitable infrastructure and facilities in tuned with advancing technological evaluation.*

Greetings,

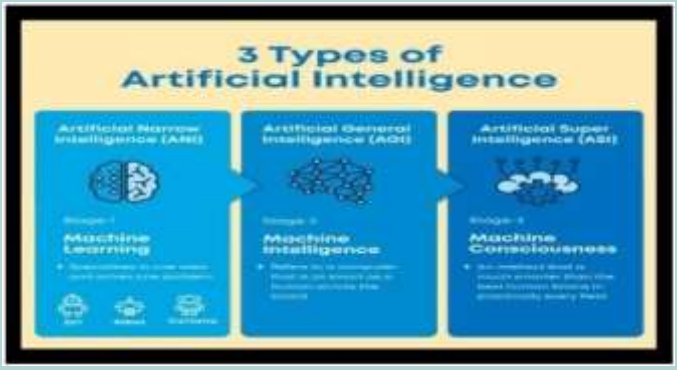
Department of Electronics and Telecommunication is unveiling technical newsletter "TeChronicle Vol. 04, Issue - 01" on 4th April on occasion of birth anniversary of late Dr. V. N . Pawar recipient of the prestigious Dr. B. C. Roy award, Sarchitnis of Maratha Vidya Prasarak Samaj (MVP, Nashik).

**Artificial Intelligence in Machines:**

[ Parth Patil TE E&TC]

The artificial intelligence (AI) in machine applications report gives an overview of the technology, application, and markets for AI on the machinery level. People began talking about the fourth industrial revolution, Industrial IoT and now with AI entering the plant floor, we're finally starting to use digital technology to replace not only muscles but also brains. Most experts agree that while AI will become deeply embedded across industrial and other applications and initial use cases have emerged, AI in manufacturing today is still a niche technology.

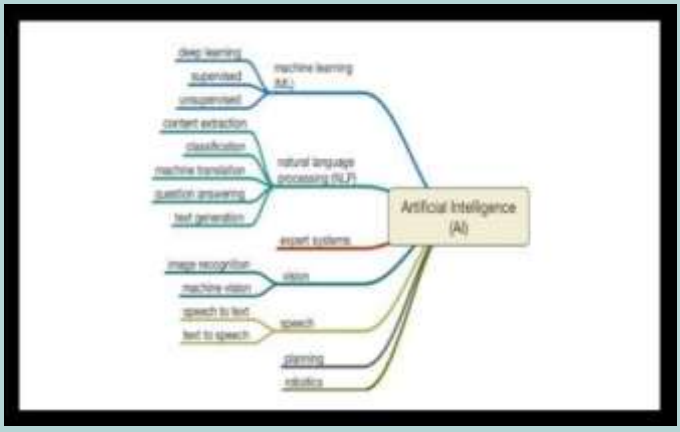
Basically, Artificial Intelligence in machines is works on the principle of defining human intelligence to a machine in order to easily mimic it and execute tasks, which includes the simplest to those that are pretty complex. So, the ultimate aim of artificial intelligence is to make Machines achieve learning, reasoning, and perception. Artificial intelligence (AI) is intelligence demonstrated by machines as opposed to natural intelligence displayed by animals including humans Leading AI textbooks define the field as the study of "intelligent agents ": any system that perceives its environment and takes actions that maximize its chance of achieving its goals. Some popular accounts use the term "artificial intelligence" To describe machines that mimic "cognitive" functions that humans associate with the human kind such as "learning" and "problem solving", however, this definition is rejected by major AI researchers. AI applications include advanced web search engines recommendation systems (used by YouTube, Amazon and Netflix, understanding human speech,




self-driving cars, automated decision-making and competing at the highest level in strategic game systems as machines become increasingly capable, tasks considered to require "intelligence" are often removed from the definition of AI, a phenomenon known as the AI effect. For instance, optical character recognition is frequently excluded from things considered to be AI, having become a routine technology.

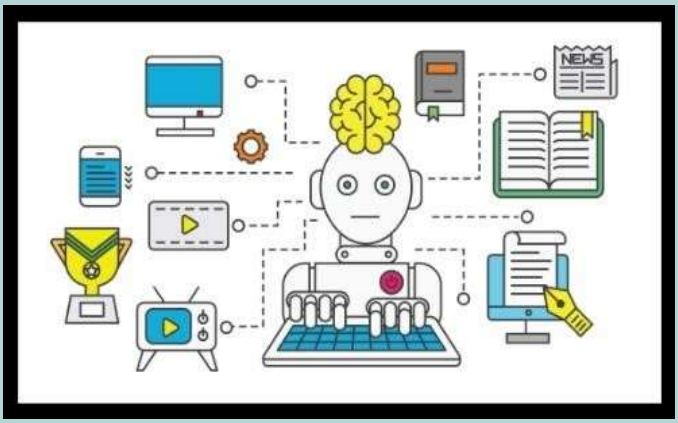
The market penetration of AI in machinery is still in its infancy. Machine builders are restructuring their business models to accommodate this new technology, while end users are working on operation-specific use cases for their machinery. However, the market has moved beyond the AI hype cycle into tangible products and applications. For each user and machine builder it is necessary to address the most common hurdles decisively.

Using robotics technologies for motion and manipulation. It seems that the limit is limitless with machines making breakthroughs in all aspects of human life's reaching 'Narrow Artificial Intelligence' (system able to handle one task at a




time) and heading toward 'General Artificial Intelligence' (system able to handle any generalized task, like human) referred to as 'Singularity'.

Although General AI seems far out of our reach today, Narrow AI is currently in use touching almost all aspect of life. Therefore, as a human species, we are entitled to plague the right part for Narrow AI elements to construct a constructive future.




However, it is also true that AI can be subjected to misuse as acquiring human cognitive abilities does pose a threat to human well-being but, we are yet far to reach such intelligence and we do not know. The more we explore AI, the clearer it becomes that it is a powerful tool requesting great responsibility. Today, although, we reside in the era of Narrow AI which is getting more sophisticated and complex, it seems okay to envision a future driven by both humans and machines, together.

**Digital India:**

[ Ruthik Admane BE E&TC]

**"Digital India-A vision that will connect every village, every town and every citizen of India".**

Digital India is a Campaign launched by the Government of India in order to ensure the Government service are made available to citizens electronically by improved online infrastructure and by increasing internet connectivity or making digitally empowered in the field of technology. The Campaign is launched by Shri Prime Minister Narendra Modi in the year 2015. The main Objective is to Power to Empower.

There are numerous advantages and disadvantages of Digital India. Advantage includes – Transparency, no Corruption, Convenient & easier, financial transactions.

Disadvantages includes- Hacking, Cyber Crimes & data security. Effects of Digital India can improve our GDP by around 1 trillion by 2025 says a report of economic analyst. Government initiatives in the field of digital India in the field of ICT in education has been such as development and textbooks for Class 9$^{th}$, Cyber safety and security guidelines, NPTEL SWAYAM platforms. The main problem in India is students are not aware of such good platform by government to improve knowledge and skills.

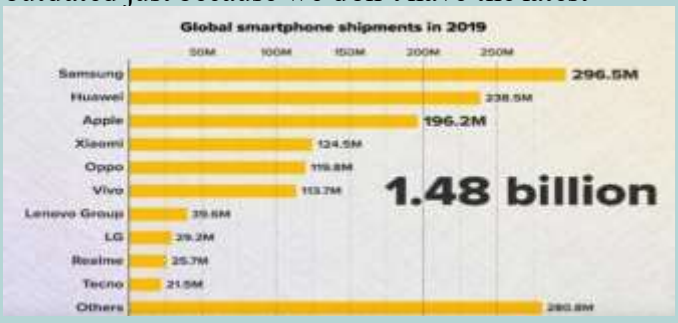
**"Don't Focus on earning always focus on learning. Earning is a temporary focus on learning ".**

Digital India is concept to change the education system in India. It is a program that bridges the literacy slippage. This is by delivering quality education & better life.
Best quotes by PM NARENDRA MODI **"I Dream of a Digital India where knowledge is strength and empowers the people."**

**E – waste Management:**
**[ Kushi Patil]**
As I was cleaning the house for the coming Diwali festival like we all traditionally do, I came across a bunch of phones right from the button ones to cracked screen smartphones which apparently weren't smart anymore. I asked my mom, why are we saving these to which she replied if we give it to the waste management people, they're going to dump it in the ground anyway which is harmful for the land. I immediately countered, "That is not true, they manage it properly without dumping, or even reuse some of the parts" and in no mood to get in a debate with me she said, "Google it!". And I did it immediately to prove my point. Minutes later when there was complete silence, she coughed a little and said "Found anything?". I let the silence continue.
I was not bummed about how I failed to prove my point anymore but now it was about how over only 20 percent of the global electronic waste is recycled. Not only that but electronics which is not recycled properly is shipped overseas to China, India, Africa or anywhere there is cheap labour regulation and dumped there. The 20 percent which does get recycled is done in a way which pollutes the environment and decreases the quality of soil around that area. Not to mention it is also very harmful for the workers who manage that.


Over 80% of U.S. recycling is illegally dumped overseas in Asia and Africa

Suddenly I remembered about the 3R's we were taught in school- Reduce Reuse, Recycle. I was taken back to yesterday where I shortlisted a couple of phones which I wanted to buy because there was a sale, completely ignoring the fact that I already had a phone which was in a perfectly working condition. My eyes stumbled upon the newspaper whose whole front page was covered with the new iPhone. Now I was wondering if this is a coincidence. Ignoring that, I thought about how every time there's a new iPhone or iPad or any new technology we immediately shift to the new ones. That's when I realised, we have completely forgotten about our first R, we forgot to reduce.
Statistics show that 23-25% of electronics which is taken for recycling is still functional and can be repaired. There we have our second R, reuse. We don't reuse anymore or even if we do it is in a very negligible amount. When only one side of our headphones is working, we choose the replace the entire piece instead of just taking it to a repair shop and figuring out what is wrong. We buy a new one, profiting the company. That's when I found out we don't have a proper system or proper rules and regulations for the company who sells electronic products. The recycling cost is not built-in when we purchase electronics. These big guys take no responsibility for recycling the products but take the profit from all the sales. This brings us to our third R, recycling. When more complicated electronics like microwave or refrigerator or air fryer are taken to recycle, there are still some working parts inside. Now many of the gadgets are made up of glue instead of screws which makes it very hard to recover. No matter how advanced technology we have today, someone actually has to take the screw driver and take it apart manually, which is not an easy job. So, the labour cost is expensive. And this is the cost which should be covered in these huge companies who live on our fear of being the outdated just because we don't have the latest




iPhone. When we want to buy a phone or any electronic gadget for that matter, we have tonnes of options right from e-commerce websites to actual shops just across the lane. But when it comes to recycling, we don't have many options. If there are minor repairs in our gadgets, the so-called branded companies don't provide services. It is found that big companies use the 'Planned Obsolescence' method in which the company strategically slows down or makes it harder to use old devices. The

number of repair shops has also decreased and the ones already existing don't resolve more complicated problems. Every Developing city should have small recycle plants and a greater number of repair shops and the manufacturers need to get involved in solving this problem. Repair, remanufacture and reuse is just as important. Toxic materials like arsenic, cadmium, lead, beryllium and other materials which is present in the electronics waste is directly dumped into landfills, rivers and lakes. This eventually degrades our environment and our whole ecosystem. Most of the materials like steel, plastic, aluminium, copper, gold, silver, etc is recyclable but lithium-ion batteries have to go through special recycling process and can be a fire hazard. Similarly, there is a rare earth element use in our phone speakers called neodymium is very hard to recycle and requires toxic chemicals and acids to separate. Tech company apple said that its ultimate goal is to create a 100% recycled iPhone. It also said that the iPhone 12 used recycled rare earth materials and magnets. It's latest model iPhone 13 is free of harmful substances like beryllium, brominated flame retardants, PVC, phthalates, arsenic in the display glass, and mercury. But these are very small initiatives, and may work for tech giants like Apple and Samsung but what about the lesser ones. We have only started to think around this problem, we are not there yet and we have a very long way to go. But as a consumer, repair instead of replacing, use refurbished products and don't dump your e-waste anywhere and don't save it like I did, go to recycling units. After reading all this and criticizing almost everything which led all of us in such a situation, I found out, in 2020 Tokyo Olympics, all the medals were made of 50,000 tonnes of e-waste, which put a smile to my face and I of course immediately shared it with my mom to which she just smiled. We both knew it was not a great counter point, but something better than nothing, right? I also sneakily deleted my list of shortlisted phones, and took out the box of preserved old, cracked, non-working phones to get them to a recycling unit.

**Travel Time Estimation (TTE) using Graph Neural Network (GNN)**

**[Mr. A.P.Meshram, Associate Professor]**

Accurate forecasting of real-time traffic speed is a major and important activity in the smart city sector and is particularly useful in several programs such as road network traffic planning, route guidance and traffic congestion.

Graph Neural Networks (GNNs) are a class of deep learning methods designed to perform inference on data described by graphs. GNNs are neural networks that can be directly applied to graphs, and provide an easy way to do node-level, edge-level, and graph-level prediction tasks.

GNN helps reduce the work for the machine to work upon drastically, since it can be directly applied as mentioned before. For our project we got the dataset from Chengdu, a city in China.

Initially we are provided with interconnected nodes which will be representing the Chengdu dataset. These nodes will be presented as a whole for the the model, all thanks to 'dgl' libraries. We were provided with multiple features to work on, which is required so that we predict any output. Initially provided with 50 features, we need to bring down number of features to reduce the time load that might cause a bigger impact in the future. In order to take down this problem, we will be using autoencoders. By using this, we will be bringing down the number features from 50 to 16. The specific features are properly chosen via autoencoders in order that there are no drastic changes even after reducing the number of features which decides in predicting the output. The model is made with the help of GCN or Graph Convolutional Network. Required number of layers were added accordingly. SCN or the Spatial Convolutional Network, which is a sub part of GCN, is mainly used. because we need something similar to CNN where we can apply convolution, relu function and pooling on fixed as well as on arbitrary center node, thus helping us in graph classification and link prediction as well, thus, in predicting the time travel estimation between specified link. It has been a powerful tool for analyzing graph data.

So finally, in the end result we will be having predicted time for each and every possible connected links as per the inputs provided to us. There are some redundant losses which are minimized during epochs, thus reaching our main objective, i.e., travel time prediction.

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