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RPTC TECHNICAL MAGAZINE

RANE TECHNO-VATE

LET'S TAKE THE FIRST STEP TO MAKE THE "SKILLFULL INDIA"…

……

RANE POLYTECHNIC TECHNICAL CAMPUS

FROM THE DEAN'S DESK

Dear All,

The world is facing a bleak future with energy demands growing on the one side and plant based fuel resources dying up on the other side. While renewable energy seems to be the ultimate end-game, Electric vehicles seem to be the intermediate step in the right direction. The EV revolution is upon us. According to the International Energy Agency (IEA), the number of electricity-powered passenger vehicles on the world's roads could surpass 250 million by 2030, while the International Renewable Energy Agency (IRENA) estimates that electric buses and other mass transit vehicles could number well over 10 million. EVs are here to stay, but for them to be truly a green option for the future of transportation, it is vital that we don't miss the chance to link them with renewable energy.

This issue of Technovate carries an article on E-vehicles which will throw some light on the Technology which is new. Do not miss reading the same.

***Reduce, Reuse and Recycle** – have always been the Mantra for Sustainable Environments. By finding suitable attachments to the Lathe machine, they double up to make gears and save substantial costs. Innovations of these kinds are always welcome, aren't they?*

IOT, AI, 5G, Cloud computing, Block chain, Biometrics, Drones are all buzz words… Wouldn't a little reading on these help us become familiar with those jargons too.? The issue also carries an interesting article on tackling MANET – Mobile Adhoc Network.

So with yet another edition of Technovate from our Faculty team, I promise interesting reading on current topics. Thanks to the contributors. All the Best.

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DEAN-IQAC

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MECHANICAL ENGINEERING

1.A FUTURE ON E-VEHICLES

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- ***Key words:*** *Terpenoids, Terpenes, Ashokarishta, Cyperus Rotundus, Siddha, Ayurvedic, Unani*

Introduction

An electric vehicle, also called an electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An EV is a shortened acronym for an electric vehicle. EVs are vehicles that are either partially or fully powered on electric power. EVs include road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft. In the 21st century, EVs saw resurgence due to technological developments and an increased focus on renewable energy. 90% of all U.S. household trips cover less than 100 miles.

History of electric vehicles

1769: The first steam-powered vehicle was designed by Nicolas-Joseph Cugnot and constructed by M. Brezin that could attain speeds of up to 6 km/hour.

1825: British inventor Goldsworthy Gurney built a steam car that successfully completed an 85-miles round-trip journey in ten hours' time

1886: Historical records indicate that an electric powered taxicab, using a battery with 28 cells and a small electric motor, was introduced in England.

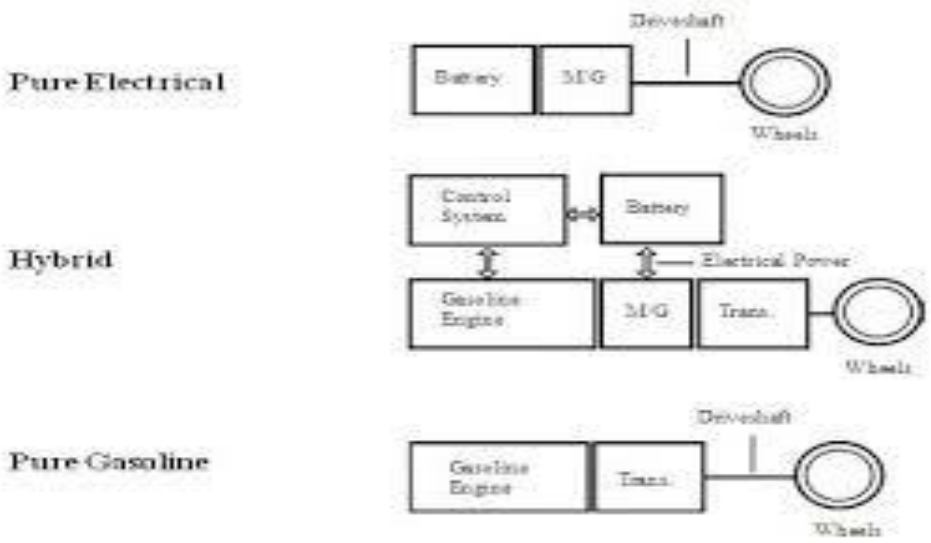
1900: Porsche showed his hybrid car at the Paris Exposition of 1900. A gasoline engine was used to power a generator which, in turn, drove a small series of motors

1915: Woods Motor Vehicle manufacturers created the Dual Power hybrid vehicle, second hybrid car in market.

1918: The Woods Dual Power was the first hybrid to go into mass production. In all, some 600 models were built by. However, the evolution of the internal combustion engine left electric power a marginal technology disappeared slowly. Now it is reappeared due to realization of its importance in curing disease without any side effect.

Basic Types of EV's

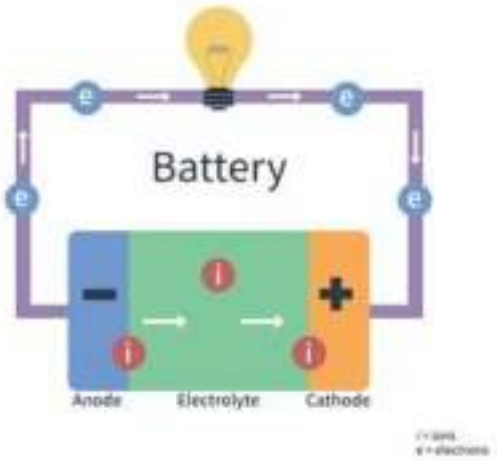
Battery Electric Vehicle (BEV)
Plug-in Hybrid Electric Vehicle (PHEV)
Hybrid Electric Vehicle (HEV)



Safety & Maintenance of EV's

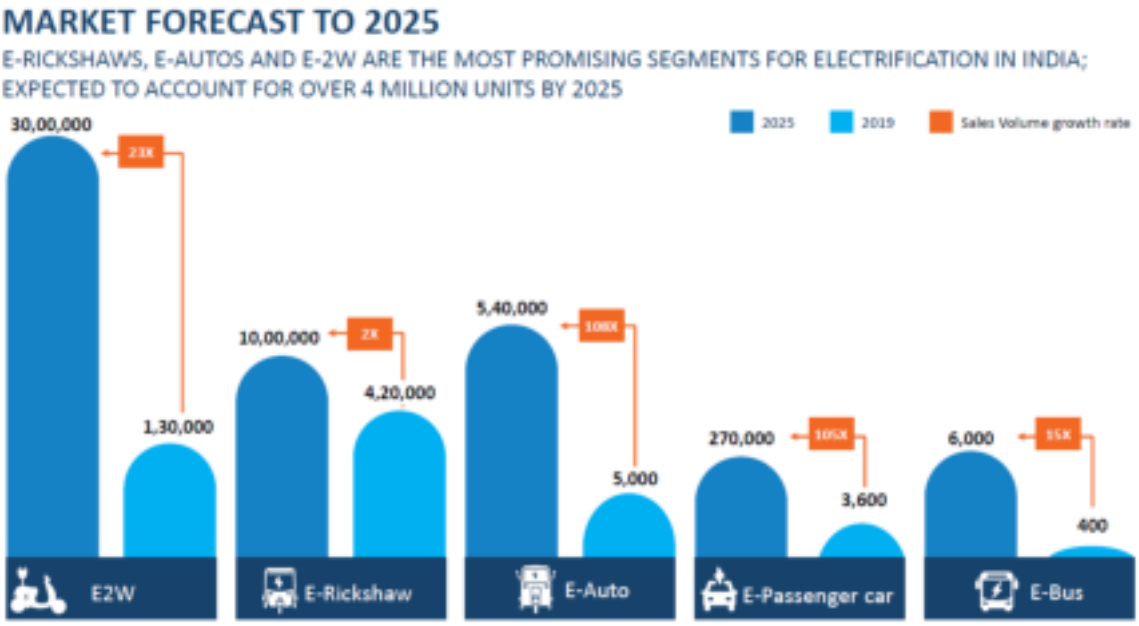
- *Maintenance Comparison*
- *Battery Maintenance*
- *Safety Requirements*
- *Emergency Response and Training*

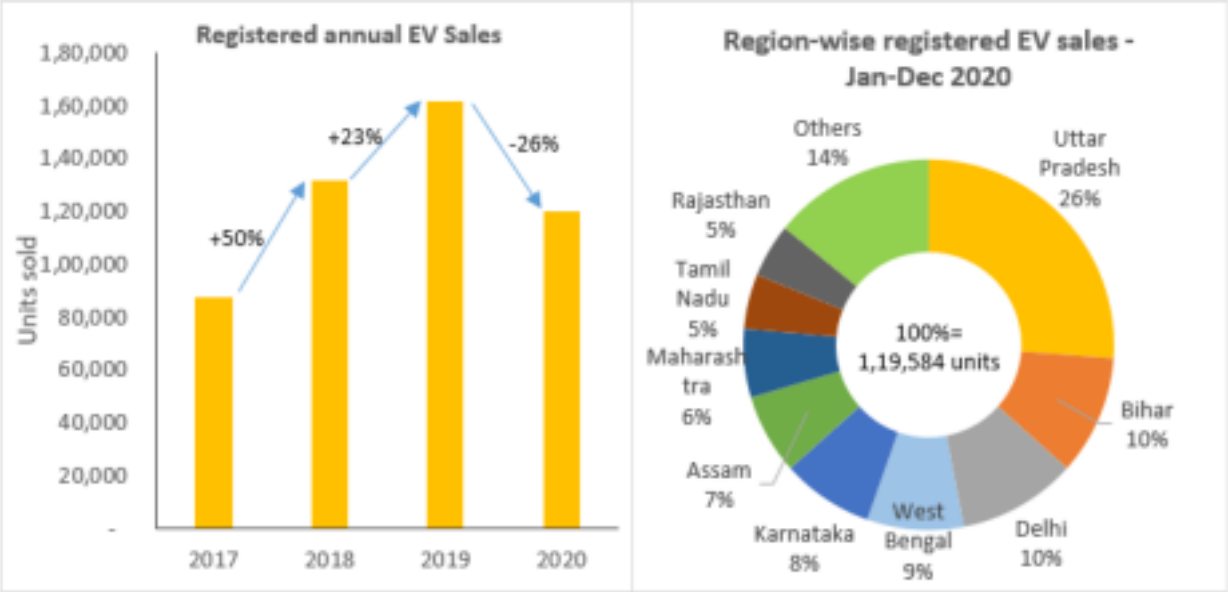
Battery



Batteries are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '-' side), a cathode (the '+' side), and some kind of electrolyte (a substance that chemically reacts with the anode and cathode).

Mobility Scenario in India





In 2013, Government of India launched the National Electric Mobility Mission Plan 2020. Under the mission plan, the Scheme for Faster Adopt on and manufacturing of (Hybrid) Electric Vehicles in India (FAME India) was launched in March, 2015 for two years as Phase-I, which was subsequently extended up to 31 March, 2019. The Government of India in its Auto move Mission Plan 2016 has laid a vision of "Safe, Comfortable and Efficient mobility" with an eye on environmental protocol and affordability through Public and Personal Transport. A review of the Phase-I, Government of India came up with FAME India Phase-II (FAME II) for period of three years from 1 April 2019 with verticals such as Demand Incentives, Establishment of Network of Charging Station and Administration of Scheme

FAME II aims to boost electric mobility and increase the number of electric vehicles in commercial fleets with an outlay of □10,000 crore (□ 100 billion) for three years ll 2022. The Government will offer the incentives for electric buses, three-wheelers and four wheelers to be used for commercial purposes. Plug-in hybrid vehicles and vehicles with a sizeable lithium-ion barely and electric motor will also be included in the scheme. Fiscal support shall be offered based on the size of the barely. Several states have announced their EV Policy to complement

the National scheme and to address state-specific needs. The EV30@30 campaign, launched in 2017 under Electric Vehicle Initiative (EVI), a multi-governmental policy forum, of which India is a member, sets a collective aspirational goal for all members to have EVs contribute up to 30% of all vehicle sales by2030.

Conclusion

Mandating the use of zero emission vehicles then the choices are automatically turns our focus on hybrid and electric vehicles only. There can be no doubt that sub components like battery, motors and associated parts production will be increase simultaneously this will go into the high profit region at the peak time. The automotive sector is believed to contribute somewhere between 15 and 25 percent of polluting emissions, such as nitrogen oxide, particulate matter and carbon dioxide according a survey. Hence, it is our collective response to make pollution free environment.

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2.LATHE ATTACHMENT FOR GEAR CUTTING

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Mechanical engineering without production and manufacturing is meaningless and inseparable. Production and manufacturing process deals with conversion of raw materials input to finished products as per required dimensions specification and efficiently using recent technology. Our project design and fabrication of spline (gear) cutting attachment is used to cut gear or splines over the cylindrical job. Our main aim is to prove lathe is a versatile machine. So this gear cutting operation is done by lathe itself.

- ***Key words: Gear Cutting, Lathe Machine, Attachment of Lathe***

INTRODUCTION

In recent years, new fabrication techniques have been developed to satisfy the technological demands. Moreover, emphasis is stressed on attachments. Attachments are used in various fields and machines depending upon the needs to be fulfilled and mode of operation. An attachment eliminates the purchasing of a new unit which serves the same purpose. For example, a lathe occupies a place opposite to that of a gear cutting machine, the ten machines mainly used to produce cylindrical and plain surfaces respectively. By implementing an attachment to a unit, the capacity of the unit can be increased which is very economical.

GEARS

Gears are toothed wheel used to transmit power for small distances. It is positive types of drive and mostly preferred in machines. The important uses of various types of gears are as follows,

1) Spur gear-sliding mesh gear box, machine tool gearbox

2) Helical gear- automobile gear box

3) Rack & pinion- lathe carriage, steering gear box

4) Worm & worm wheel- wiper mechanism, material handling equipment's gear box, steering gear box

5) Bevel gear- automobile differential gear box

6) Spiral gear-drives in textile machineries

7) Lathe Machine – Lathe Machine is one of the oldest machine tool and is to remove metal from a work piece to give it the required shape and size, by performing some machining operation on workpiece. The lathe consists of a bed, a head stock, a carriage with cross slide, and tool post mounted on the cross slide. The spindle which carries the work holding device is driven by motor usually through a gear box for obtaining various speeds. The carriage moves on the bed guide ways, parallel to the axis of the work spindle, and cross slide provides transverse motion the require power for movements is obtained a feed shaft geared to the spindle drive.

8) Form Milling - From figure the working principle of form milling can be understanding, cutter is mounted on arbour with its axis right angle to work piece. Indexing plate provided for indexing movement of work piece which is generally used in gear cutting. In single pass one tooth is finished hence it is time consuming process and suitable for job production.

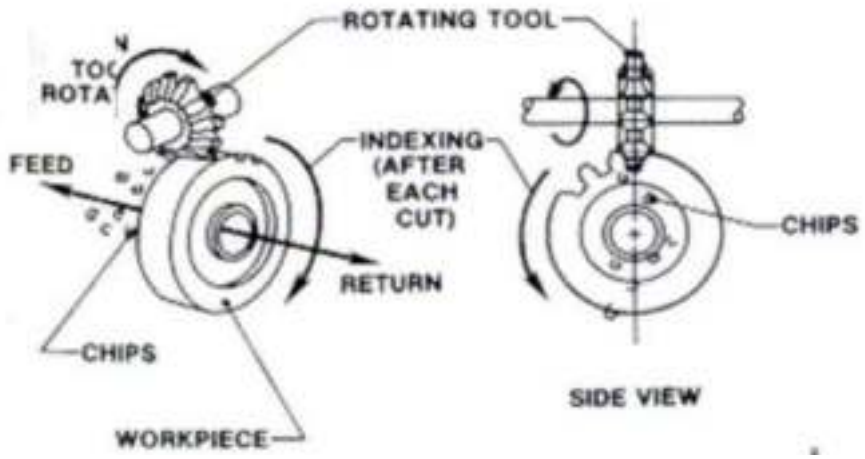

Fig 1.1 Form Milling Process

Indexing - Indexing is an operation of dividing the periphery of a piece of work into any number of equal parts with the help of indexing plate which has number of holes on its periphery and indexing pin, for e.g. this operation can be adopted for producing hexagonal and square headed bolts, cutting spines on shafts, fluting drills and in gear cutting. All these works require a holding device which will permit the rotation of the work about the axis so that periphery of the work piece can be divided equally and accurately.

SPUR GEAR

Spur gears have their teeth parallel to the axis and are used for transferring power between two parallel shafts. They're simple in construction as shown in Fig 1, simple to manufacture and low cost. They need the most effective potency and smart accuracy rating. They are used in high speed and high load application altogether varieties of trains and an honest sort of velocity ratios. Hence, they perceive wide applications right from clocks, organization gadgets, motorcycles, vehicles, and railways to aircrafts.

GEAR MANUFACTURING METHODS:

Gear producing is divided into two classes particularly forming and machining. Forming consists of direct casting, molding, drawing, or extrusion of tooth forms in liquid, powdered, or heat softened materials and machining involve roughing and finishing operations the tooth form with shaped cutters or generating the form with a rack cutter, a shaping cutter or a hob cutter Despite its name, the roughing processes truly manufacture a sleek and accurate gear tooth. Just for high exactness and quiet running.

REQUIREMENT OF GEAR CUTTING ATTACHMENT IN LATHE:

Lathe is a very important manufacturing subsystem in many sectors. Even though it is a versatile machine, it has some limitations while performing certain operations like a spline, gear cutting. The use of milling machines in the production of the spline and gear cutting is well recognized.

If an attachment on general purpose lathe is made available, the cost of production of a product could be reduced. A CNC machine can perform the said operations more effectively since the human involvement is limited. However, due to increase in the cost of a CNC machine and the indirect costs associated with these machines, they are considered as white elephants in a certain class of manufacturing units.

PROBLEM STATEMENT

A. Few most commonly used gear manufacturing processes in industries are as follow:-

1) Form Milling – for simple and job-shop production

2) Hobbing - for mass production

3) Shaping – for mass production and internal gear manufacturing

B. All processes mention above required costly machine tools and equipments, which may not be affordable for all the small scale industries

and workshops. Whereas in some processes we don't get the desired gear suitable for our requirement.

Then our problem is that we have to find out such method or technique which can be used to manufacture teeth on gear without using such a costly machine tool. Hence our need is that we have to find out a cheap alternative method for gear production.

OBJECTIVE

- *Our project design and fabrication of gear cutting attachment is used to cut gear or splines over the cylindrical job.*
- *Our main aim is to prove lathe as a versatile machine and with the help of gear cutting attachment the object is possible by lathe itself.*

SCOPE

- *To cut gears without milling machine.*
- *To cut splines over shafts.*
- *To cut key ways & slots.*

ADVANTAGES

- *Initial cost will be reduced.*
- *Flexible in operation.*
- *Simple in operation and no need for a skilled operator.*
- *Good accuracy can be achieved.*
- *Simple construction.*
- *Easy to install.*
- *Work piece diameter can be extended up to 200mm*

DISADVANTAGES

- *Spline gear cutting work piece thickness should not exceed 150 mm.*
- *There is a chance to get vibration during operation.*
- *Hard material like high carbon steel cannot be cut (unless until structure should make up of strong metal like cast iron etc.).*

AREA OF APPLICATION

- *Production of the spur gear, spline shaft, grooves etc.*
- *In small workshop where milling machine is not affordable.*

CONCLUSION

The attachment is made to cut spur gear which is done by Modelling and assembly of CAD parts are accomplished by AUTOCAD 18 software. Fabrication of the attachment is completed by using raw material as mild steel. Final fabricated model is fitted to the lathe machine and sample gear is produced. Produced samples might competitive with milling accuracy. A lot of investment is saved instead of buying a gear cutting machine. Also by using this attachment production cost of making gear also reduced.

FUTURE SCOPE

In this attachment direct indexing chosen as dividing head. This has particular limitation it is only a few no of divisions can make by using this attachment. This limitation can overcome by using compound indexing. If the center is combined with bushes, then the shaft wear and tear will be reduced material like cast iron and stainless steel will be improving the strength of the attachment and that will allow us to perform almost all horizontal milling operations.

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3.TOP TEN EMERGING TECHNOLOGY OF THE YEAR

IoT

Internet of Things

*The **Internet of Things** (IoT) describes the network of physical objects— "things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.*

Interesting Facts!

- ✓ *Internet of Things does not require Internet Connection at all the time.*
- ✓ *Some of the IoT based Technology/equipments-Apple's Siri, Amazon's Alexa, Microsoft's Cortana, Google Assistant and "Our Mobile Phones"*
- ✓ *ZigBee is a standards-based wireless technology developed to enable low-cost, low-power wireless machine-to-machine (M2M) and Internet of things (IoT) networks.*

Artificial Intelligence

Artificial intelligence (AI) is the ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans because they require human intelligence and discernment.

Interesting Facts!

- ✓ *John McCarthy, an American Computer Scientist, is Father of AI.*
- ✓ *Google Assistants, Amazon's Alexa and Apple's Siri are the most widely using AI technology.*
- ✓ *The IQ Levels of the above AI systems are 76.57%,56.29% and 41.32% respectively.*
- ✓ *Higher than this IQ Level is 162, an eight-year-old girl named Adhara Perez Sanchez from Mexico who surpassed the IQ of Albert Einstein and Stephen Hawkings.*

5G

5G — the tech that will be able to support the remote control of critical services. It will advance autonomous driving, the Internet of things, personal communications, and the way our businesses work in terms of accessing, storing, sharing and protecting data. It will impact AI and augmented reality.

Interesting Facts!

- ✓ *Aside from its faster speeds, it also allows more users to connect to one tower, avoiding network congestion during conventions and mass gatherings.*
- ✓ *In Oct. 2019, three major wireless carriers in China launched 5G networks: China Mobile, China Telecom, and China Unicom. While coverage is limited in some areas, Beijing, Shanghai, and Shenzhen are the cities with the best coverage thus far.*
- ✓ *5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.*

SERVERLESS COMPUTING

Serverless is a cloud-native development model that allows developers to build and run applications without having to manage servers.

Interesting Facts!

- ✓ *"Serverless" is a misnomer, where it still uses server by cloud service provider.*
- ✓ *AWS Lambda, Microsoft Azure Functions, Google Cloud Functions and IBM OpenWhisk are some Serverless services offered.*
- ✓ *Cost. You'll only pay for what you use.*
- ✓ *Flexibility. Serverless models scale without your intervention.*

BLOCKCHAIN TECHNOLOGY

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain.

Interesting Facts!

- ✓ *Blockchain is the technology that enables the existence of cryptocurrency (among other things). Bitcoin is the name of the best-known cryptocurrency, the one for which blockchain technology was invented.*
- ✓ *Nakamoto was the one who mined the first blockchain of Bitcoin.*
- ✓ *Satoshi Nakamoto that has been credited as developing the world's first and largest, cryptocurrency – Bitcoin.*
- ✓ *The number one blockchain company in the world right now is Coinbase Global Inc. (COIN).*

ROBOTICS

5 Primary Areas of Robotics

Operator interface.

Mobility or locomotion.

Manipulators & Effectors.

Programming.

Sensing & Perception.

Interesting Facts!

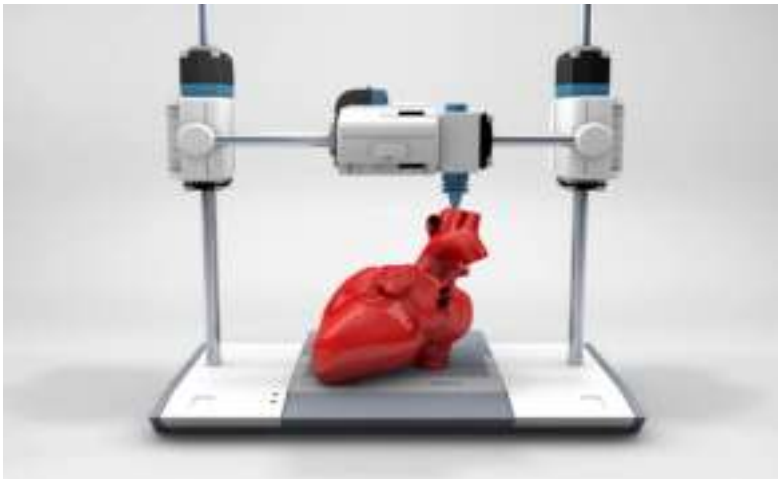
- ✓ *In 1967 the first industrial robot was put to productive use in Japan.*
- ✓ *Fathers of Robotics are "Al-Jazari" (1136-1206) a Mesopotamian Inventor, "Isaac Asimov" (1920-1992) an American writer and "Joseph Engelberger (1925-2015) an American Physicist.*
- ✓ *South Korea leads the world in Robot Density.*
- ✓ *The first humanoid Robot is WABOT created by George Devol, an American Inventor.*

BIOMETRICS

Biometrics are biological measurements or physical characteristics that can be used to identify individuals. The main uses of biometric systems and devices are identification and authentication. For example, fingerprint mapping, facial recognition, and retina scans are all forms of biometric technology, but these are just the most recognized options.

Interesting Facts!

- ✓ *There are two types of biometrics: Behavioural Biometrics and Physiological Biometrics.*
- ✓ *Seven characteristics: universality, uniqueness, permanence, collectability, performance, acceptability, and circumvention.*
- ✓ *DNA Biometrics- DNA is an increasingly useful biometric, and is encountered most often in forensics and healthcare. For forensics, current DNA identification technologies measure short tandem repeat sequences (STRs) in the nuclear or mitochondrial DNA.*



3D PRINTING

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created.

Interesting Facts!

- ✓ *It is not necessary to have a computer in order to use a 3d printer. This is due to the fact that almost all 3d printers have an SD card reader that is used to read files and start printing them.*
- ✓ *When it comes to 3D printing, a wide range of clay material, including ceramic and terracotta, can be extruded through a nozzle to produce final shapes.*
- ✓ *Materials used in different states are Powder, Filament, Pallets, Granules, Resin, etc.*
- ✓ *Some of the Materials used widely are Plastics, Metals, Ceramics, Paper, Bio Materials and Others.*

VIRTUAL REALITY/ AUGMENTED REALITY

Virtual Reality (VR) is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings.

Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology

Interesting Facts!

- ✓ *Some of the Software Development Toolkit of AR are Vufaria, ARToolKit, Google AR Core, AppleARKit.*
- ✓ *Three basic features of AR : a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.*
- ✓ *Three Types of VR simulations are non-immersive, semi-immersive, and fully-immersive simulations.*
- ✓ *VR is not suitable for children under 12 because it could affect their vision.*
- ✓ *23 Industries are using VR as their tools. Some are Automobiles, Marketing, Law Enforcement, Recreation, Interior Design, Architecture, Entertainment, Sports, etc.*

An unmanned aerial vehicle (UAV), commonly known as a drone, is defined as a "powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload.

DRONES

Interesting Facts!

- ✓ *Abraham Karem, an Aeronautical Engineer from Iraq has invented the Drone(UAV) and is regarded as Founding Father of Drone.*
- ✓ *Non-military applications include forest fire monitoring, aerial photography, product deliveries, agriculture, policing and surveillance, infrastructure inspections, science, and drone racing.*
- ✓ *Four main physical types of professional drones: multi-rotor, fixed-wing, single-rotor helicopter, and fixed-wing hybrid VTOL.*
- ✓ *DJI (Da-Jiang Innovations), Shenzhen, China is the Leading Drone(UAV) Manufacturer of the world.*

4.A CONSISTENT INTERRUPTION DETECTION METHOD TO DETECT AND PREVENT WORMHOLE ATTACK IN MANET

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Abstract *– Mobile Ad hoc Network (MANET) is a continuously self – configuring and infrastructure less network of mobile devices connected wirelessly. They can be influenced by various kinds of attacks because of their dynamic nature and lack of a central point of control. Collaborative attacks are possible when multiple attackers try to attack the network simultaneously with their actions. One of the most severe collaborative attacks that can harm the network is wormhole attack. This attack can't be detected easily as it is executed by two or more nodes formed as a team. This attack works in two phases. In the first phase, the intruder nodes try to satisfy the normal nodes to transfer data through them. The reason for such an action is that these intruder nodes try to involve themselves in more number of routes. In the second phase, they use the data in many ways such as transferring the data to third parties, modifying and re-sending to the network etc… In this paper, we have come up with an idea of Detection and Prevention System (DPS) to detect and block the intruder nodes in MANETs. To implement this system, exclusive nodes called DPS nodes are used in the network. The main purpose of DPS nodes is to monitor the behavior of the nodes in the network continuously. When the DPS node identifies a node with an abnormal behavior, it will announce that node as a wormhole node to the network by broadcasting a message. All communicative messages will be abandoned by the network from the wormhole node. Simulations using NS – 2 proves that the proposed DPS remarkably reduces the number of packets dropped by the wormhole nodes with very low false positive rate.*

Index Terms*: Wormhole, Tunnel, MANET, DPS & Collaborative attacks.*

1. INTRODUCTION

A mobile ad hoc network (MANET), also known as wireless ad hoc network or ad hoc wireless network is a consistently self-designing, framework less system of cell phones associated remotely. Every gadget in a MANET will move openly and autonomously toward any path and will change its connects to different gadgets much of the time. Every gadget should forward movement irrelevant to its own particular utilize and should be a switch. The essential test in building a MANET is preparing every gadget to consistently keep up the data required for legitimate course activity. Such systems may work independent from anyone else or might be associated with the web. They may contain one or numerous and diverse handsets between hubs. These outcomes in a very powerful, independent topology. MANETs are a kind of wireless ad hoc network (WANET) that more often than not has a routable systems administration condition over a connection layer specially appointed system. MANETs comprise of a distributed, self-shaping and self-recuperating system. Diverse conventions are assessed in light of measures, for example, the parcel drop rate, the overhead presented by the steering convention, end-to-end bundle delays, arrange throughput and versatility.

In MANETs, every hub fills in as a switch and can speak with different hubs specifically or in a roundabout way with the assistance of its neighbors. MANETs can be sent in calamity territories to gather basic data, in war zone to convey among troopers and in unsafe regions as sensor systems. Because of the absence of an essential issue of control, it is more probable that noxious hubs join the system and dispatch different kinds of assaults. An assault can be propelled by a solitary hub or different hubs in an agreeable way. The aggressor hub can be outer (hub outside the system) or inward (bargained hub inside the system). The inside assailants are more hazardous and are hard to distinguish than outer aggressors. In a few assaults, different aggressors synchronize their

activities to upset an objective system. These kinds of assaults are called Collaborative Attacks (CA). Out of numerous such assaults, wormhole assault is a standout amongst the most serious security dangers in remote impromptu systems. Location and avoidance of wormhole assault is an extremely difficult issue. The wormhole assault is conceivable regardless of whether the assailant has not traded off any hosts and all the correspondence gives credibility and secrecy. It is a genuine danger for steering conventions, for example, Ad hoc On-request Distance Vector (AODV) and Dynamic Source Routing (DSR). By and large, this assault is propelled by at least two vindictive hubs having a private channel called burrow between them. A malevolent hub toward one side of the passage catches the control parcel and sends it to alternate pernicious hub through the passage; the second malignant hub rebroadcasts the bundle locally. The course through the passage is chosen in view of having better measurements (e.g. less time or less number of jumps when contrasted with alternate courses) for correspondence between the source and the goal. On the off chance that the time interim is longer than ordinary, the bundle is dropped.

In the previous couple of years, a few creators have proposed answers for defeat the issue of wormhole assault. A large portion of the arrangements depend on time interim amongst sending and accepting bundles. For instance, if the time interim is longer than typical, the bundle is dropped. These arrangements require a clock and won't work legitimately when there is more activity on a few connections or the hubs have diverse handling abilities.

2. RELATED WORK

In [1] Yih-Chun Hu et.al., discussed about the wormhole attack. In the wormhole attack, an attacker records packets (or bits) at one location in the network, tunnels them (possibly selectively) to another location, and retransmits them there into the network. A general mechanism called packet leashes is implemented, for detecting and defending against wormhole attacks. A specific

protocol called TIK that implements leashes is used. In [2], Azer et.al., proposes a scheme for the wormhole attack prevention. The scheme relies on the idea that usually the wormhole nodes participate in the routing in a repeated way as they attract most of the traffic. Therefore, each node will be assigned a cost depending on its participation in routing. Besides preventing the network from the wormhole attack, the scheme provides a load balance among nodes to avoid exhausting nodes that are always cooperative in routing. In [3], Ming-Yang Su implements a secure routing protocol based on the AODV (Ad hoc On-demand Distance Vector) routing protocol named as WARP (Wormhole-Avoidance Routing Protocol). WARP enables the neighbors of the wormhole nodes to discover that the wormhole nodes have abnormal path attractions. Then the wormhole nodes would be gradually isolated by their normal neighboring nodes and finally be quarantined by the whole network. In [4], Hon Sun Chiu et al., proposes an efficient detection method called Delay Per Hop Indication (DelPHI). By observing the delays of different paths to the receiver, the sender is able to detect both kinds of wormhole attacks. This method requires neither synchronized clocks nor special hardware equipped mobile nodes. In [5], El-Soudani et al., proposed a scheme for the wormhole attack prevention in ad hoc networks. Each node will be assigned a cost depending in its participation in routing. The cost function is chosen to be exponential in powers of two such that to rapidly increase the cost of already used nodes. This scheme provides a load balance among nodes to avoid exhausting nodes that are always cooperative in routing. In [6], JooSeok Song et al., proposed a time-based scheme for the purpose of preventing wormhole attacks in wireless ad hoc networks. The scheme includes two phases which are detection phase and location phase. By detection phase, the existence of wormhole attacks can be detected. By location phase, the wormhole nodes can be identified.

3. PROPOSED METHOD

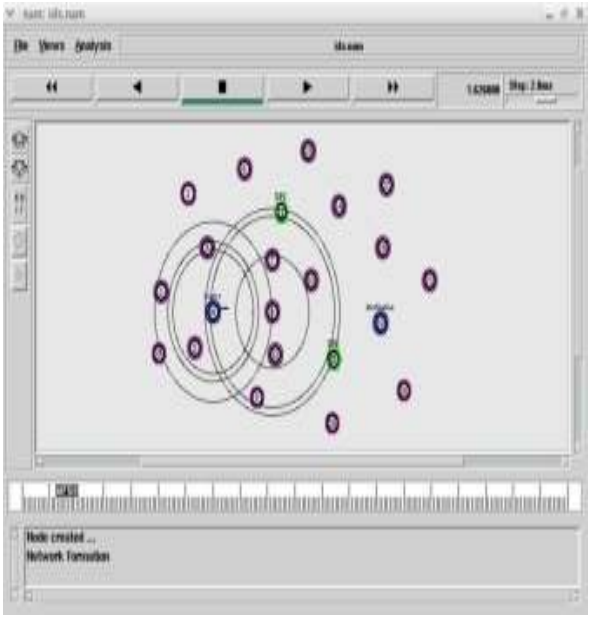
The proposed method consists of three types of nodes.

Normal Nodes

They are basic hubs in the group, which sends packets of information to various hubs to pass on data. To obstruct malevolent hubs, every regular hub keeps up Block Table, which shows the pernicious hubs reported by the DPS hubs. These hubs simply disregard every one of the information packets (RREQs, RREPs, HELLO messages, and information bundles) got from the noxious hubs.

Wormhole Nodes

These hubs catch RREQ from one segment of system and pass on it to the supplementary piece of the system without raising the hop tally and after that send the RREP back to a similar way to get engaged with more routes. The source hub considers that the route through these (noxious) hubs is the shortest way and this way begins correspondence through it.



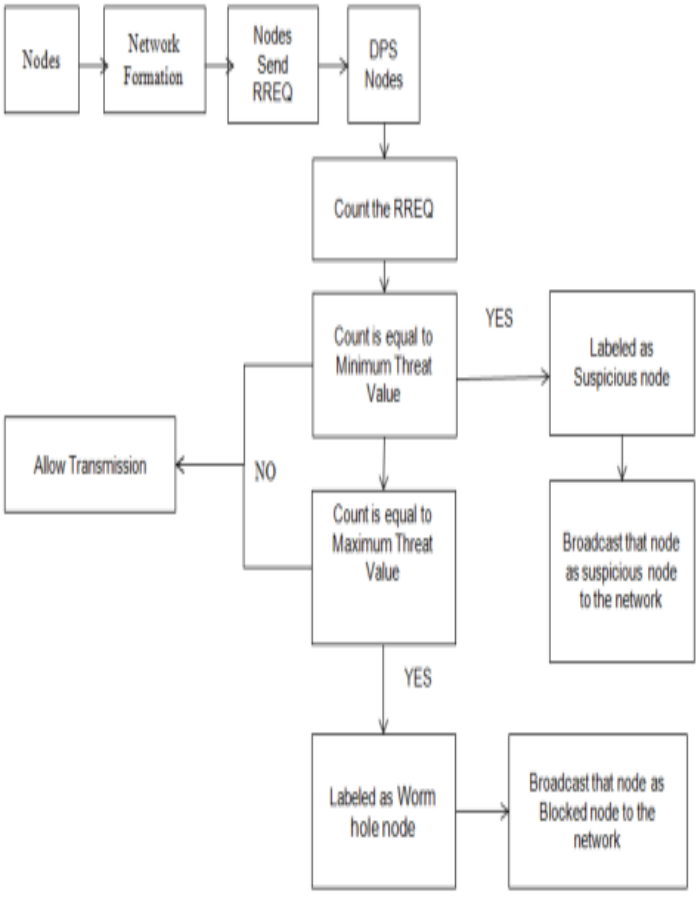
DPS Nodes

These are the hubs that attempt to recognize the wormhole hubs and afterward square them with the assistance of procedures running on them. Every DPS node keeps up an Analysis Table. The status field in the Analysis Table shows whether the hub is as of now in the scope of the DPS hub or not. The hubs that move out of the scope of the DPS hub (i.e. whose RREQs can't be recognized by the DPS hub) are set as latent. The quantity of DPS hubs relies on two elements: organize region and transmission run. To accomplish best outcomes, DPS hubs ought to be conveyed such that they cover the entire system zone and speak with each other straightforwardly.

Proposed a Detection and Prevention System (DPS) to recognize and piece malevolent hubs in MANETs. Exceptional hubs called DPS hubs are conveyed in the system, which consistently screen the conduct of different hubs. At the point when a DPS hub finds a hub with a suspicious conduct, it pronounces that suspicious hub as a wormhole hub by communicating a message. All information and control messages are disposed of by the system from a hub that has been proclaimed as wormhole. NS-2 recreations demonstrate that the proposed DPS impressively lessens the quantity of bundles dropped by the malevolent hubs with low false positive rate. The quantity of DPS hubs relies on two components: arrange zone and transmission go. To accomplish best outcomes, DPS hubs ought to be sent such that they cover the entire system region and speak with each other specifically.

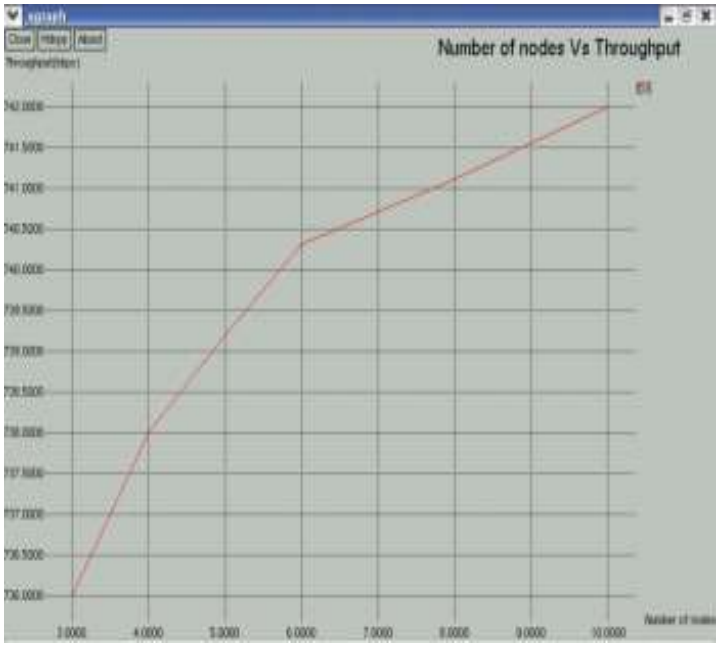
Whenever a DPS node receives a RREQ, route request counting starts. As each DPS node keeps record of its neighbors in the Analysis Table, whenever it receives a RREQ from a node, it first checks whether the node that is broadcasting the RREQ is already included in its Analysis Table. If it is not found in the Analysis Table then a new entry is created in which the status is set to active, RREQ count is set to 1. The Suspicious value is set to 0 and Wormhole

confirmed fields are set to No. The Suspicious value calculation process checks all the nodes in the Analysis Table whose status is active. If there is a node that has RREQ count less than Minimum Request Count then its suspicious value is incremented by one. If the suspicious value is equal to Minimum Threat Value and the Wormhole Threat field is No, then the DPS node will broadcast a threat message, which includes the ID of the malicious node. After sending the Threat message, the Wormhole Threat field of the malicious node is set to yes. Then the process will continue for other nodes. If the suspicious value of a node becomes equal to Maximum Threat Value and its Wormhole Confirmed field is No, then the DPS node will broadcast a Block message, which contains the ID of the malicious node.



After sending Block message, Wormhole Confirmed field is set to Yes. To reduce the false positive rate, if a node has Suspicious Value more than zero but shows normal behavior i.e. the RREQ forwards are more than the Minimum Request Count, then its Suspicious Value is decremented by one. This condition reduces the chances of legitimate nodes being declared as wormhole nodes due to isolation from the network. At the end of the Suspicious Value calculation process, the status of all the nodes in the table will be changed to inactive and the RREQ Count resets to zero.

4. PERFORMANCE EVALUATION



The performance is evaluated using NS 2 simulations. The above figure shows the throughput graph when the network is under wormhole attack. The throughput is gradually increased and it reaches the peak only after the worm hole nodes are identified and blocked.

5. CONCLUSION

The proposed method is used to recognize wormhole attacks in adhoc frameworks. Single Center points called Detection and Prevention System center points are executed to control the different center points' direct. If any center point carries on strangely, it will alert rest of the center points by strategies for a peril message. In case a comparative center point carries on abnormally reliably, the DPS center point will impart a piece message to whatever remains of the center points in the framework. Starting now and into the foreseeable future, the correspondence will be overseen without interfacing the wormhole centers. In future, difference in the DPS centers is done to discover remaining attacks as well.

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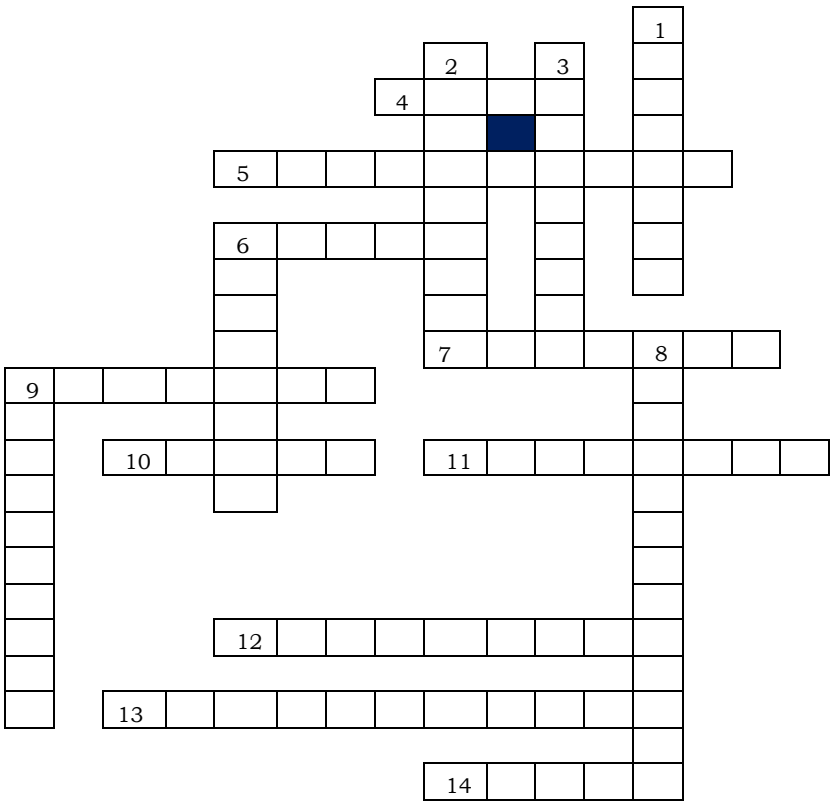
PUZZLES ZONE

Crossword Puzzle

Across

4. Government space agency
5. Replacement leg or arm
6. Type of security for computers and networks.
7. _____ engineers manage complex projects like shipping routes and space launches.
9. Fuel made from plants
10. Building vehicles for under -water exploration would be the work of this type of engineer.
11. A soft drink flavoured to taste like blueberry pie might be the work of this type of engineer.
12. A human colony on the moon would be planned by this type of engineer.
13. Engineers are making _____ planes and ships that burn less fuel
14. A skyscraper that can withstand earthquakes and hurricanes would be the challenge of a _____ engineer.



Down

1. Farming in city high-rises
2. Robots are found here, making production faster, cheaper, and safer.
3. These engineers create new types of plastics and metals.
6. These engineers work at places like Facebook and Apple.
8. Field of engineering that works to protect the earth's air, water, and soil.
9. This type of engineer might someday grow bones for transplants.

PUZZLES ZONE

3/4 Chicken,

2/3 Cat,

1/2 Goat

= ?

Guess the City.

9 + 1= 91

8 + 2= 75

7 + 3= 61

6 + 4= 49

5 + 5= 39

3 + 7= ?

9=10

8=18

7=24

6=28

5=30

Then 3=?

Find the Following

√64% =?

"Education breeds Confidence.
Confidence breeds Hope.
Hope breeds Peace."

- CONFUCIUS

For your valuable Feedback/Suggestions: r.ravishankar@ranepolytechnic.edu.in

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