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ISHARE

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Ishare

Editorial

We would like to wholeheartedly thank our honorable Chairman, Secretary, Executive Director and Principal for their continuous encouragement and constant support for bringing out the magazine. We profoundly thank our Head of Department for encouraging and motivating us to lead the magazine a successful one right from the beginning. Ishare serves as a platform for updating and enhancing upcoming technologies in Information and Communication. We are grateful to all the contributors to this magazine so far. The magazine has been sent to almost 60 institutions in and around Tamilnadu. So far we have received feedbacks and appreciations from various institutions.

We would be very pleased to receive your feedbacks. Please send your feed backs to ksrcas.ishare@gmail.com

By,

Editorial Board

Content

1. DATA ANALYTICS AT CORPORATE USING DATA MINING TECHNIQUES

C.Sasikala M.Sc.,M.Phil.,

Assistant Professor - CS

What is Data Mining?

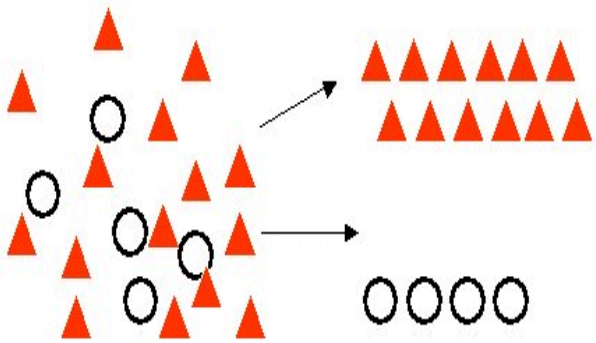
Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD).

Data mining is primarily used today by companies with a strong consumer focus - retail, financial, communication, and marketing organizations. It enables these companies to determine relationships among "internal" factors such as price, product positioning, or staff skills, and "external" factors such as economic indicators, competition, and customer demographics.

Data mining techniques:

1. Classification:

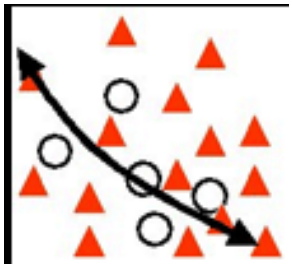
It is the commonly used technique for predicting a specific outcome such as response / no-response, high / medium / low-value customer, likely to buy / not buy.



Algorithms used for classification are Logistic Regression, Naive Bayes, and Support Vector Machine and Decision Tree.

2. Regression

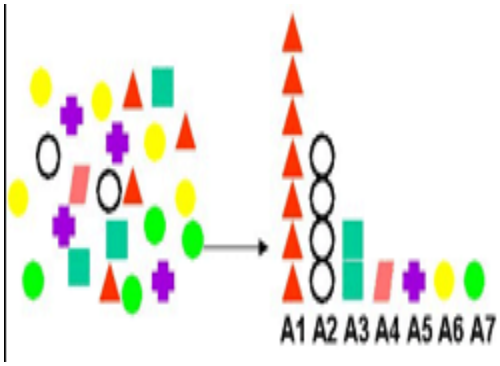
This technique is mainly used for predicting a continuous numerical outcome such as customer lifetime value, house value, process yield rates.



Algorithms used for Regression are Multiple Regression and Vector Support Machine.

3. Attribute Selection:

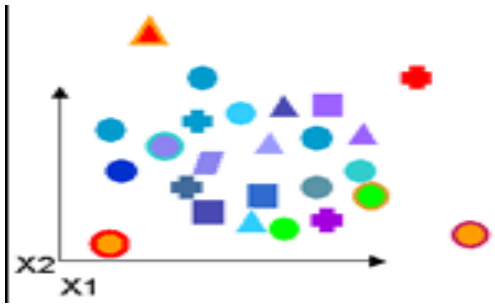
It is used to rank attributes according to strength of relationship with target attribute. Use cases include finding factors most associated with customers who respond to an offer, factors most associated with healthy patients.



Algorithms used for Attribute Selection are Logistic Regression, Naive Bayes, and Support Vector Machine and Decision Tree.

4. Anomaly Detection:

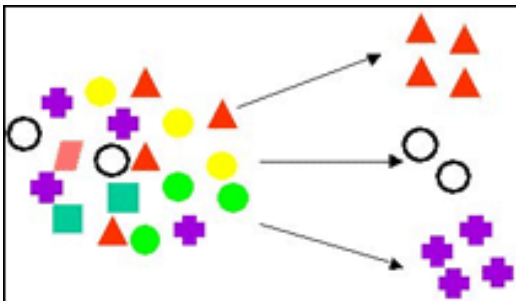
It is used to identify unusual or suspicious cases based on deviation from the norm. Common examples include health care fraud, expense report fraud, and tax compliance.



Algorithms used for Anomaly Detection is One-class Support Vector Machine.

5. Clustering:

Useful for exploring data and finding natural groupings. Members of a cluster are more like each other than they are like members of a different cluster. Common examples include finding new customer segments, and life sciences discovery.

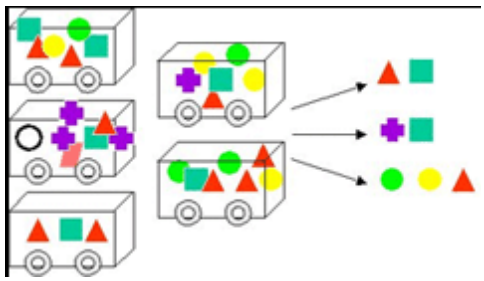


Algorithms used for clustering are Enhanced K-Means, Orthogonal Partitioning Clustering (Hierarchical clustering, density based) and Expectation Maximization—

Clustering technique that performs well in mixed data (dense and sparse) data mining problems.

6. Association:

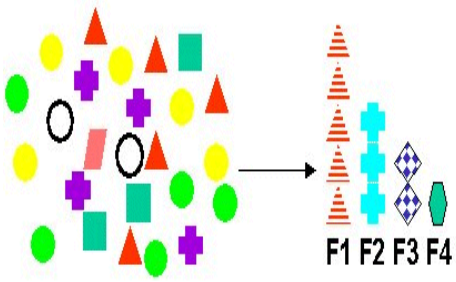
Finds rules associated with frequently co-occurring items, used for market basket analysis, cross-sell, root cause analysis. Useful for product bundling, in-store placement, and defect analysis.



Algorithm used for clustering is Apiori.

7. Feature Selection and Extraction:

It can produces new attributes as linear combination of existing attributes. Applicable for text data, latent semantic analysis, data compression, data decomposition and projection, and pattern recognition.



Algorithm used for Feature Selection and Extraction are Non-negative Matrix Factorization, Principal Components Analysis (PCA) and Singular Vector Decomposition.

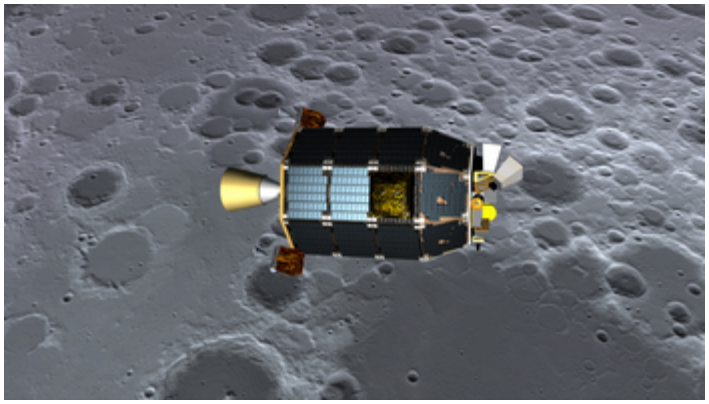
2. MIT FIGURES OUT HOW TO GIVE THE MOON BROADBAND -- USING LASERS

S. VIGNESHWARAN

Assistant Professor - CS

Four transmitting telescopes in the New Mexico desert, each just 6 inches in diameter, can give a satellite orbiting the moon faster Internet access than many U.S. homes get.

The telescopes form the earthbound end of an experimental laser link to demonstrate faster communication with spacecraft and possible future bases on the moon and Mars. Researchers from the Massachusetts Institute of Technology will give details about the system and its performance next month at a conference of The Optical Society.



An artist's concept of NASA's Lunar Atmosphere and Dust Environment Explorer (LADEE) spacecraft seen orbiting near the surface of the moon.

The Lunar Laser Communication Demonstration (LLCD) kicked off last September with the launch of NASA's LADEE (Lunar Atmosphere and Dust

Environment Explorer), a research satellite now orbiting the moon. NASA built a laser communications module into LADEE for use in the high-speed wireless experiment.

LLCD has already proved itself, transmitting data from LADEE to Earth at 622Mbps (bits per second) and in the other direction at 19.44Mbps, according to MIT. It beat the fastest-ever radio communication to the moon by a factor of 4,800.

NASA hopes lasers can speed up communication with missions in space, which use radio to talk to Earth now, and let them send back more data. Laser equipment also weighs less than radio gear, a critical factor given the high cost of lifting any object into space.

The project uses transmitting telescopes at White Sands, New Mexico, to send data as pulses of invisible infrared light. The hard part of reaching the moon by laser is getting through Earth's atmosphere, which can bend light and cause it to fade or drop out on the way to the receiver.

One way the researchers got around that was by using the four separate telescopes. Each sends its beam through a different column of air, where the light-bending effects of the atmosphere are slightly different. That increases the chance that at least one of the beams will reach the receiver on the LADEE.

Test results have been promising, according to MIT, with the 384,633-kilometer optical link providing error-free performance in both darkness and bright sunlight, through partly transparent thin clouds, and through atmospheric turbulence that affected signal power.

One reason it works is that there's plenty of signal power to spare. The transmission power from the Earth antennas totals 40 watts and less than a billionth of a

watt is received on the LADEE. But that's still 10 times the signal needed to communicate without errors, according to MIT. On the craft, a smaller telescope collects the light and focuses it into an optical fiber. After the signal is amplified, it's converted to electrical pulses and into data.

3. Open Source Web-Based Project Management Software

R. NIRMALA, M.Sc., M.Phil,

Assistant Professor - CS

Introduction

Project management software is not just for managing software based project. It can be used for variety of other tasks too. The web-based software must provide tools for planning, organizing and managing resources to achieve project goals and objectives.

A web-based project management software can be accessed through an intranet or WAN / LAN using a web browser. There is no need to install any other software on the system. The software can be easy of use with access control features (multi-user). The project management software is used for projects (for e.g. building a new cluster farm) for issue / bug-tracking, calendar, Gantt charts, email notification and much more.

The following open source software is used by some of the biggest research organizations and companies world wild. For example, NASA's Jet Propulsion Laboratory uses track software or open source project such as lighted / phpbb use red mine software to keep track of their projects.

1: Codendi

Codendi is an open-source collaborative development platform offered by Xerox. From only one interface, it gathers, all the needed tools for software development teams:

management and versioning of code, bugs, requirements, documents, reporting, tests etc. It is mainly used for managing software project processes.

2: Redmine

Redmine is a flexible project management web application. Written using Ruby on Rails framework, it is cross-platform and cross-database. It includes calendar and Gantt charts to aid visual representation of projects and their deadlines.

3: ProjectPier

ProjectPier is a Free, Open-Source, self-hosted PHP application for managing tasks, projects and teams through an intuitive web interface. ProjectPier will help your organization communicate, collaborate and get things done Its function is similar to commercial groupware/project management products, but allows the freedom and scalability of self-hosting.

4: Trac

Trac is an open source, web-based project management and bug-tracking tool. Trac allows hyperlinking information between a computer bug database, revision control and wiki content. It also serves as a web interface to a version control system like Subversion, Git, Mercurial, Bazaar and Darcs.

5: Project HQ

Project HQ is a collaborative open source project management tool, similar to Basecamp and activeCollab. Project HQ is built on open source technologies like Python, Pylons and SQLAlchemy and is fully database independent. Project HQ uses a structured workflow to assist you in managing your projects.

6: Collabtive

Collabtive is a web-based project management software that is being published as Open Source software. The project was started in November 2007. It strives to provide an Open Source alternative to proprietary tools like Basecamp or ActiveCollab.

7: eGroupWare

eGroupWare is a free open source groupware software intended for businesses from small to enterprises. Its primary functions allow users to manage contacts, appointments, projects and to-do lists.

It is used either via its native web-interface, making access platform-independent, or by using different supported groupware clients, such as Kontact, Novell Evolution, or Microsoft Outlook. It can also be used by mobile phone or PDA via SyncML.

8: KForge

KForge is an open-source (GPL) system for managing software and knowledge projects. It re-uses existing best-of-breed tools such as a versioned storage (subversion), a tracker (trac), and wiki (trac or moinmoin), integrating them with the system's own facilities (projects, users, permissions etc). KForge also provides a complete web interface for project administration as well a fully-developed plugin system so that new services and features can be easily added.

9: OpenGoo

It is a complete online solution focused on improving productivity, collaboration, communication and management of your teams. OpenGoo main features include document management, contact management, e-mail, project management, and time management. Text documents and presentations can be created and edited online. Files can be uploaded, organized and shared, independent of file formats.

10: ClockingIT

ClockingIT is a free Project Management solution, which helps your team stay focused and on top of things.

4. MAJOR TRENDS IN MOBILE CLOUD COMPUTING

Ms. J. Mary Dalfin Bruxella

Assistant Professor – CS

If a survey will be conducted on the most glorified technology trends of the year, there are only two answers most people will say; it's either cloud computing or smart phones and tablets. It's everywhere on wall discussions of most IT forums and communities.

While some vendors are busy slapping these products, the trend is still up for these two giants. And millions of dollars on investment continue to flood into cloud computing and mobile applications. Major companies like Microsoft, Cisco, Oracle and IBM are only a few of the major investors who are willing to empty their pockets for it.

What is so interesting is the intersection happening between cloud computing and mobile computing, giving rise to the new trend in the "Mobile Cloud". Although mobile cloud and the Cloud may seem to be interchanged and viewed as one and the same, they are actually different with regard to security, platform infrastructure, design and many others. Other differences will be noticeable as the new "mobile cloud" continues to evolve.

Mobile cloud in its infancy has very strong major trends to look out for:

1. Acceleration in the "Consumerization" of IT through Mobile Computing

The increase in demand from workers to access non-PC devices and be able to work everywhere on smart phones and tablet PC's speeds up the consumerization of mobile computing.

As social networks like Facebook, Twitter and LinkedIn continues to be popular and convenient for users, they have now become a place to do business and work using mobile gadgets. The tremendous increase in demand for smart phones and tablets has a parallel demand for IT solutions to speed up applications development for mobile computing while ensuring security is in place.

2. Risk Challenges are Evolving

The issue of security vulnerability in mobile computing increases the risk more than double and has caught the attention of hackers to invade smart phones and tablets. This has been examined and authentication verification was strengthened. Certain security protocols have also been established like limitations to access and data modification from end-users. However, this may only work for awhile because IT people will either find a way to work around these restrictions that are often a less secure platform.

3. Mobile Computing will Revolutionize How Work is Done

When mobile computing entered the cloud, one of the first applications that got the highest demand was email access; whether it was for personal or business use. That is why Microsoft, Google and Salesforce.com laid out immediately their cloud – based email platforms.

Mobile cloud computing will change and speed up how work is done especially for those in sales and marketing. This trend is a welcome paradigm shift for mobile users, but will put a tremendous pressure with IT solutions providers.

4. Mobile Computing will become the "Internet of Things"

This is where mobile computing will cross the threshold; while everyone else are busy managing and building the cloud platform and infrastructure, network servicing companies are getting their devices ready to mix everything together, making it the "Internet of Things."

Projections made by IBM, Cisco and Ericsson that there will be 1 trillion Internets connected to mobile phones by 2015 was moved up by IBM to 2013. Network companies and mobile computing will be the cornerstone for end users and service providers such as: sensor networks, smart grids and smart buildings.

5. Mobile Computing is Here to Stay Whether People or IT are Prepared or Not

David Link of ScienceLogic who tagged mobile computing as the "Internet of Things" and "Device-aggedon," referred to this even in the early adoption of cloud computing. In fact, many people are unaware that smart grid and smart parking meters they now use are all cloud-based applications.

Even business owners who are firm about their stand not to move their core applications to the cloud, are also unaware that while they are using Salesforce.com, OpenAir and other SaaS applications, they are already in the cloud.

5. LOCK YOUR FOLDER WITHOUT ANY SOFTWARE

A.GOKULRAJ

II-BCA-A

Folder Protector v1.0 :

Instructions to execute:

1) Copy and paste the below source code into notepad.
2) Save it as any name .bat (anyname.bat ex: Gokul.bat)
3) Then Double click the File you saved i.e Gokul.bat
4) At this time, Your Secret folder will be displayed.
5) Now place your all secret files and folders into it.
6) Then Double click the file Gokul.bat once again
7) Now, It will ask you to password to lock your folder.
8) Here I have Assigned your computer's user name is password.
9) If you Don't know your user name just open cmd or Terminal and type "msg * %USERNAME%" it will pop_up your User name
10) After enter the password just Hit Enter Now Your folder will be Locked/Protected
11) If you Want to Retrieve your files again, Double click Gokul.bat once again
12) It will ask password to Un-Lock folder Type your Password and Hit Enter now your folder will be retrieved

Source Code:

```
@echo off
:AGAIN
cls
color 0a
titleGokul's folder protector V1.0
if EXIST "Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}" goto UNLOCK
if NOT EXIST %USERNAME% goto MDLOCKER
:CONFIRM
```

```
set/p pass=%USERNAME% Enter password to Lock:
if %pass%==%USERNAME% goto LOCK
msg * Sorry %USERNAME% Ivalid Password, Click OK to Try Again...!
Goto AGAIN
goto CONFIRM
:LOCK
renGokul "Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}"
attrib +h +s "Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}"
msg * %USERNAME% Your Folder has Protected...:)...!
goto End
:UNLOCK
set/p pass=%USERNAME% Enter the Password To Un-Lock Folder:
if NOT %pass%==%USERNAME% goto FAIL
attrib -h -s "Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}"
ren "Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}" %USERNAME%
msg * %USERNAME% Your Folder Unlocked successfully....:)...!
goto End
:FAIL
msg * Sorry %USERNAME% Invalid Password, Click ok to Try Again...!
goto AGAIN
:MDLOCKER
md %USERNAME%
msg * %USERNAME% , Your Folder Created Successfully....:)...!
goto End
:End
```

Use the below link to get soft copy of the code (To easily copy and Paste):

http://mysticodes.blogspot.in/2013/12/folder-locker-v10.html

Use the below link to Download the Application

https://drive.google.com/folderview?id=0B4wHXb7WXUUScGN0T3A5VlpveDA&usp=sharing

6. ROBOTICS

Ms. N.Shanmugapriya.,M.Sc.,M.Phil.,
Assistant Professor, Dept. of CS

- Robotics is the branch of technology that deals with the design, construction, operation, and application of robots.
- These technologies deal with automated machines that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behavior, and/or cognition.
- Many of today's robots are inspired by nature contributing to the field of bio-inspired robotics.

History of Robot

- In 1927 the Maschinenmensch ("machine-human") gynoid humanoid robot (also called "Parody", "Futura", "Robotrix", or the "Maria impersonator") was the first depiction of a robot ever to appear on film was played by German actress Brigitte Helm in Fritz Lang's film Metropolis.
- In 1942 the science fiction writer Isaac Asimov formulated his Three Laws of Robotics.
- In 1948 Norbert Wiener formulated the principles of cybernetics, the basis of practical robotics.
- Fully autonomous robots only appeared in the second half of the 20th century.
- The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal from a die casting machine and stack them.
- Commercial and industrial robots are widespread today and used to perform jobs more cheaply, or more accurately and reliably, than humans.
- They are also employed in jobs which are too dirty, dangerous, or dull to be suitable for humans.

7. LEACH PROTOCOL

J.RATHI M.Sc., M.Phil.,
Asst. Professor –Dept. of CS

INTRODUCTION

Low Energy Adaptive Clustering Hierarchy ("LEACH") is a TDMA-based MAC protocol which is integrated with clustering and a simple routing protocol in wireless sensor networks (WSNs). The goal of LEACH is to lower the energy consumption required to create and maintain clusters in order to improve the life time of a wireless sensor network.

PROTOCOL EXPLANATION

LEACH is a hierarchical protocol in which most nodes transmit to cluster heads, and the cluster heads aggregate and compress the data and forward it to the base station(sink). Each node uses a stochastic algorithm at each round to determine whether it will become a cluster head in this round. LEACH assumes that each node has a radio powerful enough to directly reach the base station or the nearest cluster head, but that using this radio at full power all the time would waste energy.

LEACH WITH CLUSTER

Nodes that have been cluster heads cannot become cluster heads again for P rounds, where P is the desired percentage of cluster heads. Thereafter, each node has a $1/P$ probability of becoming a cluster head in each round. At the end of each round, each node that is not a cluster head selects the closest cluster head and joins that cluster. The cluster head then creates a schedule for each node in its cluster to transmit its data.

All nodes that are not cluster heads only communicate with the cluster head in a TDMA fashion, according to the schedule created by the cluster head. They do so using the minimum energy needed to reach the cluster head, and only need to keep their radios on during their time slot.

LEACH also uses CDMA so that each cluster uses a different set of CDMA codes, to minimize interference between clusters.

LEACH (Low Energy Adaptive Clustering Hierarchy) is designed for sensor networks where an end-user wants to remotely monitor the environment. In such a situation, the data from the individual nodes must be sent to a central base station, often located far from the sensor network, through which the end-user can access the data.

PROPERTIES

Properties of this algorithm include:

- Cluster based
- Random cluster head selection each round with rotation
- Cluster membership adaptive
- Data aggregation at cluster head
- Cluster head communicate directly with sink or user
- Communication done with cluster head via TDMA
- CDMA across clusters

There are several desirable properties for protocols on these networks:

- Use 100's - 1000's of nodes
- Maximize system lifetime
- Maximize network coverage
- Use uniform, battery-operated nodes

CONCLUSION

Conventional network protocols, such as direct transmission, minimum transmission energy, multi-hop routing, and clustering all have drawbacks that don't allow them to achieve all the desirable properties. LEACH includes distributed cluster formation, local processing to reduce global communication, and randomized rotation of the cluster-heads. Together, these features allow LEACH to achieve the desired properties. Initial simulations show that LEACH is an energy-efficient protocol that extends system lifetime.

8. VISUAL THINKING VS. PATTERN RECOGNITION

K. Priya, M.Sc., MCA., M.Phil

Asst. Professor - Dept of Computer Science

Visual thinking is a way to organize the thoughts and improve the ability to think and communicate. It’s a way to expand your range and capacity by going beyond the linear world of the written word, list and spreadsheet, and entering the non-linear world of complex special relationships, networks, maps and diagrams.

It’s also about using tools — like pen and paper, index cards and software tools — to externalize your internal thinking processes, making them more clear, explicit and actionable.

Drawing is a natural process for thinking, exploring ideas and learning.

First, we must discover how to recognize patterns within the environment, within information clusters and within problems. Secondly, must proactively combine the data which have acquired into visual patterns that help to identify critical solutions — leading you to breakthrough thinking, ideas and innovation.

Within this I would like to highlight how to apply *pattern recognition* into visual thinking practices.

The World is built upon Patterns

Whether we look at the world from a macro-level of understanding or a micro-level, one thing is undeniably clear:

Everything around us thrives on predictable or semi-predictable cycles, rhythms and patterns.

The human body is built upon biological patterns and rhythms that keep us alive and functioning. The same is true of our psychology which traps us in patterns of semi-predictable behaviors, habits, actions and decisions that merge together to create our destiny. Moreover, the combined psychology of small to large groups of people can essentially predict a collective destiny that spans across cultures, political boundaries, religions and borders.

Pattern Recognition is Link to Evolution

Ever since the dawn of mankind we have evolved as a society because of the few individuals who took the time to identify patterns within their environment.

In recent years science has built the foundations of extraordinary medical and technological breakthroughs. Scientists, doctors and engineers continue to make sense of patterns that lead to the formation of new associations and understandings of what's possible in every area of our lives.

As you can see, patterns are everywhere, and it is the patterns that lay down the critical foundations for every breakthrough technology and idea that has shaped the society we live in today.

How to Recognize Patterns

What would like to focus on here is the process of actively looking for patterns, organizing them, and imagining new possibilities.

1. Actively Look for Patterns

The first step is to begin actively looking for patterns within your environment, industry, within people's behavior and within the subject you are studying — to help you identify an opportunity or solve a problem.

Take the time to notice how things happen, how the information is structured, how the different pieces interact with other elements, and how they come together to form outcomes.

At this stage you are essentially looking for the cause and effect relationship between the different pieces, and how this relationship forms predictable or semi-predictable patterns that you can take advantage of. It is therefore paramount that you collect as much data as possible in order to help you identify the connection between these relationships.

Keep in mind that patterns may not be immediately evident. For now, simply collect every piece of data you can. The patterns will eventually come to the surface during the concluding stages of this process.

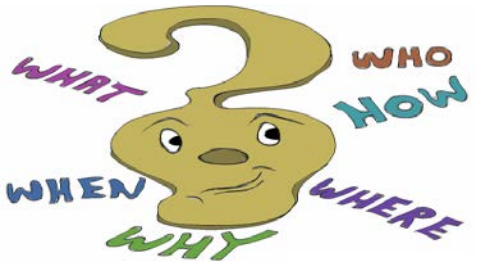
Finally, it's important that you do not question anything at this stage. Just observe the data that is out there. If you fall into the trap of questioning too early, then your preconceived assumptions might lead you astray.

2. Organize the Pieces

Now that you've spent time observing the data that is out there, your next step is to lay out this data into a visual format that will allow you to make sense of existing connections and form new associations.

It's important to note that your main objective here is not to find solutions or answers, but to rather organize the information into chunks or groups that will help you to better pinpoint possible patterns you've been observing. Creating mind maps can be very helpful.

3. Question the Data



Having observed and organized the data into a visual format now comes time to start questioning this information. Ask "who?", "what?", "how much?", "where?", "when?", "how?"and "why?" questions, and…

- Identify what you see.
- Determine whether you've seen this type of information before.
- Pinpoint things that stand out in your mind.
- Question whether there are pieces missing.
- Think about possible patterns that might be emerging.

4. Visualize the Data

As you continue to ask relevant questions, begin visualizing the data using graphs, charts, maps, pictures, etc. The better you are able to visualize this information the more patterns will start to emerge, and the more likely you are to find solutions.

5. Imagine New Possibilities

While you are visualizing the data, new patterns will start to emerge. This will inspire new concepts and ideas that will expose you to opportunities and possibilities that you probably never considered or didn't even know existed.

This is in essence the realm of *idea generation*, where you explore the possibilities that lie before you.

The Steps towards Breakthrough Innovation

The above five step process lays down the foundations of how pattern recognition can lead to breakthrough ideas and innovative concepts.

9. SQUIGGLY LINES THE FUTURE OF PASSWORD SECURITY

R. LAVANYA

ASSISTANT PROFESSOR – Dept of CS

Researchers studied the practicality of using free-form gestures for access authentication on smart phones and tablets. With the ability to create any shape in any size and location on the screen, the gestures had an inherent appeal as passwords. Since users create them without following a template, the researchers predicted these gestures would allow for greater complexity than grid-based gestures offer.

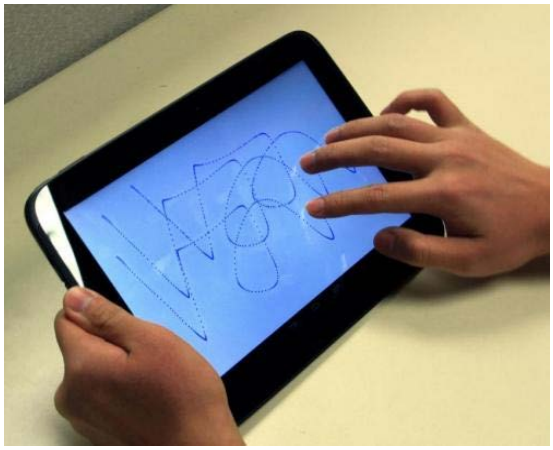
As more people use smart phones or tablets to pay bills, make purchases, store personal information and even control access to their houses, the need for robust password security has become more critical than ever.

A new Rutgers University study shows that free-form gestures – sweeping fingers in shapes across the screen of a smart phone or tablet – can be used to unlock phones and grant access to apps. These gestures are less likely than traditional typed passwords or newer "connect-the-dots" grid exercises to be observed and reproduced by "shoulder surfers" who spy on users to gain unauthorized access.

"All it takes to steal a password is a quick eye," said Janne Lindqvist, one of the leaders of the project and an assistant professor in the School of Engineering's Department of Electrical and Computer Engineering. "With all the personal and transactional

information we have on our phones today, improved mobile security is becoming increasingly critical."

Lindqvist believes this is the first study to explore free-form gestures as passwords. The researchers will publish their findings in June as part of the proceedings of MobiSys '14, a premier international conference in mobile computing.



In developing a secure solution to this problem, Lindqvist and the other researchers from Rutgers and collaborators from Max-Planck Institute for Informatics, including Antti Oulasvirta and University of Helsinki studied the practicality of using free-form gestures for access authentication. With the ability to create any shape in any size and location on the screen, the gestures had an inherent appeal as passwords. Since users create them without following a template, the researchers predicted these gestures would allow for greater complexity than grid-based gestures offer.

"You can create any shape, using any number of fingers, and in any size or location on the screen," Lindquist said. "We saw that this security protection option was clearly missing in the scientific literature and also in practice, so we decided to test its potential."

To do so, the researchers applied a generate-test-retest paradigm where 63 participants were asked to create a gesture, recall it, and recall it again 10 days later. The gestures were captured on a recognizer system designed by the team. Using this data, the authors tested the memorability of free-form gestures and invented a novel method to measure the complexity and accuracy of each gesture using information theory. Their analysis demonstrated results favorable to user-generated, free-form gestures as passwords.

To put their analysis to practice, the Rutgers researchers then had seven computer science and engineering students, each with considerable experience with touch screens, attempt to steal a free-form gesture password by shoulder surfing. None of the participants were able to replicate the gestures with enough accuracy, so while testing is in its preliminary stages, the gestures appear extremely powerful against attacks. While widespread adaptation of this technology is not yet clear, the research team plans to continue to analyze the security and management of free-form passwords in the future.

10. Ten Technology Trends To Watch In 2014

SIVAKUMAR. G

Assistant Professor in CS

1. Space Tourism

Virgin Galactic is scheduled to become the first private commercial "spaceliner" to blast tourists into space, with an inaugural trip in 2014 carrying its founder, Sir Richard Branson. Branson and his children, Holly and Sam, will lift off on SpaceShipTwo from the Spaceport America in New Mexico.

Beyond 2014, a handful of private companies are also racing to bring tourists to space, including the ambitious Mars One colony trip to the red planet and Space Adventures' trip to the moon.

2. Wearable Tech

Ok, Glass. Show us the future. Google is expected to ship its groundbreaking augumented-reality glasses to the public in 2014, expanding the wearable tech market.

Smartwatches like Samsung's Galaxy Gear Watch and the Pepple Smartwatch will continue to be more useful as developers create more apps for the devices. Health-tracking devices like the Nike Fuel Band, Jawbone Up and Fitbit Force will continue to drive the health technology marketplace into the mainstream.

3. Internet of things

At the 2013 IFA consumer electronics show in Berlin, technology company Philips demonstrated a concept called the HomeCooker Next that could time cooking, change temperature and stir food -- using a smartphone. The Nest thermostat not only can control your home's temperature remotely, it also learns your behavior and makes adjustments accordingly.

The networking of our physical world will continue to boom in 2014. Connected devices are no longer just limited to smart phones and computers. Everything from door locks and home appliances to bikes and watches can now be networked.

4. Robots on the rise

Will the machines become self-aware in 2014? We certainly hope not, but advancing technology in robotics and artificial intelligence are definitely on the rise.

Google acquired a portfolio of incredible robots with its purchase of Boston Dynamics in 2013, including the Cheetah, Petman and Atlas, making spectators wonder what the tech giant has planned for the machines.

The Defense Advanced Research Projects Agency (DARPA) is challenging robot-makers to address the need for rescue workers in dangerous emergency response situations. The DARPA robotics challenge is underway and will have finals happening at the end of 2014. Winners will receive a $2 million prize.

5. Machines in the sky

Keep an eye on the sky in 2014 because unmanned aerial vehicles – or drones – are about to become a big part of the airspace.

Amazon made a big splash when CEO JeffBezos on "60 Minutes" revealed plans for a drone that would deliver packages in 30 minutes. But a handful of other drones garnered attention in 2013, including drones that could deliver beer at a festival and pizza to a home in the United Kingdom.

In 2013, the Federal Aviation Administration (FAA) released its first annual roadmap to address concerns that are arising with the increased use of drones in American airspace, paving the way for clear regulations of the flying devices. The FAA recently announced the locations of six drone test sites in the United States, setting the stage for what could be the next booming industry.

6. Bigger, smarter TVs

Just watching movies and shows on TV won't cut the mustard in 2014. A growing market of smart TVs will continue to expand, with more households having the option to browse the Internet, launch apps and have social interactions through their TV sets.

LG is planning to release a feature that lets users communicate with smart home appliances, using a mobile messaging app called Line, at the Consumer Electronics Show (CES) in January. Samsung's smart TVs will soon let users use voice command and gestures to change the channel, control the volume and stop videos. The two companies are also planning to show 105-inch curved 4K TVs at CES. Samsung has already begun selling a 110-inch TV in South Korea for a whopping $150,000.

7. 3D printed everything

Need a new iPhone case? There's a printer for that. The future of 3D printing is bright and may hit the mainstream soon. According to growth projections by IDC, 3D printers units will have a compound growth rate of 59 percent and revenue growing by 29 percent from 2012 to 2017.

Hobbyists aren't the only ones that have use for 3D printers – the medical, aerospace and automotive industries are also using 3D printers.

8. Multi-screen world

Spoiler alert: Live-tweeting TV shows is now a thing. As more mobile devices hit the market in 2014, so will more opportunities for a second-screen experience. More TV programming will include hashtags to continue the conversation online, during breaks or after shows air. Apps like Zeebox notify users when a program is about to air, shows trending conversations online and highlights related content.

9. The fight for privacy

Privacy became a buzzword in summer of 2013, with the details of the National Security Agency's surveillance programs coming to light through leaked documents by former contractor Edward Snowden.

According to a July 2013 Pew Research survey, 86 percent of Internet users have taken steps to protect their digital footprint by using methods like encrypting their email or clearing cookies.

Privacy advocates may want to keep their eyes on several cases filed against the U.S. government in 2013 that are still pending. NSA director Gen. Keith Alexander will retire in 2014, which could spark a new round of conversations about privacy.

10. Smartphone market continues to grow

Not everyone has a smartphone, but that will eventually change. One prediction by Credit Suisse says that over1 billion smartphones will sell worldwide in 2014, getting a boost from demand in China. According to IDC, smartphone shipments in China's growing market are estimated to hit 450 million in 2014 – compared to an estimated 360 million in 2013.

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BEAUTY OF MATHEMATICS

$$1 \times 8 + 1 = 9$$
$$12 \times 8 + 2 = 98$$
$$123 \times 8 + 3 = 987$$
$$1234 \times 8 + 4 = 9876$$
$$12345 \times 8 + 5 = 98765$$
$$123456 \times 8 + 6 = 987654$$
$$1234567 \times 8 + 7 = 9876543$$
$$12345678 \times 8 + 8 = 98765432$$
$$123456789 \times 8 + 9 = 987654321$$

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