ECHELON

A DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING's MAGAZINE

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INSIDE THIS ISSUE:

Vision of the Department

To become a centre of excellence that grooms globally competent and ethical engineers with the talent for higher learning and research and the capability to think critically of innovative solutions for diverse social needs.

Mission of the Department

M1: To impart quality technical education with strong foundations using superior academic standards and well-equipped infrastructure.

M2: To provide excellent pedagogics through qualified and highly skilled faculty who are trained on a regular basis.

M3: To establish research labs and a centre of excellence that will nurture the technical skills by training them with state of art technology required for the industry.

M4: To inculcate professional and ethical values in the students along with leadership qualities so that they are well equipped to handle the dynamic and diverse challenges they will face as engineers.

Programme Educational Objectives (PEOs)

PEO-1: To exhibit strong fundamental concepts of Computer Science & Engineering along with advanced knowledge on emerging technologies so that they can devise solutions for real time & social issues.

PEO-2: To be employed, to pursue higher studies, to become entrepreneurs and also to have an excellent aptitude for research.

PEO-3: To be technically sound, socially acceptable and ethical professionals with global competence.

PEO-4: To be young leaders with the capability to lead teams with good communication skills and excellence in social awareness.

Clayodor

clayodor (\klei-o-dor\) is a clay-like malleable material that changes smell based on user manipulation of its shape. This work explores the tangibility of shape changing materials to capture smell, an ephemeral and intangible sensory input. We present the design of a proof-of-concept prototype, and discussions on the challenges of navigating smell though form. Recent HCI research has moved beyond static and rigid physical interfaces to dynamically controlled materials. For example, research has explored materials with dynamically changing qualities such as shape, stiffness, weight, and optical properties. For the last decade, researchers from CMU and Intel have worked towards the realization of Claytronics, a future material composed by nanoscale computers in the form of atoms. This will potentially enable direct and dynamic user manipulations with programmable materials. Building on top of the possibilities of shape changing interfaces, we envision clayodor, a clay-like malleable material that changes smell based on user manipulation of its shape.We explore the tangibility of shaping a malleable material to capture an ephemeral and intangible sensor input: smell. By allowing users to take this material into their hands and physically shape it into various meaningful forms, we are aiming to explore the potential mental model of coupling these forms with smells. Similarly, Obrist et al also indicated the evocative quality of scent to connect people to memories and past experiences. However, there is no focus on the power for objects to be used as a symbol in the production or recall of smell. Further, we posit that because smell is a distinctively difficult sense to describe, shaping and molding objects has potential to forgo the necessity for users to attempt at providing descriptions of smells for recall. On a poetic note, our work explores how shaping materials into symbolic forms serves as triggers to scents that connect people to past experiences. One main challenge is the complexity to produce arbitrary smells on demand. Humans have a thousand different olfactory receptors in our nose, each sensing a different chemical bond Reproducing arbitrary smell would therefore require a thousand-dimension space, which presents significant challenges compared to the 3- dimensional space of vision (RGB). Another challenge is the difficulty of creating as systemic and reproducible classification scheme for smell. As humans refer to smells through ambiguous descriptions, it is difficult to create rigorous categorization for universal reference. Recent HCI research efforts focus on user interaction with smell-based technology, rather than the chemical engineering challenge of reproducing specific scents. To the best of our knowledge, most systems use off the shelf aromas in their prototypes, focusing research effort on interaction design. Brewster et al. developed a smell-based photo-tagging tool (Olfoto) to elicit memories though smell. Commercial product Scentee lets you associate particular smells with smartphone notifications. The Smelling Screen is a display system that can generate smell distribution on a 2D screen. Ranasinghe et al. explored using smell for digital communication, enabling the sharing of smell over the Internet. By recreating smell though form, clayodor explores the possibility of form as a user-designated navigator for smell.

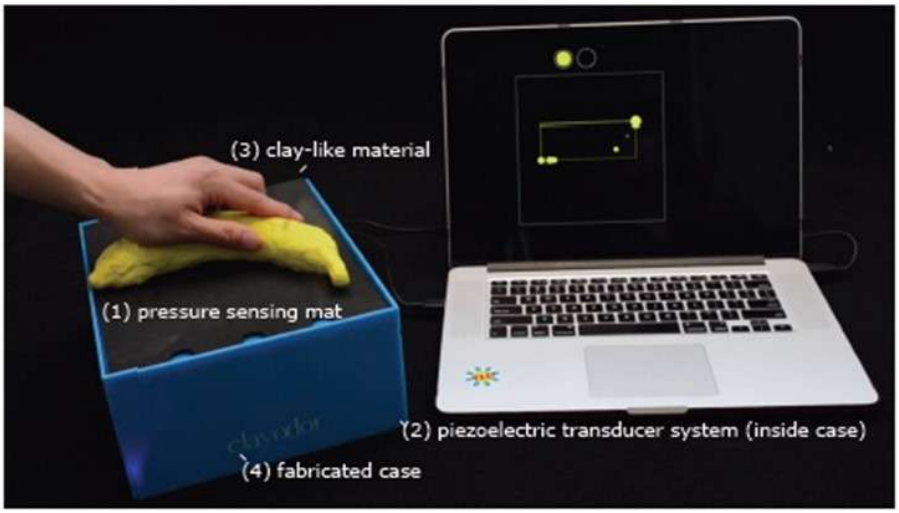

Figure 1. *clayodor* prototype

Submitted by
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189E1A1235

New Veeam Agent for Microsoft Windows

Due to various factors, including complex hardware configurations and regulatory compliance requirements, some physical servers and workstations cannot be virtualized. And everyday occurrences such as lapses in connectivity, hardware failures, file corruption-even ransomware or thefcan leave an organization's data at risk.

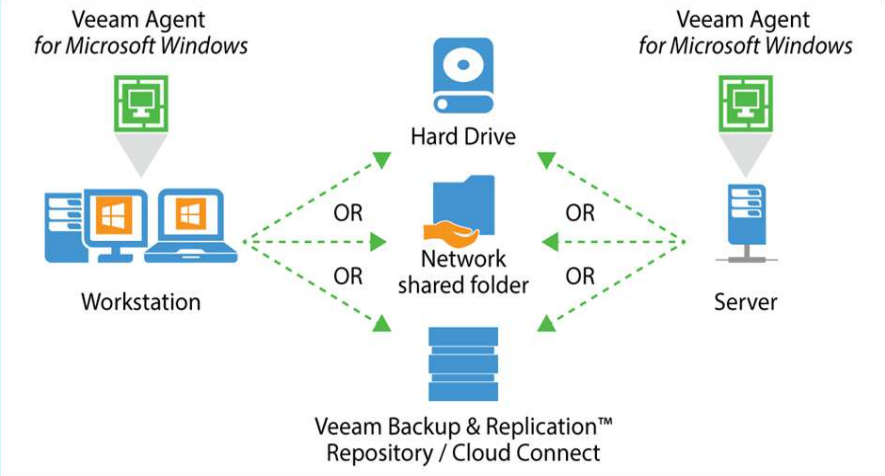
NEW Veeam® Agent *for Microsoft Windows* — a key component of the Veeam Availability Platform — solves these issues by closing the gap that some enterprises face with large, heterogeneous or multi-cloud environments environments and further enables workload mobility by delivering Availability for Windows-based workstations, physical servers and cloud instances.

Veeam Agent *for Microsoft Windows* is built on the extremely successful Veeam Endpoint Backup™ FREE and includes three editions.Workstation, Physical Server and Cloud Instance — with additional features

designed to ensure the Availability of your Windows workloads by providing backup and recovery for physical and cloud-based workloads, as well as endpoint devices that belong to remote users.With Veeam Agent *for Microsoft Windows*, you get:

Enterprise-level backup and recovery: Get complete protection for both workstations and Windows-based servers those running in the cloud including full application awareness**Physical backups off site:** Back up Windows-based workloads off site to a cloud service provider through Veeam Cloud Connect and more

Protection of roaming endpoints: Meet RPOs for laptops and tablets outside the corporate network



Submitted by
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189E1A1242

Holograms

Holograms were used mostly in telecommunications as an alternative to screens. Holograms could be transmitted directly, or they could be stored in various storage devices (such as holodiscs) the storage device can be hooked up with a holoprojector in order for the stored image to be accessed [1]. Fig.2. Example of visual Image Debatably, virtual reality goggles (which consist of two small screens but are nonetheless sufficiently different from traditional computer screens to be considered screen less) and heads-up display in jet fighters (which display images on the clear cockpit window) also are included in Visual Image category. In all of these cases, light is reflected off some intermediate object (hologram, LCD panel, or cockpit window) before it reaches the retina. In the case of LCD panels the light is refracted from the back of the panel, but is nonetheless a reflected source[3]. The new software and hardware will enable the user to, in effect; make design adjustments in the system to fit his or her particular needs, capabilities, and preferences. They will enable the system to do such things as adjusting to users' behaviors in dealing with interactive movable type.

Submitted by
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189E1A1272

Aneka: A Software Platform for .NET-based Cloud Computing

Aneka is a platform for deploying Clouds developing applications on top of it. It provides a runtime environment and a set of APIs that allow developers to build .NET applications that leverage their computation on either public or private clouds. One of the key features of Aneka is the ability of supporting multiple programming models that are ways of expressing the execution logic of applications by using specific abstractions. This is accomplished by creating a customizable and extensible service oriented runtime environment represented by a collection of software containers connected togetherCloud Computing [1] is a recent technology trend whose aim is to deliver on demand IT resources on a pay per use basis. Previous trends were limited to a specific class of users, or focused on making available on demand a specific IT resource, mostly computing. Cloud Computing aims to be global and to provide such services to the masses, ranging from the end user that hosts its personal documents on the Internet, to enterprises outsourcing their entire IT infrastructure to external data centers. Neverbefore an approach to make IT a real utility has been so global and complete: not only computing and storage resources are delivered on demand but the entire stack of computing can be leveraged on the Cloud. Figure 1 provides an overall view of the scenario envisioned by Cloud Computing. It encompasses so many aspects of computing that very hardly a single solution is able to provide everything that is needed. More likely, specific solutions can address the user needs and be successful in delivering IT resources as a real utility. Figure 1 also identifies the three pillars on top of which Cloud Computing solutions are delivered to end users. These are: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure/Hardware as a Service (IaaS/HaaS). These new concepts are also useful to classify the available options for leveraging on the Cloud the IT needs of everyone. Examples of Software as a Service are Salesforce.com 2 and Clarizen.com3 , which respectively provide on line CRM and project management services. PaaS solutions, such as Google AppEngine4 , Microsoft Azure5 , and Manjrasoft Aneka provide users with a development platform for creating distributed applications that can automatically scale on demand.

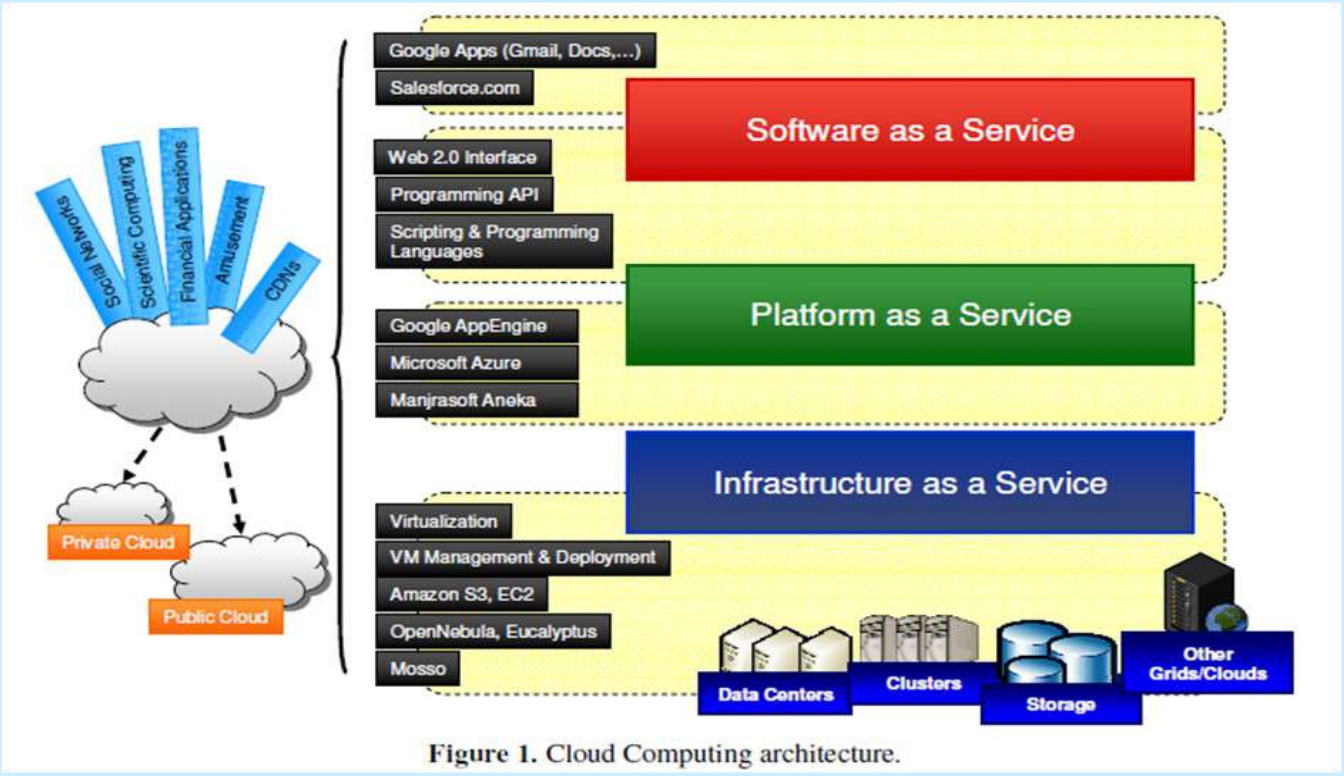

Figure 1. Cloud Computing architecture.

Submitted by
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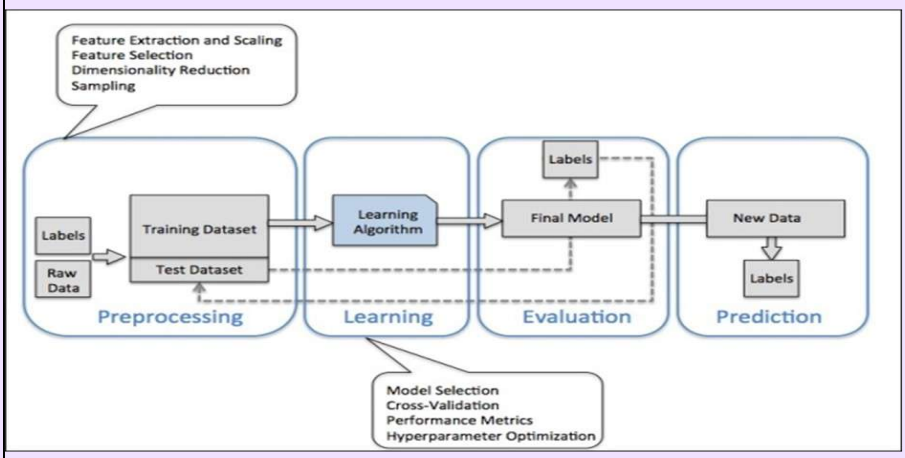
Machine learning

Machine Learning is a new trending field these days and is an application of artificial intelligence. Machine learning uses certain statistical algorithms to make computers work in a certain way without being explicitly programmed. The algorithms receive an input value and predict an output for this by the use of certain statistical methods. The main aim of machine learning is to create intelligent machines which can think and work like human beings. Machine Learning is a branch of **Artificial Intelligence** that gives systems the ability to learn automatically and improve themselves from the experience without being explicitly programmed or without the intervention of human. Its main aim is to make computers learn automatically from the experience.



Requirements of creating good machine learning systems

So what is required for creating such machine learning systems? Following are the things required in creating such machine learning systems:

Data – Input data is required for predicting the output.

Algorithms – Machine Learning is dependent on certain statistical algorithms to determine data patterns.

Automation – It is the ability to make systems operate automatically.

Iteration – The complete process is iterative i.e. repetition of process.

Scalability – The capacity of the machine can be increased or decreased in size and scale.

Modeling – The models are created according to the demand by the process of modeling.

Methods of Machine Learning

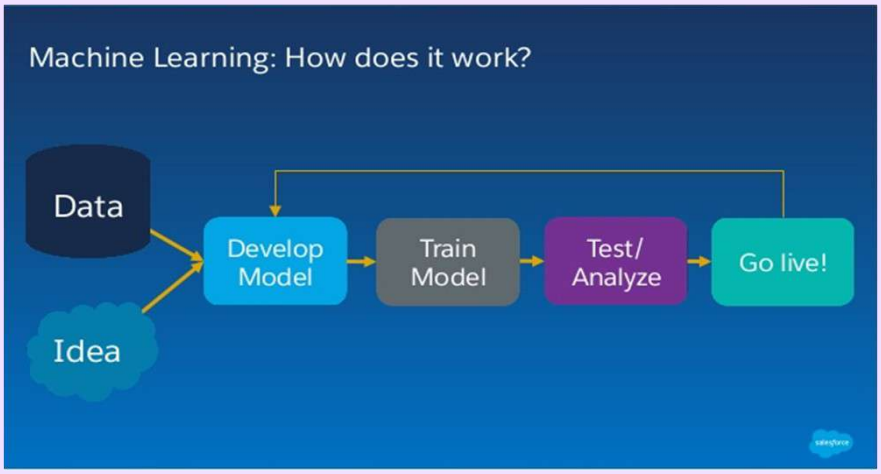
Machine Learning methods are classified into certain categories. These are:

Supervised Learning – In this method, input and output is provided to the computer along with feedback during the training. The accuracy of predictions by the computer during training is also analyzed. The main goal of this training is to make computers learn how to map input to the output.

Unsupervised Learning – In this case, no such training is provided leaving computers to find the output on its own. Unsupervised learning is mostly applied on transactional data. It is used in more complex tasks. It uses another approach of iteration known as deep learning to arrive at some conclusions.

Reinforcement Learning – This type of learning uses three components namely – agent, environment, action. An agent is the one that perceives its surroundings, an environment is the one with which an agent interacts and acts in that environment. The main goal in reinforcement learning is to find the best possible policy.

How does machine learning work? Machine learning makes use of processes similar to that of data mining. Machine learning algorithms are described in terms of target function(f) that maps input variable (x) to an output variable (y). This can be represented as: $y=f(x)$ There is also an error e which is the independent of the input variable x. Thus the more generalized form of the equation is: $y=f(x) + e$ In machine the mapping from x to y is done for predictions. This method is known as predictive modeling to make most accurate predictions. There are various assumptions for this function.



Submitted by
Y.Chandini

Deep Neural Network

Deep Learning: One of the machine learning technique that learns features directly from data.

Why deep learning: When the amounth of data is increased, machine learning techniques are insufficient in terms of performance and deep learning gives better performance like accuracy.

What is amounth of big: It is hard to answer but intuitively 1 million sample is enough to say "big amounth of data"

Usage fields of deep learning: Speech recognition, image classification, natural language procession (nlp) or recommendation systems

What is difference of deep learning from machine learning:

Machine learning covers deep learning.

Features are given machine learning manually.

On the other hand, deep learning learns features directly from data.

Deep Learning is a part of the broader field machine learning and is based on data representation learning. It is based on the interpretation of artificial neural network. Deep Learning algorithm uses many layers of processing. Each layer uses the output of previous layer as an input to itself. The algorithm used can be supervised algorithm or unsupervised algorithm. Deep Learning is mainly developed to handle complex mappings of input and output. It is another hot topic for M.Tech thesis and project along with machine learning.

Deep Neural Network

Deep Neural Network is a type of Artificial Neural Network with multiple layers which are hidden between the input layer and the output layer. This concept is known as feature hierarchy and it tends to increase the complexity and abstraction of data. This gives network the ability to handle very large, high-dimensional data sets having millions of parameters. The procedure of deep neural networks is as follows:

Consider some examples from a sample dataset.

Calculate error for this network.

Improve weight of the network to reduce the error.

Repeat the procedure.

Applications of Deep Learning

Here are some of the applications of Deep Learning:

1. Automatic Speech Recognition
2. Image Recognition
3. Natural Language Processing
4. Toxicology
5. Customer Relationship Management
6. Bioinformatics
7. Mobile Advertising

Advantages of Deep Learning

Deep Learning helps in solving certain complex problems with high speed which were earlier left unsolved. Deep Learning is very useful in real world applications. Following are some of the main advantages of deep learning:

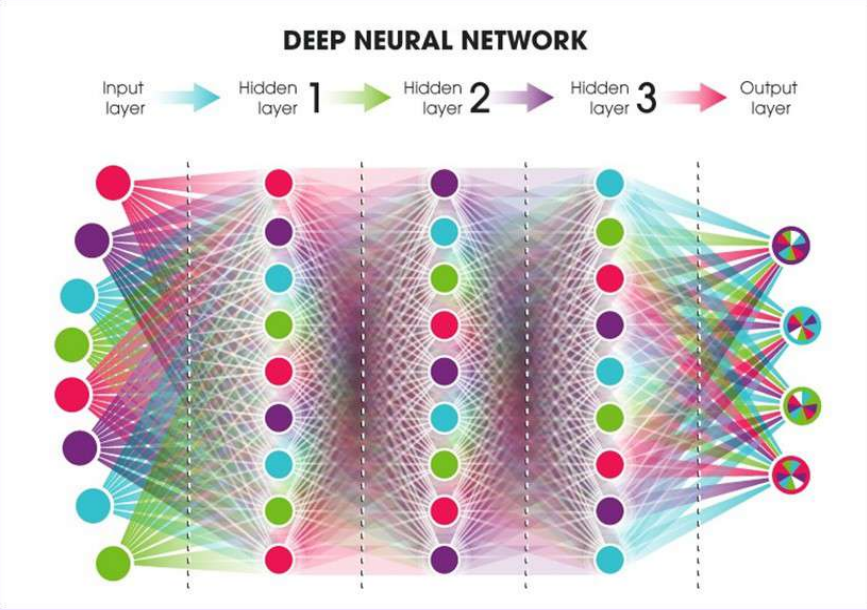
Eliminates unnecessary costs – Deep Learning helps to eliminate unnecessary costs by detecting defects and errors in the system.

Identifies defects which otherwise are difficult to detect – Deep Learning helps in identifying defects which left untraceable in the system.

Can inspect irregular shapes and patterns – Deep Learning can inspect irregular shapes and patterns which is difficult for machine learning to detect.

From this introduction, you must have known that why this topic is called as hot for your M.Tech thesis and projects. This was just the basic introduction to machine learning and deep learning. There is more to explore in these fields.

It is a part of the family of machine learning and deals with the functioning of the artificial neural network. Neural Networks are used to study the functioning of the human brain. It is one of the growing and exciting field. Deep learning has made it possible for the practical implementation of various machine learning applications.



Submitted by
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179E1A05H4

INTERNET OF THINGS (IOT)

It's believed by many that in the future, when human population has swelled to unprecedented levels, water will be so scarce that fighting over it will be the cause of most wars. Wouldn't it be better if we just wasted less? Two Californian firms that have come up with well – a smart home initiative that uses sensors to monitor water usage.IOT water Conversation system hopes to reduce waste.

The firms realised early on that – unlike with power use – very few people have any idea how much water they use. The core of the design is a network of sensors attached to each water outlet, like kitchen and bathroom sinks, toilet, washing machine and the biggest user of all – the shower. Each component is self-powered and doesn't require professional installation, and when each sensor is connected via WiFi, the information is then sent to the customer's smart phone so they have an accurate tally of all their water usage. Users start by entering household information into the app, like number of residents, location of property, and the app works out how much the household should be using per day. This is then illustrated using a digital tank of water, which depletes as water is used revealing a desert behind the water. The hope is that water usage will no longer feel so abstract

and users will start to conserve more. The app also creates daily, weekly, monthly and yearly usage charts. The system should help each household save around 12 percent of water, which might not change the world overnight but would be a step in the right direction. Users start by entering household information into the app, like number of residents, location of property, and the app works out how much the household should be using per day. This is then illustrated using a digital tank of water, which depletes as water is used revealing a desert behind the water. The hope is that water usage will no longer feel so abstract and users will start to conserve more. The app also creates daily, weekly, monthly and yearly usage charts. The system should help each household save around 12 percent of water, which might not change the world overnight but would be a step in the right direction.

Submitted by
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Brain controlled Robots

For robots to do what we want, they need to understand us. Too often, this means having to meet them halfway: teaching them the intricacies of human language, for example, or giving them explicit commands for very specific tasks. But what if we could develop robots that were a more natural extension of us and that could actually do whatever we are thinking? Using data from an electroencephalography (EEG) monitor that records brain activity, the system can detect if a person notices an error as a robot performs an object-sorting task. The team's novel machine-learning algorithms enable the system to classify brain waves in the space of 10 to 30 milliseconds. While the system currently handles relatively simple binary-choice activities, the paper's senior author says that the work suggests that we could one day control robots in much more intuitive ways."Imagine being able to instantaneously tell a robot to do a certain action, without needing to type a command, push a button or even say a wordPast work in EEG -controlled robotics has required training humans to "think" in a prescribed way that computers can recognize. For example, an operator might have to look at one of two bright light displays, each of which corresponds to a different task for the robot to execute. The downside to this method is that the training process and the act of modulating one's thoughts can be taxing, particularly for people who supervise tasks in navigation or construction that require intense concentration.

Submitted by
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Talking to an android

We've all tried talking with devices, and in some cases they talk back. But, it's a far cry from having a conversation with a real person. Now, a research team from Kyoto University, Osaka University, and the Advanced Telecommunications Research Institute, or ATR, has significantly upgraded the interaction system for conversational android ERICA, giving her even greater dialog skills. ERICA is an android created by Hiroshi Ishiguro of Osaka University and ATR, specifically designed for natural conversation through incorporation of human-like facial expressions and gestures. The research team demonstrated the updates during a symposium at the National Museum of Emerging Science in Tokyo."When we talk to one another, it's never a simple back and forward progression of information," says Tatsuya Kawahara of Kyoto University's Graduate School of Informatics, and an expert in speech and audio processing. "Listening is active. We express agreement by nodding or saying 'uh-huh' to maintain the momentum of conversation. This is called 'back channelling,' and is something we wanted to implement with ERICA."The team also focused on developing a system for "attentive listening." This is when a listener asks elaborating questions, or repeats the last word of the speaker's sentence, allowing for more engaging dialogue. Deploying a series of distance sensors, facial recognition cameras and microphone arrays, the team began collecting data on parameters necessary for a fluid dialog between ERICA and a human subject.

Submitted by
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159E1AO5f9

CloudDrops

Cloud Drops is a pervasive awareness platform that integrates virtual information from the Web more closely with the contextually rich physical spaces in which we live and work. Cloud Drops consists of many interactive stamp sized displays, each showing a tiny bit of digital information. The large number of displays and their small size allows the user to flexibly instrument, orchestrate and reconfigure her personal information environment. We show different form factors for stamp-sized displays, provide a device concept and a first implementation.

People intensively use physical space for accessing and remembering paper-bound information Transforming large parts of our formerly physical information environment into the digital realm has its obvious advantages that cannot be underestimated; but this also comes at a cost: we are giving up the notion of having an information item at a meaningful place and of using our entire surroundings for managing information.

Recent advances in pervasive display technologies enable high-resolution yet tiny, stamp-sized touch-displays that include processing power and networking capabilities. These self-contained devices are capable of displaying tiny information bits while being tangible and highly mobile, such that they can be situated at virtually any location. and highly mobile, such that they can be situated at virtually any location. This opens up a physical design flexibility for awareness systems, which largely overcomes the possibilities of using a handheld device (such as a smart phone) or a static installation (such as a large screen or a projector). The end user can flexibly arrange the set of stamp -sized displays, locate them at meaningful places and thereby easily instrument, orchestrate and reconfigure his or her personal information environment, to stay aware of digital information. However, making use of such tiny displays for awareness applications poses various challenges.This includes the questions of how content should be mapped to displays, how it should be visualized on the tiny displays, and how the user can interact with content. It is also unclear how several displays can be used in concert and how displays can be combined with physical arti facts to support situated awareness. We address these challenges and contribute Cloud Drops, an interactive awareness platform that consists of many stamp sized displays, which provide awareness of websites, contacts and places.

Submitted by

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159E1A05J7.