INGLÉS I

TEXT 1

Ten typical jobs graduates can do in IT

The IT industry is host to a whole raft of job titles. To help you, we've deciphered ten of the top IT job titles you might encounter when searching for graduate jobs.

To make sure you find the right graduate IT job with the right employer, always check job descriptions carefully when applying so that you understand the skills and responsibilities of the role.

The IT industry is well known for its wide range of job titles which can make it hard for graduates interested in this sector to pin down exactly what people do.

As a job-hunting graduate, chances are you've got a lot on your plate so we've decoded some of the more common job titles you may come across during your graduate job search. However, pay close attention to the job description of particular positions you apply for. Make note of the key skills and competences wanted, and ask questions at interviews to find out more specific information about what the role will involve day to day. This will ensure that you find the right graduate job in IT with the right employer.

Graduate job 1: Software engineer

Also known as: application programmer, software architect, system programmer/engineer.

This job in brief: The work of a software engineer typically includes designing and programming system-level software: operating systems, database systems, embedded systems and so on. They understand how both software and hardware function. The work can involve talking to clients and colleagues to assess and define what solution or system is needed, which means there's a lot of interaction as well as full-on technical work. Software engineers are often found in electronics and telecommunications companies. A computing, software engineering or related degree is needed.

Key skills include:

- analysis,
- logical thinking,
- teamwork
- attention to detail.

Graduate job 2: Systems analyst

Also known as: product specialist, systems engineer, solutions specialist, technical designer.

This job in brief: Systems analysts investigate and analyse business problems and then design information systems that provide a feasible solution, typically in response to requests from their business or a customer. They gather requirements and identify the costs and the time needed to implement the project. The job needs a mix of business and technical knowledge, and a good understanding of people. It's a role for analyst programmers to move into and typically requires a few years' experience from graduation.

Key skills include:

- ability to extract and analyse information,
- good communication
- persuasion
- sensitivity.

Graduate job 3: Business analyst

Also known as: business architect, enterprise-wide information specialist.

This job in brief: Business analysts are true midfielders, equally happy talking with technology people, business managers and end users. They identify opportunities for improvement to processes and business operations using information technology. The role is project based and begins with analysing a customer's needs, gathering and documenting requirements and creating a project plan to design the resulting technology solution. Business analysts need technology understanding, but don't necessarily need a technical degree.

Key skills include:

- communication
- presentation
- facilitation
- project management
- problem solving.

Graduate job 4: Technical support

Also known as: helpdesk support, IT support analyst, operations analyst.

This job in brief: These are the professional troubleshooters of the IT world. Many technical support specialists work for hardware manufacturers and suppliers solving the problems of business customers or consumers, but many work for end-user companies supporting, monitoring and maintaining workplace technology and responding to users' requests for help. Some lines of support require professionals with specific experience and knowledge, but tech support can also be a good way into the industry for graduates.

Key skills include:
- wide ranging tech knowledge
- problem solving

- communication/listening
- patience
- diplomacy.

Graduate job 5: Network engineer

Also known as: hardware engineer, network designer.

This job in brief: Network engineering is one of the more technically demanding IT jobs. Broadly speaking the role involves setting up, administering, maintaining and upgrading communication systems, local area networks and wide area networks for an organisation. Network engineers are also responsible for security, data storage and disaster recovery strategies. It is a highly technical role and you'll gather a hoard of specialist technical certifications as you progress. A telecoms or computer science-related degree is needed.

Key skills include:

- specialist network knowledge
- communication
- planning
- analysis
- problem solving.

Graduate job 6: Technical consultant

Also known as: IT consultant, application specialist, enterprise-wide information specialist.

This job in brief: The term 'consultant' can be a tagline for many IT jobs, but typically technical consultants provide technical expertise to, and develop and implement IT systems for, external clients. They can be involved at any or all stages of the project lifecycle: pitching for a contract; refining a specification with the client team; designing the system; managing part or all of the project; after sales support... or even developing the code. A technical degree is preferred, but not always necessary.

Key skills include:

- communication
- presentation
- technical and business understanding
- project management
- teamwork.

Graduate job 7: Technical sales

Also known as: sales manager, account manager, sales executive.

This job in brief: Technical sales may be one of the least hands-on technical roles, but it still requires an understanding of how IT is used in business. You may sell hardware, or extol the business benefits of whole systems or services. Day to day, the job could involve phone calls, meetings, conferences and drafting proposals. There will be targets to meet and commission when you reach them. A technology degree isn't necessarily essential, but you will need to have a thorough technical understanding of the

product you sell.

Key skills include:

- product knowledge
- persuasion
- interpersonal skills
- drive
- mobility
- business awareness.

Graduate job 8: Project manager

Also known as: product planner, project leader, master scheduler.

This job in brief: Project managers organise people, time and resources to make sure information technology projects meet stated requirements and are completed on time and on budget. They may manage a whole project from start to finish or manage part of a larger 'programme'. It isn't an entry-level role: project managers have to be pretty clued up. This requires experience and a good foundation of technology and soft skills, which are essential for working with tech development teams and higher level business managers.
Key skills include:

- organisation
- problem solving
- communication
- clear thinking
- ability to stay calm under pressure.

Graduate job 9: Web developer

Also known as: web designer, web producer, multimedia architect, internet engineer.

This job in brief: Web development is a broad term and covers everything to do with building websites and all the infrastructure that sits behind them. The job is still viewed as the trendy side of IT years after it first emerged. These days web development is pretty technical and involves some hardcore programming as well as the more creative side of designing the user interfaces of new websites. The role can be found in organisations large and small.

Key skills include:

- basic understanding of web technologies (client side, server side and databases)
- analytical thinking
- problem solving
- creativity.

Graduate job 10: Software tester

Also known as: test analyst, software quality assurance tester, QA analyst.

This job in brief: Bugs can have a massive impact on the productivity and reputation of an IT firm. Testers try to anticipate all the ways an application or system might be used and how it could fail. They don't necessarily program but they do need a good understanding of code. Testers prepare test scripts and macros, and analyse results, which are fed back to the project leader so that fixes can be made. Testers can also be involved at the early stages of projects in order to anticipate pitfalls before work begins. You can potentially get to a high level as a tester.

Key skills include:

- attention to detail
- creativity
- organization
- analytical and investigative thinking
- communication

Ten typical jobs graduates can do in IT. (2017). [online] TARGETjobs. Available at: https://targetjobs.co.uk/career-sectors/it-and-technology/advice/286189-ten-typical-jobs-graduates-can-do-in-it [Accessed 19 Feb. 2017].

❖ <u>Make a chart including the main characteristics of each job. Be ready to discuss and comment on them</u>

TEXT 2

Computers make the world smaller and smarter

The ability of tiny computing devices to control complex operations has transformed the way many tasks are performed, ranging from scientific research to producing consumer products. Tiny 'computers on a chip' are used in medical equipment, home appliances, cars and toys. Workers use handheld computing devices to collect data at a customer site, to generate forms, to control inventory, and to serve as desktop organisers.

Not only is computing equipment getting smaller, it is getting more sophisticated. Computers are part of many machines and devices that once required continual human supervision and control. Today, computers in security systems result in safer environments, computers in cars improve energy efficiency, and computers in phones provide features such as call forwarding, call monitoring, and call answering.

These smart machines are designed to take over some of the basic tasks previously performed by people; by so doing, they make life a little easier and a little more pleasant. Smart cards store vital information such as health records, drivers' licenses, bank balances, and so on. Smart phones, cars, and appliances with built in computers can be programmed to better meet individual needs. A smart house has a built-

in monitoring system that can turn lights on and off, open and close windows, operate the oven, and more.

With small computing devices available for performing smart tasks like cooking dinner, programming the DVD recorder, and controlling the flow of information in an organization, people are able to spend more time doing what they often do best - being creative. Computers can help people work more creatively.

Multimedia systems are known for their educational and entertainment value, which we call 'edutainment'. Multimedia combines text with sound, video, animation, and graphics, which greatly enhances the interaction between user and machine and can make information more interesting and appealing to people. Expert systems software enables computers to 'think' like experts. Medical diagnosis expert systems, for example, can help doctors pinpoint a patient's illness, suggest further tests, and prescribe appropriate drugs.

Connectivity enables computers and software that might otherwise be incompatible to communicate and to share resources. Now that computers are proliferating in many areas and networks are available for people to access data and communicate with others, personal computers are becoming interpersonal PCs. They have the potential to significantly improve the way we relate to each other. Many people today telecommute -that is, use their computers to stay in touch with the office while they are working at home. With the proper tools, hospital staff can get a diagnosis from a medical expert hundreds or thousands of miles away. Similarly, the disabled can communicate more effectively with others using computers.

Distance learning and videoconferencing are concepts made possible with the use of an electronic classroom or boardroom accessible to people in remote locations. Vast databases of information are currently available to users of the Internet, all of whom can send mail messages to each other. The information superhighway is designed to significantly expand this interactive connectivity so that people all over the world will have free access to all these resources.

People power is critical to ensuring that hardware, software, and connectivity are effectively integrated in a socially responsible way. People - computer users and computer professionals - are the ones who will decide which hardware, software, and networks endure and how great an impact they will have on our lives. Ultimately people power must be exercised to ensure that computers are used not only efficiently but in a socially responsible way.

Glendinning, Eric H.; McEwan, John (2006). Oxford English for Information Technology , Second Edition, Oxford University Press. Oxford: Oxford University Press.

❖ Find the answers to these questions in the text

1 Name some types of devices that use "computers on a chip"

2 What uses of handheld computers are mentioned in the text

3 What are the benefits of using computers with the following items? A) Security systems B) Cars C) Phones

4 What smart devices are mentioned in the text?

5 What smart devices are mentioned in the text?

6 What are the advantages of multimedia=

7 What can medical expert systems do?

8 How can computers help the disabled?

9 What types of computing systems are made available to people in remote locations using electronic classrooms or boardrooms?

10 What aspects of computing can people power determine?

❖ <u>Find the comparative and superlative adjectives used in the text and make sentences</u>

TEXT 3

Six Important Stages in the Data Processing Cycle

Much of data management is essentially about extracting useful information from data. To do this, data must go through a data mining process to be able to get meaning out of it. There is a wide range of approaches, tools and techniques to do this, and it is important to start with the most basic understanding of processing data.

What is Data Processing?

Data processing is simply the conversion of raw data to meaningful information through a process. Data is manipulated to produce results that lead to a resolution of a problem or improvement of an existing situation. Similar to a production process, it follows a cycle where inputs (raw data) are fed to a process (computer systems, software, etc.) to produce output (information and insights).

Generally, organizations employ computer systems to carry out a series of operations on the data in order to present, interpret, or obtain information. The process includes activities like data entry, summary, calculation, storage, etc. Useful and informative output is presented in various appropriate forms such as diagrams, reports, graphics, etc.

Stages of the Data Processing Cycle

1) Collection is the first stage of the cycle, and is very crucial, since the quality of data collected will impact heavily on the output. The collection process needs to ensure that the data gathered are both defined and accurate, so that subsequent decisions based on the findings are valid. This stage provides both the baseline from which to measure, and a target on what to improve.

Some types of data collection include census (data collection about everything in a group or statistical

population), sample survey (collection method that includes only part of the total population), and administrative by-product (data collection is a byproduct of an organization's day-to-day operations).

2) Preparation is the manipulation of data into a form suitable for further analysis and processing. Raw data cannot be processed and must be checked for accuracy. Preparation is about constructing a dataset from one or more data sources to be used for further exploration and processing. Analyzing data that has not been carefully screened for problems can produce highly misleading results that are heavily dependent on the quality of data prepared.

3) Input is the task where verified data is coded or converted into machine readable form so that it can be processed through a computer. Data entry is done through the use of a keyboard, digitizer, scanner, or data entry from an existing source. This time-consuming process requires speed and accuracy. Most data need to follow a formal and strict syntax since a great deal of processing power is required to breakdown the complex data at this stage. Due to the costs, many businesses are resorting to outsource this stage.

4) Processing is when the data is subjected to various means and methods of manipulation, the point where a computer program is being executed, and it contains the program code and its current activity. The process may be made up of multiple threads of execution that simultaneously execute instructions, depending on the operating system. While a computer program is a passive collection of instructions, a process is the actual execution of those instructions. Many software programs are available for processing large volumes of data within very short periods.

5) Output and interpretation is the stage where processed information is now transmitted to the user. Output is presented to users in various report formats like printed report, audio, video, or on monitor. Output need to be interpreted so that it can provide meaningful information that will guide future decisions of the company.

6) Storage is the last stage in the data processing cycle, where data, instruction and information are held for future use. The importance of this cycle is that it allows quick access and retrieval of the processed information, allowing it to be passed on to the next stage directly, when needed. Every computer uses storage to hold system and application software.

The Data Processing Cycle is a series of steps carried out to extract information from raw data. Although each step must be taken in order, the order is cyclic. The output and storage stage can lead to the repeat of the data collection stage, resulting in another cycle of data processing. The cycle provides a view on how the data travels and transforms from collection to interpretation, and ultimately, used in effective business decisions.

About The Author: Phillip Harris is data management enthusiast and he has written numerous blogs and articles on effective document management and data processing.

Rudo, P. (2017). *6 Important Stages in the Data Processing Cycle*. [online] Enterprise Features. Available at: http://www.enterprisefeatures.com/6-important-stages-in-the-data-processing-cycle/ [Accessed 19 Feb. 2017].

TEXT 4

Can You Teach Creativity to a Computer?

From Picasso's "The Young Ladies of Avignon" to Munch's "The Scream," what was it about some paintings that arrested people's attention upon viewing them, that cemented them in the canon of art history as iconic works?

In many cases, it's because the artist incorporated a technique, form or style that had never been used before. They exhibited a creative and innovative flair that would go on to be mimicked by artists for years to come.

Throughout human history, experts have often highlighted these artistic innovations, using them to judge a painting's relative worth. But can a painting's level of creativity be quantified by Artificial Intelligence (AI)?

At Rutgers' Art and Artificial Intelligence Laboratory, my colleagues and I proposed a novel algorithm that assessed the creativity of any given painting, while taking into account the painting's context within the scope of art history.

In the end, we found that, when introduced with a large collection of works, the algorithm can successfully highlight paintings that art historians consider masterpieces of the medium.

The results show that humans are no longer the only judges of creativity. Computers can perform the same task – and may even be more objective.

Defining Creativity

Of course, the algorithm depended on addressing a central question: how do you define – and measure – creativity?

There is a historically long and ongoing debate about how to define creativity. We can describe a person (a poet or a CEO), a product (a sculpture or a novel) or an idea as being "creative."

In our work, we focused on the creativity of products. In doing so, we used the most common definition for creativity, which emphasizes the originality of the product, along with its lasting influence.

These criteria resonate with Kant's definition of artistic genius, which emphasizes two conditions: being original and "exemplary."

They're also consistent with contemporary definitions, such as Margaret A. Boden's widely accepted notion of Historical Creativity (H-Creativity) and Personal/Psychological Creativity (P-Creativity). The former assesses the novelty and utility of the work with respect to scope of human history, while the latter evaluates the novelty of ideas with respect to its creator.
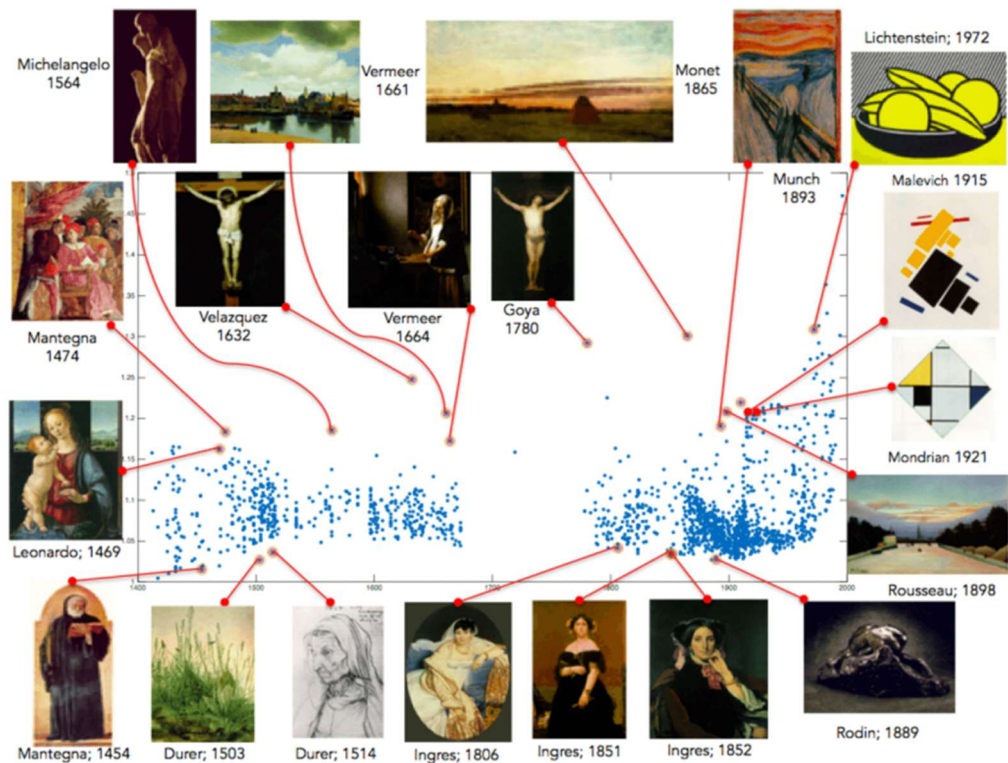
A graph highlighting certain paintings deemed most creative by the algorithm. Credit: Ahmed Elgammal

Building the Algorithm

Using computer vision, we built a network of paintings from the 15th to 20th centuries. Using this web (or network) of paintings, we were able to make inferences about the originality and influence of each individual work.

Through a series of mathematical transformations, we showed that the problem of quantifying creativity could be reduced to a variant of network centrality problems – a class of algorithms that are widely used in the analysis of social interaction, epidemic analysis and web searches. For example, when you search the web using Google, Google uses an algorithm of this type to navigate the vast network of pages to identify the individual pages that are most relevant to your search.

Any algorithm's output depends on its input and parameter settings. In our case, the input was what the algorithm saw in the paintings: color, texture, use of perspective and subject matter. Our parameter setting was the definition of creativity: originality and lasting influence.

The algorithm made its conclusions without any encoded knowledge about art or art history, and made its assessments of paintings strictly by using visual analysis and considering their dates.

Innovation Identified

The Scream. Credit: wikimedia Commons

When we ran an analysis of 1,700 paintings, there were several notable findings. For example, the algorithm scored the creativity of Edvard Munch's "The Scream" (1893) much higher than its late 19th-century counterparts. This, of course, makes sense: it's been deemed one of the most outstanding Expressionist paintings, and is one of the most-reproduced paintings of the 20th century.

The algorithm also gave Picasso's "Ladies of Avignon" (1907) the highest creativity score of all the paintings it analyzed between 1904 and 1911. This is in line with the thinking of art historians, who have indicated that the painting's flat picture plane and its application of Primitivism made it a highly innovative work of art – a direct precursor to Picasso's Cubist style.

The algorithm pointed to several of Kazimir Malevich's first Suprematism paintings that appeared in 1915 (such as "Red Square") as highly creative as well. Its style was an outlier in a period then-dominated by Cubism. For the period between 1916 and 1945, the majority of the top-scoring paintings were by Piet Mondrian and Georgia O'Keeffe.

Of course, the algorithm didn't always coincide with the general consensus among art historians.

For example, the algorithm gave a much higher score to Domenico Ghirlandaio's "Last Supper" (1476) than to Leonardo da Vinci's eponymous masterpiece, which appeared about 20 years later. The algorithm favored da Vinci's "St. John the Baptist" (1515) over his other religious paintings that it analyzed. Interestingly, da Vinci's "Mona Lisa" didn't score highly by the algorithm.

Picasso's "Ladies of Avignon." Credit: Wally Gobetz via Flickr

Test of Time

Given the aforementioned departures from the consensus of art historians (notably, the algorithm's evaluation of da Vinci's works), how do we know that the algorithm generally worked?

As a test, we conducted what we called "time machine experiments," in which we changed the date of an artwork to some point in the past or in the future, and recomputed their creativity scores.

We found that paintings from the Impressionist, Post-Impressionist, Expressionist and Cubism movements saw significant gains in their creativity scores when moved back to around AD 1600. In contrast, Neoclassical paintings did not gain much when moved back to 1600, which is understandable, because Neoclassicism is considered a revival of the Renaissance.

Meanwhile, paintings from Renaissance and Baroque styles experienced losses in their creativity scores when moved forward to AD 1900.

We don't want our research to be perceived as a potential replacement for art historians, nor do we hold the opinion that computers are a better determinant of a work's value than a set of human eyes.

Rather, we're motivated by Artificial Intelligence (AI). The ultimate goal of research in AI is to make machines that have perceptual, cognitive and intellectual abilities similar to those of humans.

We believe that judging creativity is a challenging task that combines these three abilities, and our results are an important breakthrough: proof that a machine can perceive, visually analyze and consider paintings much like humans can.

 This article was originally published on The Conversation.

Can You Teach Creativity to a Computer?. (2017). [online] The Crux. Available at: http://blogs.discovermagazine.com/crux/2015/07/30/creativity-computer/#.WKkIBFWLTIV [Accessed 19 Feb. 2017].
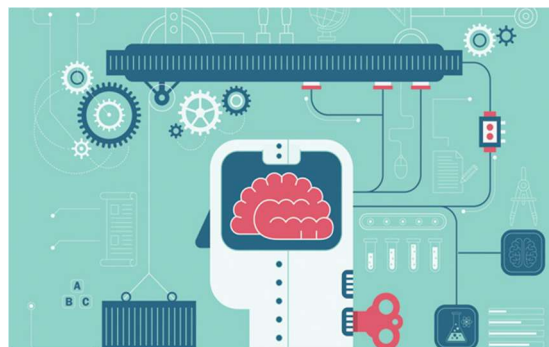
INGLÉS II

New Transparent Metal Could Make Smartphones Cheaper. By Nathaniel Scharping

As smartphones get smaller, cheaper and faster, one essential component remains costly: the screen.

Almost 90 percent of smartphone touchscreens utilize a rare and expensive compound called indium tin oxide, which has kept the price of such screens high. Now, researchers at Pennsylvania State University have developed a new material, called strontium vanadate, that shares the transparent and conductive properties of indium tin oxide at a fraction of the cost.

The researchers detailed their findings in an article published earlier this month in the journal *Nature Materials*. They crafted a transparent metal composed of strontium and vanadium with an unusual configuration of electrons that allows light to pass through while retaining the electrically conductive properties of metals.

A New Way To Look At Screens

The researchers see smartphone screens, which need to be electrically conductive and transparent, as the most immediate application of their discovery. Indium tin oxide possesses those integral properties but its cost comes in around $750 per kilogram. As a result, when you shell out several hundred dollars for a new smartphone, roughly 40 percent of the cost is tied up in the screen. Both strontium and vanadium sell for just $25 or less per kilogram, according to the researchers. In addition, researchers produced the compound in a film only 10 nanometers thick, making it perfect for touchscreens.

Typically, metals share their electrons freely, which allows them to move throughout the structure uninhibited, much like gaseous molecules. This gives metals their distinctive properties, such as malleability and conductivity. The electrons in strontium vanadate, a so-called correlated metal, behave more like a liquid than a gas, moving slower and interacting with each other in curious ways.

Electrons in strontium vanadate molecules exhibit stronger forms of electrostatic interaction — the forces acting between positively and negatively charged articles. These forces slow down the electrons and cause them to interact in complex ways, according to the researchers. The end result is a metal that retains its conductivity, but is less reflective when light is shined on it, making it transparent. This combination of properties makes it perfect for use in smartphone screens. The researchers also see applications for their compound in a new form of solar cells, as well as smart windows and television screens.

Transparent metal sounds like an oxymoron, but you could one day be reading this story through it.

New Transparent Metal Could Make Smartphones Cheaper - D-brief. (2017). [online] D-brief. Available at: http://blogs.discovermagazine.com/d-brief/2015/12/24/new-transparent-metal-could-make-smartphones-cheaper/#.WAuYxo8rLIU [Accessed 19 Feb. 2017].

Researchers want to use hardware to fight computer viruses

Dmitry Ponomarev, professor of computer science at Binghamton University, State University of New York. *Credit: Jonathan Cohen/Binghamton University*

Fighting computer viruses isn't just for software anymore. Binghamton University researchers will use a grant from the National Science Foundation to study how hardware can help protect computers too.

"The impact will potentially be felt in all computing domains, from mobile to clouds," said Dmitry Ponomarev, professor of computer science at Binghamton University, State University of New York. Ponomarev is the principal investigator of a project titled "Practical Hardware-Assisted Always-On Malware Detection."

More than 317 million pieces of new malware -- computer viruses, spyware, and other malicious programs -- were created in 2014 alone, according to work done by Internet security teams at Symantec and Verizon. Malware is growing in complexity, with crimes such as digital extortion (a hacker steals files or locks a computer and demands a ransom for decryption keys) becoming large avenues of cyber attack.

"This project holds the promise of significantly impacting an area of critical national need to help secure systems against the expanding threats of malware," said Ponomarev. "[It is] a new approach to improve the effectiveness of malware detection and to allow systems to be protected continuously without requiring the large resource investment needed by software monitors."

Countering threats has traditionally been left solely to software programs, but Binghamton researchers want to modify a computer's central processing unit (CPU) chip -- essentially, the machine's brain -- by adding logic to check for anomalies while running a program like Microsoft Word. If an anomaly is spotted, the hardware will alert more robust software programs to check out the problem. The hardware won't be right about suspicious activity 100 percent of the time, but since the hardware is acting as a lookout at a post that has never been monitored before, it will improve the overall effectiveness and efficiency of malware detection.

"The modified microprocessor will have the ability to detect malware as programs execute by analyzing the execution statistics over a window of execution," said Ponomarev. "Since the hardware detector is not 100-percent accurate, the alarm will trigger the execution of a heavy-weight software detector to carefully inspect suspicious programs. The software detector will make the final decision. The hardware guides the operation of the software; without the hardware the software will be too slow to work on all programs all the time."

The modified CPU will use low complexity machine learning -- the ability to learn without being explicitly programmed -- to classify malware from normal programs, which is Yu's primary area of

expertise.

"The detector is, essentially, like a canary in a coal mine to warn software programs when there is a problem," said Ponomarev. "The hardware detector is fast, but is less flexible and comprehensive. The hardware detector's role is to find suspicious behavior and better direct the efforts of the software."

Much of the work -- including exploration of the trade-offs of design complexity, detection accuracy, performance and power consumption -- will be done in collaboration with former Binghamton professor Nael Abu-Ghazaleh, who moved on to the University of California-Riverside in 2014.

Lei Yu, associate professor of computer science at Binghamton University, is a co-principal investigator of the grant.

Grant funding will support graduate students that will work on the project both in Binghamton and California, conference travel and the investigation itself. The three-year grant is for $275,000.

New Transparent Metal Could Make Smartphones Cheaper - D-brief. (2017). [online] D-brief. Available at: http://blogs.discovermagazine.com/d-brief/2015/12/24/new-transparent-metal-could-make-smartphones-cheaper/#.WAuYxo8rLIU [Accessed 19 Feb. 2017].

TEXT 3

Encryption method takes authentication to a new level, improves privacy protection

VTT Technical Research Centre of Finland has developed new kinds of encryption methods for improving the privacy protection of consumers to enable safer, more reliable and easier-to-use user authentication than current systems allow.

The method combines safety, usability and privacy protection, when, until now, implementing all three at the same time has been a challenge.

"Our method protects, for example, the user's biometric data or typing style," says Senior Scientist Kimmo Halunen.

In biometric authentication, the risk is that a person's permanent biometric identifiers, which cannot be changed, leak out of the database. VTT's method stores data in the database in an encrypted form and all comparisons between measuring results and the database are conducted using encrypted messages so there is no need to open any biometric data at this stage of the process.

VTT integrates new kind of encryption methods, such as homomorphic cryptography and secure exchange of cryptographic keys, to known measuring methods of typing styles.

The traditional authentication based on passwords has proved to be weak, since users mostly select weak passwords, and hackers often succeed in stealing quite large password databases. Recently, companies such as Dropbox and Yahoo have fallen prey to such data breaches.

In addition, new types of user environments, such as smart devices, cars, and home appliances, create challenges for user authentication with the help of passwords.

VTT is now looking for a partner for further processing and commercialisation of this method, which could be available to consumers within a year or two.

Encryption method takes authentication to a new level, improves privacy protection. (2017). [online] ScienceDaily. Available at: https://www.sciencedaily.com/releases/2016/09/160929082204.htm [Accessed 19 Feb. 2017].

TEXT 4

 No GPS, no problem: Next-generation navigation

Simulation results for a unmanned drone flying over downtown Los Angeles showing the true trajectory (red line), from GPS only (yellow line), and GPS aided with cellular signals (blue line).

Credit: ASPIN Laboratory at UC Riverside

A team of researchers at the University of California, Riverside has developed a highly reliable and accurate navigation system that exploits existing environmental signals such as cellular and Wi-Fi, rather than the Global Positioning System (GPS). The technology can be used as a standalone alternative to GPS, or complement current GPS-based systems to enable highly reliable, consistent, and tamper-proof navigation. The technology could be used to develop navigation systems that meet the stringent requirements of fully autonomous vehicles, such as driverless cars and unmanned drones.

Led by Zak Kassas, assistant professor of electrical and computer engineering in UCR's Bourns College of Engineering, the team presented its research at the 2016 Institute of Navigation Global Navigation Satellite System Conference (ION GNSS+), in Portland, Ore., in September. The two studies, "Signals of Opportunity Aided Inertial Navigation" and "Performance Characterization of Positioning in LTE Systems," both won best paper presentation awards.

Most navigation systems in cars and portable electronics use the space-based Global Navigation Satellite System (GNSS), which includes the U.S. system GPS, Russian system GLONASS, European system Galileo, and Chinese system Beidou. For precision technologies, such as aerospace and missiles, navigation systems typically combine GPS with a high-quality on-board Inertial Navigation System (INS), which delivers a high level of short-term accuracy but eventually drifts when it loses

touch with external signals.

Despite advances in this technology, current GPS/INS systems will not meet the demands of future autonomous vehicles for several reasons: First, GPS signals alone are extremely weak and unusable in certain environments like deep canyons; second, GPS signals are susceptible to intentional and unintentional jamming and interference; and third, civilian GPS signals are unencrypted, unauthenticated, and specified in publicly available documents, making them spoofable (i.e., hackable).

Current trends in autonomous vehicle navigation systems therefore rely not only on GPS/INS, but a suite of other sensor-based technologies such as cameras, lasers, and sonar.

"By adding more and more sensors, researchers are throwing 'everything but the kitchen sink' to prepare autonomous vehicle navigation systems for the inevitable scenario that GPS signals become unavailable. We took a different approach, which is to exploit signals that are already out there in the environment," Kassas said.

Instead of adding more internal sensors, Kassas and his team in UCR's Autonomous Systems Perception, Intelligence, and Navigation (ASPIN) Laboratory have been developing autonomous vehicles that could tap into the hundreds of signals around us at any point in time, like cellular, radio, television, Wi-Fi, and other satellite signals.

In the research presented at the ION GNSS+ Conference, Kassas' team showcased ongoing research that exploits these existing communications signals, called "signals of opportunity (SOP)" for navigation. The system can be used by itself, or, more likely, to supplement INS data in the event that GPS fails. The team's end-to-end research approach includes theoretical analysis of SOPs in the environment, building specialized software-defined radios (SDRs) that will extract relevant timing and positioning information from SOPs, developing practical navigation algorithms, and finally testing the system on ground vehicles and unmanned drones.

"Autonomous vehicles will inevitably result in a socio-cultural revolution. My team is addressing the challenges associated with realizing practical, cost-effective, and trustworthy autonomous vehicles. Our overarching goal is to get these vehicles to operate with no human-in-the loop for prolonged periods of time, performing missions such as search, rescue, surveillance, mapping, farming, firefighting, package delivery, and transportation," Kassas said.

University of California - Riverside. (2016, October 13). No GPS, no problem: Next-generation navigation. *ScienceDaily*. Retrieved February 19, 2017 from www.sciencedaily.com/releases/2016/10/161013150039.htm

INGLÉS III

New special-purpose computer may someday save us billions

Post-doctoral scholar Peter McMahon, left, and visiting researcher Alireza Marandi examine a prototype of a new type of light-based computer.

Credit: L.A. Cicero

The processing power of standard computers is likely to reach its maximum in the next 10 to 25 years. Even at this maximum power, traditional computers won't be able to handle a particular class of problem that involves combining variables to come up with many possible answers, and looking for the best solution.

Now, an entirely new type of computer that blends optical and electrical processing, reported Oct. 20 in the journal *Science*, could get around this impending processing constraint and solve those problems. If it can be scaled up, this non-traditional computer could save costs by finding more optimal solutions to problems that have an incredibly high number of possible solutions.

"This is a machine that's in a sense the first in its class, and the idea is that it opens up a sub-field of research in the area of non-traditional computing machines," said Peter McMahon, postdoctoral scholar in applied physics and co-author of the paper. "There are many, many questions that this development raises and we expect that over the next few years, several groups are going to be investigating this class of machine and looking into how this approach will pan out."

The traveling salesman problem

There is a special type of problem -- called a combinatorial optimization problem -- that traditional computers find difficult to solve, even approximately. An example is what's known as the "traveling salesman" problem, wherein a salesman has to visit a specific set of cities, each only once, and return to the first city, and the salesman wants to take the most efficient route possible. This problem may seem simple but the number of possible routes increases extremely rapidly as cities are added, and this underlies why the problem is difficult to solve.

"Those problems are challenging for standard computers, even supercomputers, because as the size grows, at some point, it takes the age of the universe to search through all the possible solutions," said Alireza Marandi, a former postdoctoral scholar at Stanford and co-author of the study. "This is true even with a supercomputer because the growth in possibilities is so fast."

It may be tempting to simply give up on the traveling salesman, but solving such hard optimization problems could have enormous impact in a wide range of areas. Examples include finding the optimal path for delivery trucks, minimizing interference in wireless networks, and determining how proteins fold. Even small improvements in some of these areas could result in massive monetary savings, which is why some scientists have spent their careers creating algorithms that produce very good approximate solutions to this type of problem.

An Ising machine

The Stanford team has built what's called an Ising machine, named for a mathematical model of magnetism. The machine acts like a reprogrammable network of artificial magnets where each magnet only points up or down and, like a real magnetic system, it is expected to tend toward operating at low energy.

The theory is that, if the connections among a network of magnets can be programmed to represent the problem at hand, once they settle on the optimal, low-energy directions they should face, the solution can be derived from their final state. In the case of the traveling salesman, each artificial magnet in the Ising machine represents the position of a city in a particular path.

Rather than using magnets on a grid, the Stanford team used a special kind of laser system, known as a degenerate optical parametric oscillator, that, when turned on, will represent an upward- or downward-pointing "spin." Pulses of the laser represent a city's position in a path the salesman could take. In an earlier version of this machine (published two years ago), the team members extracted a small portion of each pulse, delayed it and added a controlled amount of that portion to the subsequent pulses. In traveling salesman terms, this is how they program the machine with the connections and distances between the cities. The pulse-to-pulse couplings constitute the programming of the problem. Then the machine is turned on to try to find a solution, which can be obtained by measuring the final output phases of the pulses.

The problem in this previous approach was connecting large numbers of pulses in arbitrarily complex ways. It was doable but required an added controllable optical delay for each pulse, which was costly and difficult to implement.

Scaling up

The latest Stanford Ising machine shows that a drastically more affordable and practical version could be made by replacing the controllable optical delays with a digital electronic circuit. The circuit emulates the optical connections among the pulses in order to program the problem and the laser system still solves it.

Nearly all of the materials used to make this machine are off-the-shelf elements that are already used for telecommunications. That, in combination with the simplicity of the programming, makes it easy to scale up. Stanford's machine is currently able to solve 100-variable problems with any arbitrary set of connections between variables, and it has been tested on thousands of scenarios.

A group at NTT in Japan that consulted with Stanford's team has also created an independent version of the machine; its study has been published alongside Stanford's by Science. For now, the Ising machine still falls short of beating the processing power of traditional digital computers when it comes to combinatorial optimization. But it is gaining ground fast and the researchers are looking forward to seeing what other work will be possible based on this breakthrough.

"I think it's an exciting avenue of exploration for finding alternative computers. It can get us closer to more efficient ways of tackling some of the most daunting computational problems we have," said Marandi. "So far, we've made a laser-based computer that can target some of these problems, and we

have already shown some promising results."

Stanford University. (2016, October 21). New special-purpose computer may someday save us billions. *ScienceDaily*. Retrieved February 19, 2017 from www.sciencedaily.com/releases/2016/10/161021121413.htm

TEXT 2

Internet and mobile devices prompt positive lifestyle changes

People are more likely to adopt heart healthy behaviors when guided and encouraged via the Internet, their cellphones or other devices, according to 23 years of research reviewed in *Journal of the American Heart Association*, the Open Access Journal of the American Heart Association/American Stroke Association.

"Both Internet-based and mobile-based programs can help people become more physically active, eat better and achieve modest weight loss over 3-12 months," said Ashkan Afshin, M.D., M.P.H., Sc.D., lead study author and acting assistant professor of global health at the Institute for Health Metrics and Evaluation at the University of Washington in Seattle.

Researchers reviewed 224 studies conducted on generally healthy adults, published between 1990 and 2013. The studies evaluated the effect of using Internet, mobile phones, personal sensors or stand-alone computer software tools to inspire behavioral changes, such as improving diet, increasing physical activity, losing weight and stopping/reducing tobacco or alcohol use.

Among the findings:

- Participants in Internet interventions improved their diets, became more active, lost body weight/fat, reduced tobacco use and cut excessive alcohol use.
- Participants in mobile device interventions (using smartphone apps or receiving text or voicemail messages) increased their physical activity and lost body weight/fat.

"Programs that have components such as goal-setting and self-monitoring and use multiple modes of communication with tailored messages tended to be more effective. We also found these programs were more effective if they included some interactions with healthcare providers.

Clinicians, in particular in primary care settings, can use such programs to help people improve their lifestyle behaviors and reduce the risk of chronic disease, such as cardiovascular disease and diabetes," Afshin said.

The available research is limited because most studies lasted less than six months, providing little information on how effective and sustainable the behavioral changes will be over the long term. In addition, most studies were conducted in high-income countries with volunteers who were generally more highly educated and motivated than the general public.

"Our study highlights several important gaps in current evidence on Internet-and mobile-based interventions. We need to evaluate their long-term value, effectiveness in different populations (such as the elderly and people from developing countries) and how different strategies may increase adherence to the programs," Afshin said.

American Heart Association. (2016, August 31). Internet and mobile devices prompt positive lifestyle changes. *ScienceDaily*. Retrieved February 19, 2017 from www.sciencedaily.com/releases/2016/08/160831223729.htm

TEXT 3

Operating systems, application software and programming languages

Operating system functions
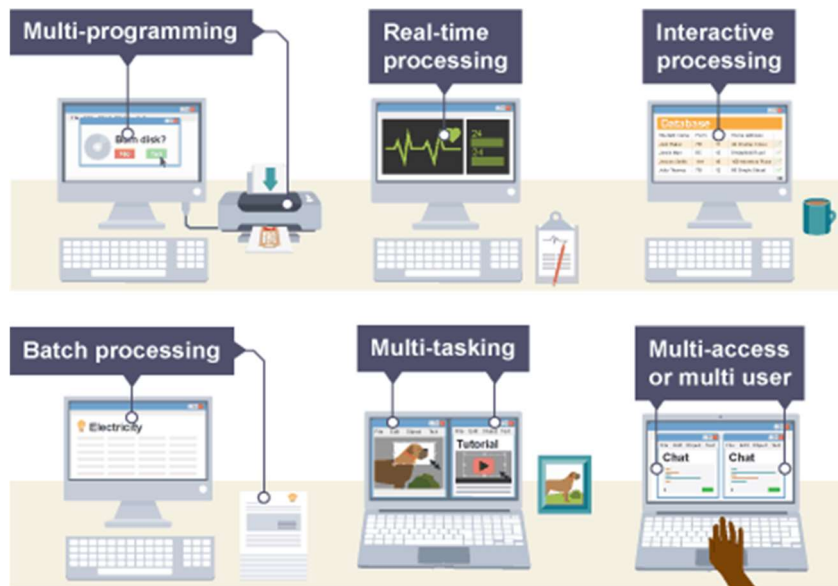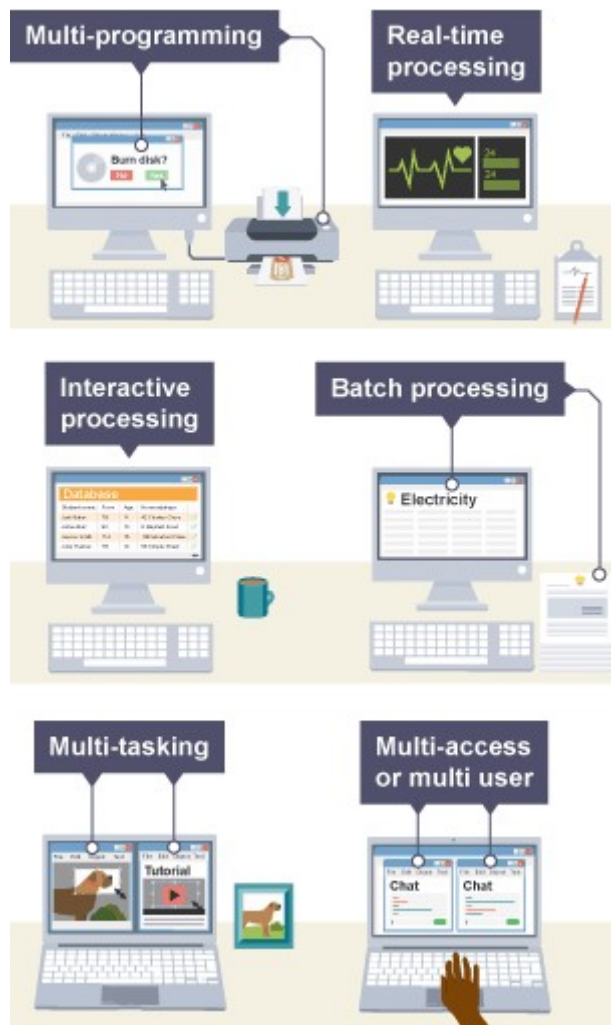

In any computer, the operating system:
- Controls the **backing store** and **peripherals** such as scanners and printers.
- Deals with the transfer of programs in and out of memory.
- Organises the use of **memory** between programs.
- Organises **processing time** between programs and users.
- Maintains security and access rights of users.
- Deals with errors and user instructions.
- Allows the user to save files to a backing store.
- Provides the interface between the user and the computer - for example, **Windows Vista** and Apple **OSX**. For more information, see the **User Interfaces** study guide.
- Issues simple error messages.

In a larger computer such as a **mainframe** the operating system works on the same principles.

Modes of operation

Computers can operate in many different ways requiring different and complex **operating systems**.

Real-time processing

When the computer has to react within a guaranteed time to an **input**, a real-time operating system (RTOS) is used. For example, the engine management system within a car uses a real-time operating system in order to react to **feedback** from **sensors** placed throughout the engine.

A real-time operating system does not necessarily have to be fast. It simply has to be quick enough to respond to inputs in a predictable way. Embedded computers often contain an RTOS as many are used to control something.

Computers operating in real time are often dedicated to the control of systems such as industrial processes, planes and space flights.

Multi-programming

Multi-programming is a method of operating such that several **programs** appear to be running at once.

The operating system switches jobs in and out of **processor** time according to priority. For example, while one job is being allocated printer time, another will be being processed in **memory**. The processor is so fast that it seems that many jobs are being processed at the same time.

Batch processing

A batch processing system is where programs or data are collected together in a batch and processed in one go. Typically the processing of payrolls, electricity bills, invoices and daily transactions are dealt with this way.

This method of operation lends itself to jobs with similar inputs, processing and **outputs** where **no human intervention** is needed. Jobs are stored in a queue until the computer is ready to deal with them. Often batch processed jobs are done overnight.

Interactive processing

An interactive processing system is where the tasks on the computer system require a continual exchange of information between the user and the computer system. It can be seen as the opposite of batch processing.

Multi-tasking

This isn't just about running more than one **application** at the same time. Multi-tasking allows multiple tasks to run concurrently, taking turns using the resources of the computer.

This can mean running a couple of applications, sending a document to the printer and **downloading** a **web page**.

Multi-access or multi-user

Modern personal computers can allow **multi-user access**. A multi-access (or multi-user) system is one where several users can use the same system together via a **LAN**.

The **CPU** deals with users in turn; clearly the more users, the slower the response time. Generally, however, the processor is so fast that the response time at the most is a fraction of a second and the user feels they are being dealt with immediately.

TEXT 4

Prove you've got the soft skills IT professionals need

All IT employers have a checklist of core competencies against which they assess candidates, and it's not just technical skills that must be up to the mark.

Some IT companies look for predictable skills such as knowledge of C++, JavaScript or .Net, but many others have more surprising requirements. Technology recruits have been known to look for creativity, the ability to be self-critical and the ability to help colleagues get their jobs done and enjoy their day.

Developing soft skills for IT graduate jobs

Many IT graduate schemes call for soft skills and commercial awareness just as much – or more – than technical understanding, particularly for business-focused roles such as consulting. Technical graduates can find themselves up against arts or social science graduates for such roles and can sometimes miss out due to less well developed soft skills. If you need to build your confidence in giving presentations or teamwork, for example, consider taking an active role in a club or society where you can develop these.

Below is a round-up of key skills that are required for almost all IT graduate schemes.

Communication

IT systems are only relevant in a business context so IT professionals need the ability to communicate well with people at all levels in an organisation, from help desk assistants and PC end users to company directors. It's important to be able to listen and understand, as well as explain technology at an appropriate level for the audience. In client-focusing roles IT professionals must also communicate clearly with clients to understand and define system requirements.

Demonstrate your graduate communication skills by:

- Keeping verbal and written communication clear, concise and confident.
- Showing you understand your audience and can tailor your communication to them.
- Showing you can listen to and consider the views of others.
- Thinking before you speak.

Planning and organisation

The IT sector is a project-focused industry. Good planning and organisation skills are essential for graduates entering the tech business, in order to manage tasks on different projects with different deadlines and competing priorities. Effective planning makes it possible to anticipate problems and challenges and transform them into positive opportunities.

Demonstrate your graduate planning and organisation skills by:

- Showing that you can put structure to a task or project.
- Highlighting how you scope out an activity and allocate time to individual tasks.
- Showing how you anticipate challenges and issues that could arise and plan contingencies.

Drive, motivation and enthusiasm

Drive and motivation are essential for working in this incredibly fast-paced industry. You need to enjoy taking on new challenges, pushing boundaries and looking towards the future. Graduate recruiters warm to enthusiastic candidates because they know that enthusiastic people are motivated people.

Demonstrate your drive, motivation and enthusiasm by:

- Showing you have the determination to achieve an end result.
- Demonstrating that you can keep your optimism and enthusiasm even when things get tough.
- Showing that you can bounce back from set backs.
- Knowing what makes yourself tick and what types of task and activity you most enjoy doing.

Problem-solving

Working in IT you need to have the ability to define problems in a timely manner, identify the root causes, and then gather relevant information to find appropriate solutions. But problem-solving goes beyond resolving just technical issues. You may also need to suggest enhancements to existing procedures and processes to deliver improved service, a better product and most importantly, satisfied clients.

Demonstrate your graduate problem-solving skills by:

- Displaying that you can take a logical and analytical approach to problem solving.
- Showing that you can view problems from a number of angles.
- Demonstrating that you can anticipate potential pitfalls and act to prevent them happening.

Teamwork

Teamwork is essential for sharing knowledge, establishing and building relationships and supporting all the people involved on a project. Teamwork requires interpersonal skills and at times, leadership qualities so that you can consider and respond appropriately to the behaviour and motives of others, adapt your personal style accordingly, or step out in front to bring others with you.

Demonstrate your graduate teamwork skills by:

- Showing that you can build and maintain positive working relationships.
- Demonstrating how you share information with others; support others and show respect for alternative views.
- Showing how you have contributed to keeping projects on track and to achieving a final goal, working sensitively and co-operatively with others.
- Showing how you have considered and identified what motivates others and how you have led by example.

Alex_TARGETjobs. (2012, July 16). Prove you've got the soft skills IT professionals need. Retrieved February 19, 2017, from https://targetjobs.co.uk/career-sectors/it-and-technology/advice/285645-prove-youve-got-the-soft-skills-it-professionals-need

INGLÉS IV

Ten tips on writing a successful CV

Katy Cowan gives her top tips on creating a memorable and readable CV

Photograph: Max Oppenheim/Getty Images

When it comes to applying for a new job, your CV could be just the ticket to get you that initial foot in the door and secure an interview – but how do you ensure your CV is added to the interview pile rather than thrown straight in the bin?

Putting together a successful CV is easy once you know how. It's a case of taking all your skills and experience and tailoring them to the job you're applying for. But what if you don't meet the right criteria? Well, I've put together the following tips to help you get started in creating a successful CV and securing your first (or next) arts job.

Get the basics right

There is no right or wrong way to write a CV but there are some common sections you should cover. These include: personal and contact information; education and qualifications; work history and/or experience; relevant skills to the job in question; own interests, achievements or hobbies; and some references.

Presentation is key

A successful CV is always carefully and clearly presented, and printed on clean, crisp white paper. The layout should always be clean and well structured and CVs should never be crumpled or folded, so use an A4 envelope to post your applications.

Always remember the CV hotspot – the upper middle area of the first page is where the recruiter's eye will naturally fall, so make sure you include your most important information there.

Stick to no more than two pages of A4

A good CV is clear, concise and makes every point necessary without waffling. You don't need pages and pages of paper – you just keep things short and sweet. A CV is a reassurance to a potential employer, it's a chance to tick the right boxes. And if everything is satisfied, there's a better chance of a job interview. Also, employers receive dozens of CVs all the time so it's unlikely they'll read each one cover to cover. Most will make a judgment about a CV within sections, so stick to a maximum of two pages of A4 paper.

Understand the job description

The clues are in the job application, so read the details from start to finish. Take notes and create bullet points, highlighting everything you can satisfy and all the bits you can't. With the areas where you're lacking, fill in the blanks by adapting the skills you do have. For example, if the job in question requires someone with sales experience, there's nothing stopping you from using any retail work you've undertaken – even if it was something to help pay the bills through university. It will demonstrate the skills you do have and show how they're transferable.

Tailor the CV to the role

When you've established what the job entails and how you can match each requirement, create a CV specifically for that role. Remember, there is no such thing as a generic CV. Every CV you send to a potential employee should be tailored to that role so don't be lazy and hope that a general CV will work because it won't.

Create a unique CV for every job you apply for. You don't have to re-write the whole thing, just adapt the details so they're relevant.

Making the most of skills

Under the skills section of your CV don't forget to mention key skills that can help you to stand out from the crowd. These could include: communication skills; computer skills; team working; problem solving or even speaking a foreign language. Skills can come out of the most unlikely places, so really think about what you've done to grow your own skills, even if you take examples from being in a local sports team or joining a voluntary group – it's all relevant.

Making the most of interests

Under interests, highlight the things that show off skills you've gained and employers look for. Describe any examples of positions of responsibility, working in a team or anything that shows you can use your own initiative. For example, if you ran your university's newspaper or if you started a weekend league football team that became a success.

Include anything that shows how diverse, interested and skilled you are. Don't include passive interests like watching TV, solitary hobbies that can be perceived as you lacking in people skills. Make yourself sound really interesting.

Making the most of experience

Use assertive and positive language under the work history and experience sections, such as "developed", "organised" or "achieved". Try to relate the skills you have learned to the job role you're applying for. For example: "The work experience involved working in a team," or "This position involved planning, organisation and leadership as I was responsible for a team of people".

Really get to grips with the valuable skills and experience you have gained from past work positions, even if it was just working in a restaurant – every little helps.

Including references

References should be from someone who has employed you in the past and can vouch for your skills and experience. If you've never worked before you're OK to use a teacher or tutor as a referee. Try to include two if you can.

Keep your CV updated

It's crucial to review your CV on a regular basis and add any new skills or experience that's missing. For example, if you've just done some volunteering or worked on a new project, make sure they're on there – potential employers are always impressed with candidates who go the extra mile to boost their own skills and experience.

This content was originally published by Creative Boom

Katy Cowan (2012). 10 tips on writing a successful CV. Retrieved March, 15th, 2012, from: https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2012/mar/15/cv-tips-first-arts-job.

- ❖ <u>Give advice to your partner before a job interview. Use should/shouldn´t. Draw ideas from your own experience.</u>
- ❖ <u>Now you are ready to read text number 2. Are there any coincidences?. Expand.</u>

TEXT 2

Six steps to a better job interview

By Peter Bowes. BBC News, Los Angeles

Dress appropriately, be on time and don't lie: three of the key steps for a successful job interview

In today's world of social networks a face-to-face interview can seem outdated, but online resources can help you ace the interview and land the job, especially if mixed with some old-fashioned common-sense advice.

1. "On time is 15 minutes early"

Interview day is not the day to sleep in and miss the train.

"You never should be late for an interview," says Lauren Ferarra, a recruiter with Creative Circle, a US staffing agency in New York.

"On time is 15 minutes early. If you're more than 15 minutes early, you're going to be waiting around a while and it comes off a little sketchy. So 15 minutes early, non-negotiable, you should be in the building ready to go."

2. "This is not the time to wing it"

Try to anticipate the questions by re-reading the job description and seeing what questions they might prompt.

"To do a good job you really need to know who you're talking to," says Kristy Stromberg, of the online jobs listing site SimplyHired.com.

"Do your research on the company and the person who is interviewing you. This is not the time to wing it. You're not gambling, you're selling."

Candidates should rehearse succinct answers to questions such as "Tell me about yourself" and "What are your goals?" - the responses should be relevant to the position on offer.

"You will be asked questions about your experience. Anticipate what the company is looking for. Who do they want to hire and what types of problems are they trying to solve?"

3. "People really underestimate smiling"

First impressions are vital to making a lasting impact on an interviewer. Being personable and friendly speaks volumes.

"I think the handshake and the eye contact are incredibly important and a smile," says Ms Ferarra.

"People really underestimate smiling and having that personality. You tend to be so nervous and tight in an interview, and you really want to come off and show that you are someone they want to work with."

4. Nerve control

Even the best-prepared candidate can feel the jitters on interview day. Michael Weiss, a public speaking coach, says it is important that people focus on their voice to avoid sounding nervous.

"You can have a lot of adrenalin running through your body and that's when you get the wavering voice. Practise questions out loud. Do some breathing exercises, calm down and just focus," he says.

Dealing with a prickly interviewer can also be unnerving.

"You need to read the personality of the person that you are interviewing with. If they're very staid and very buttoned-up, you probably want to be a little succinct and short with your answers and mirror their personality."

As the process gets under way, the jobseeker should allow the interviewer to lead the conversation. But it should be a two-way process, says Ms Ferarra.

"Don't be afraid to jump in and ask questions as the conversation is flowing. Don't feel you need to save them all to the end."

5. Don't lie

"In today's world of LinkedIn and other social networks, it's very easy for someone to do a back-channel reference," says Ms Stromberg.

"That is, speak to people they know through a common network to check out your story. They can consult people that you have not offered up as a reference to see if you really do what you said you did. You want to make sure that story and your message is consistent."

6. Say "thank you"

Once it is all over, the only thing left to do is send an email or written note to the interviewer. According to Ms Ferarra, it is hugely important to leave a good impression.

"Make sure you get that person's card. Follow up with an email, a thank-you, and they'll remember that in the long run."

Peter Bowes (2013). Six steps to a better job interview. Retrieved December, 10th, 2013, from: www.bbc.com/news/business-25191591.

TEXT 3

Repurposed sensor enables smartwatch to detect finger taps and other bio-acoustic signals
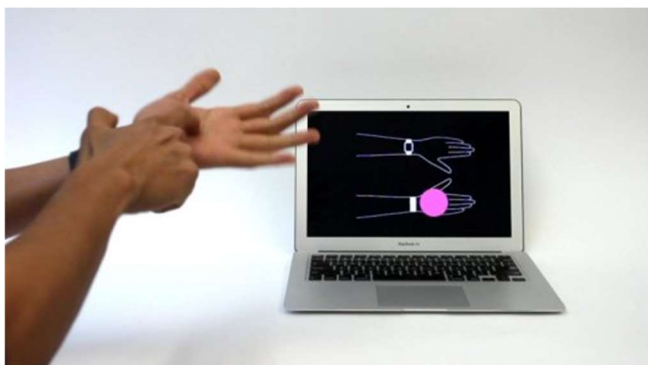
Carnegie Mellon University researchers have developed technology to enable smartwatches to detect taps, scratches and flicks against the wearer's body, making possible new types of interactions with wearable devices.

A smartwatch is capable of detecting and distinguishing a variety of taps, flicks and scratches by the hands and fingers, and all that's required is a software upgrade that repurposes the device's existing accelerometer, Carnegie Mellon University researchers discovered.

This new functionality makes possible new applications that use common gestures to control the smartwatch and, ultimately, other objects connected through the internet of things. By monitoring vibrations that occur when people hold objects or use tools, the smartwatch also would be capable of recognizing objects and activities.

It could even be used to help tune a guitar, with the smartwatch displaying the note transmitted as the guitarist plucks and adjusts each string.

"It's as if you're using your hand as a detection device," said Gierad Laput, a Ph.D. student in the Human-Computer Interaction Institute (HCII), suggesting totally new uses for smartwatches. "The hand is what people use to interact with the world."

This new technology, dubbed ViBand, was developed by Laput and Robert Xiao, both Ph.D. students in the HCII's Future Interfaces Group, along with their adviser Chris Harrison, assistant professor of human-computer interaction. They will present a paper describing the work at the Association for Computing Machinery's User Interface Software and Technology (ACM UIST) Symposium this week in Tokyo.

Normally, a smartwatch accelerometer is used to detect when a person lifts an arm so the screen can activate, or sometimes to count footsteps. To do so, the accelerometer only needs to take measurements about 100 times a second. But when researchers increased the sampling frequency to 4,000 a second, 4 kHz, they found it acted like a vibrational microphone. Rather than detecting sounds transmitted through the air, however, it couples with the body to detect bio-acoustic signals.

"ViBand isn't just a way to control your smartwatch," Harrison said. "It enables you to augment your arm. It's a powerful interface that's always available to you."

A ViBand-enabled watch can tell if someone is tapping on the forearm, the palm of the hand or the back of the hand. It can detect finger flicks, scratches and other motions. It also can sense if a person is holding various mechanical and electrical tools, such as an electric toothbrush, power drill or handsaw. Each body tap, device or activity has distinctive bio-acoustic signals.

To increase the frequency of the accelerometer's sampling rate, the research team developed a custom kernel -- the core of the smartwatch's operating system. That's the only modification required and can be performed as a software update, Laput said.

The team developed several demonstration apps for ViBand, including the use of hand gestures in the area around the watch to control apps on the watch. Similar gestures could be used to control remote devices, such as lights or a TV or other appliances connected via the internet of things.

They also showed it could be used for object-aware apps, such as monitoring meal preparations or providing visual feedback while tuning an acoustic guitar.

Finally, they propose an application using what they call a vibro-tag, which is a small object that emits

inaudible, structured vibrations that contain data. A vibro-tag on a person's office door, for instance, might transmit information about office hours or alternative contact information.

Carnegie Mellon University. (2016, October 17). Repurposed sensor enables smartwatch to detect finger taps and other bio-acoustic signals. ScienceDaily. Retrieved February 18, 2017 from www.sciencedaily.com/releases/2016/10/161017111241.htm

TEXT 4

How to deal with job application rejection

By Peter Bowes. BBC News, Los Angeles

Rejection can be a chance to hone your approach to job hunting

Technology has made firing off multiple job applications easier - but as well as more opportunities for success, there is also more chance of rejection.

We wanted to know how experts suggest we turn rejection around so that it helps a job search be successful in the long run.

"Don't take rejection personally," says Los Angeles-based business coach Joanna Garzilli.

"Often there are a number of factors at play including timing, circumstances, office politics and budgets. Just because someone says no today doesn't mean it's a no in the future."

And About.com job-search expert Alison Doyle says: "The best way to deal with rejection is to consider why you were rejected, and then move on."

Feedback

But analysing rejection is easier said than done. It may be tempting to follow up a rejection email or letter by asking an employer how they reached their decision, but you won't always get a response.

"Many employers won't disclose any information to applicants they rejected, because they are concerned about legal issues like discrimination," says Ms Doyle.

"That said, it can't hurt to ask, and if you do get feedback, consider how you can use it enhance your chances in the future."

If you can't get feedback, you should spend some time asking yourself what might have gone wrong.

Ms Garzilli says: "Do a self evaluation on what went well, what didn't and why? This will help you to be well prepared for the next job interview."

Re-focus

In the relatively anonymous world of online job searching, where the number of applications and rejections can mount up very quickly, it it easy to lose focus on the ultimate goal.

Ms Doyle says: "Do consider how effective your job search is - or isn't.

"Are you applying for the right jobs? Jobs that are a strong match for your qualifications? If not, you are wasting time because there are so many applicants for each position, only the most qualified candidates will be considered."

'Disappointing, disillusioning and discouraging'

Since May, Sheri Bennett, from California, has applied for more than 200 jobs online, but she is still looking for work.

"I have not had many call-backs at all, and a lot of the companies don't even send a courtesy email that you've not been selected," she says.

"Not even an acknowledgment, not even a thank you for applying. Nothing."

The former teacher says it can be very "disappointing" and "disillusioning."

Emotional toll

Ms Bennett, who says she is "discouraged" at times, responds by simply "trying harder."

Dan Sparks, vice-president of sales at Hire Live, which stages career fairs, says: "There are very qualified candidates out there and sometimes it just takes a little time to find that right position. says .

"Don't just talk to one company and say, 'That was it, that's all I need to do, I already got that job.' Keep an open mind, don't be disappointed if they say no or don't be disappointed if they move forward with somebody else."

Being out of work for a prolonged period takes its toll emotionally. Relationships suffer, and unsuccessful candidates can find themselves on a downwards spiral into depression.

Ms Doyle says: "One way many job seekers have dealt with lethargy or depression is to not focus all their time and energy on job seeking.

"Spending time volunteering, for example, will help you feel better about yourself. It may also help you make valuable contacts who can help your job search."

Peter Bowes (2013). How to deal with job application rejection. Retrieved December, 17th, 2013, from: www.bbc.com/news/business-25218012.