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01

Self-Diagnosis using the Internet: Google's AI Skin Doctor

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A phenomenon that has emerged in the Internet age is the tendency for users to self-diagnose based on symptoms that they are experiencing and find health information by using Internet search engines or online resources. This practice has been identified and discouraged by medical professionals, who warn that unreliable or misleading information could increase the anxiety of Internet users, a phenomenon known as “cyberchondria”. Furthermore, searching for health information online could lead to a misdiagnosis, resulting in worsened or more severe health problems if incorrect treatment is applied [1].

While some medical search engines such as WebMD have been developed to help combat this practice, there is still concern that many users are not capable of navigating academic journals and distinguishing their symptoms from similar ones. However, Google's recently unveiled “Dermatology Assist Tool” may help to reduce some of the risks associated with self-diagnosis. The tool is expected to launch later this year and is



Image from chinadaily.com.cn

designed to help users identify issues with their skin, hair, and nails by simply using a smartphone camera. By taking multiple pictures of the affected area from various angles and answering a series of questions, users receive a list of possible conditions, similar images, and information from dermatologists, which they can research further or seek out advice from a professional.

The web-based tool is powered by artificial intelligence technology, which is built on a database including over 280 conditions, as well as 65,000 images and case data [2]. Users will have the option to donate their images to help improve the accuracy of the tool, but they can also choose to privately save or delete any data. This service is not unprecedented and was developed from previous artificial intelligence and deep learning projects that Google is already undertaking, including technologies such as AI that can identify breast cancer by analyzing mammograms with a higher accuracy rate than doctors [4].

This tool and similar technologies have not been approved as replacements for professional diagnosis by humans, but there is potential in using AI to support doctors with medical imaging practices, to increase accuracy and reduce the risk of false diagnoses. This is possible because deep learning techniques allow AI to be trained with huge datasets of case studies and images, which is far more than a human could process. However, great care must be taken to ensure that all ages, races, and skin types are sufficiently represented, to make such services accurate for all users and avoid facilitating bias development within algorithms. This is an issue that Google has addressed regarding the design of its dermatology tool.

Access to similar services allows individuals with low health literacy to open a dialogue about topics that may be unfamiliar to them. Particularly, mobile applications or web-based tools “inform the conversation around what the diagnosis might be and what treatment to offer to an individual” [3]. In this sense, patients are empowered, as they gain a better understanding of their symptoms and receive tailored treatment. The convenience of using the service may also make people feel inclined to quickly check out symptoms, potentially catching serious diseases early, when they may have been otherwise ignored.

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02

The Ongoing Construction of the Digital Social Credit System in China

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As data becomes one of the most efficient tools to evaluate and analyze an individual's behavior, many governments have adopted data measuring methods in addition to the conventional census to attempt to manage society. Although many are already familiar with the existence of the social credit system in China, there are some additional issues that need to be addressed regarding this unique system.



Image from beautifulpeoplemagazine.com

The social credit system is used by the Chinese government to monitor the trustworthiness of both individuals and companies based on a wide set of databases [1]. Such digital identity has become a new standard to categorize social status as those with lower credit scores will find themselves restrained from even completing the most fundamental tasks such as purchasing train tickets online.

Back in 2014, the Chinese State Council has released an initial plan to fully establish such a system by 2020, but many experts have recently pointed out that the data construction is yet to be completed and that there is still a large gap to be filled within the inter-government data transfer [2]. However, one of the observations is that the system has so far been mainly used to regulate corporate actions instead of individuals, especially as a method to minimize the spread of COVID-19 by encouraging firms with effective pandemic prevention methods and punishing those violating the rules by downgrading their social credit score.

The establishment of such a system is also correlated to the use of cryptocurrencies. When DCEP (China's centralized cryptocurrency) becomes widely used, the government will be able to integrate data on the social credit system to closely examine an individual's purchasing behaviors and patterns [3]. While many have speculated that the recent ban of Bitcoin in China is a strategy adopted by the Chinese government to promote DCEP, it is undeniable that it, as well as cryptocurrencies in other forms, will be used in alliance with the social credit system to foster a more regulated digital ecosystem. However, one concern is privacy. Along with all other privacy-related issues encountered within a digital society, the social credit system will undoubtedly become a new threat to individuals' digital privacy as well as their right to freely travel and have access to resources. Therefore, the unbalanced digital sovereignty exhibited by the government may become a new issue needing to be resolved in the future.

Considering that the Chinese social credit system remains a largely controversial topic in the West, this article does not aim to evaluate it on a moral level. Rather, the focus should be on society's transition to a more digitalized identity and a re-construction of the social class based on people's digital behaviors.

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Wildlife Conservation using Technology

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Interest in environmental protection and regulation has rapidly increased along with attention on global climate change. Corporations and governments have also progressively started participating in reducing their environmental impact with increased interest and demand for change from the public. To tackle wildlife extinction, governments and international NGOs have started utilizing technology to reduce certain obstacles hindering conservation activities [1].

While many people perceive drones as simply a video production or entertainment tool, it is adapted to track illegal poaching in wildlife reserves and national parks. For instance, the South African Spatial Monitoring and Reporting Tool (SMART) allows limited personnel to be used efficiently. National parks cover a tremendous amount of land, making it difficult to track hunters with a limited number of rangers. Drone technology allows the government to track and identify poachers and gather useful data on animal movements that can provide valuable insight to scientists [2]. Previously, scientists and researchers were limited in collecting data, which was conducted manually by using pen and paper to write down relevant

information. Increased data allows efficient and accurate decisions to be made, reducing the burden on personnel.

Besides physically combating poachers, artificial intelligence and data analytics are also utilized to increase the population of endangered animals. The Zoological Society of London (ZSL) has received help from the technology industry to develop remote cameras capable of gathering images, tagging animals, and uploading them to the Cloud for various research organizations to use. ZSL has collaborated with companies such as Google and satellite operator Iridium to make this possible [3]. The high cost of cameras has made the wide adoption of such technologies difficult. Luckily, cheaper audio-based technology is also operated to help understand animal behavior and detect poachers. ZSL has gathered sound recordings at the Dja Faunal Reserve to detect gunshots. The audio data is then analyzed to map locations where gunshots frequently occur, helping rangers and scientists develop a plan to reduce threatening activities [4].

Even with such technologies, illegal wildlife poaching and trade have continued due to the financial incentives involved in this billion-dollar industry. Interestingly, poaching has decreased recently due to COVID-19 resulting in increased border security and customs practices. While poaching will continue, Dr. Witting of the nonprofit organization United for Wildlife points out it is the perfect time to exploit the current decline and weakness of poachers [5]. Although the development of new technologies indicates an optimistic future for wildlife conservation, the high cost involved with developing, manufacturing, installing, and maintaining the tools are still an obstacle. Wildlife conservation efforts have usually been bankrolled through wealthy donors and institutions [6]. Luckily, as more individuals are starting to become actively involved in environmental protection efforts, it is hoped that more financial support will be provided to help with utilizing current technologies to combat poaching.

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04

Big Data Analytics in Malaysia's Banking Sector

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Image from educba.com

The public and private sectors both carry out their daily operations based on data. However, having a big volume of data would be meaningless if it is not analyzed. This is where Big Data Analytics (BDA) plays a role in correlating data collected, interpreting and cleaning it to the point it becomes useful [1]. For example, raw data collected from customer's complaints and feedback that is analyzed can help to quickly interpret users' behavior, causes of failure, or risk assessment [1].

The Central Bank of Malaysia announced that it has started to issue licenses for digital banks with BDA being adapted after seven months [2]. Using BDA, banks can track customer's behavior in a more effective way compared to the traditional system. Banks can track transactions and detailed information, while performing credit risk and behavioral analysis [2]. These will be used for evaluating customers' loan applications. It can even be from data that is collected through social media, which can be matched together with the details that banks currently carry. From there, an algorithm can be formed where the banks receive information on the customer's behavior such as fraud or other activities.

On top of providing advantages to banks, BDA can also provide satisfaction to customers by giving personalized customer service. As of now, most traditional banks receive input from customers manually. With technology that interprets data (such as connecting historic online banking behaviors) into information, customers will get a more complete picture of what they want [3].

With all of the advantages that are clearly shown by having BDA in banking systems, it is hard to not agree on using it. However, as good as it seems, it also comes with disadvantages that make people doubt the effectiveness of adoption. First, security safety is a big concern for users as people can give information to a 3rd party, and the bigger the data the higher the risk of data breach [4]. Second, BDA keeps developing every day. Technology is changing so rapidly that some industries find it hard to keep up. Some of the features that are being used right after activation can be changed into something even better after only a few months [4].

All in all, the advantages of Big Data Analytics make dealing with banking affairs quicker and more effective than banks that rely on manual methods. In addition, the Internet has made people used to auto-generated answers, which is why it will be great for the banking sector to also adapt to the changes technology brings.

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The Era of “Big Blur”

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When mobile phones first came out, they were nothing more than devices to make and receive phone calls. Yet currently, the smartphone can function as a small movie theater, a camera that can capture and record every moment, or an online book available anytime at a single touch. Just like how mobile phones continue to evolve beyond their original functions, our society is experiencing a collapse of boundaries between industries due to technological advancements, known as the “Big Blur”. The Big Blur is a phenomenon in which the boundaries between distinctive industries are being blurred due to the rapid development in the ICT industry [1]. The Fourth Industrial Revolution, along with the growing utilization of new technologies such as artificial intelligence, cloud computing, the Internet of Things, and advanced wireless technologies, has played a role in rapidly blurring boundaries.

Starbucks’ mobile app, the “Siren Order” service, is a noticeable example of such a phenomenon. The Siren Order requires customers to create a prepaid account through their mobile app, and it deducts the cost of the purchase after they place their orders [2]. Through this system, Starbucks can hold customer’s money for a certain time, functioning similarly to a banking service. The industry estimates that the prepayment charge

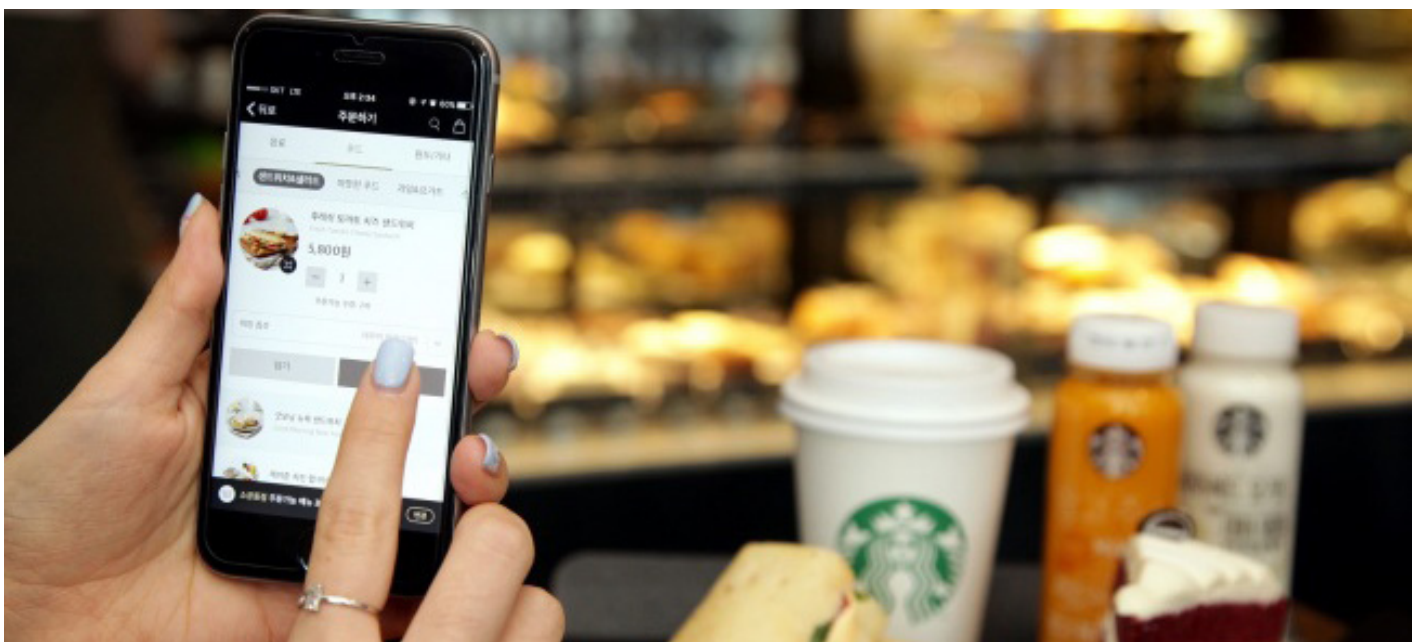


Image from koreaherald.com

deposited at Starbucks worldwide is more than \$2 billion, which is a considerable amount compared to assets of major U.S. financial firms. In fact, Starbucks opened its first coffee banking branch in Buenos Aires in October 2018, revealing its initiative to grow as a global fintech company by opening an actual offline bank branch [3].

The financial sector is also expanding beyond its traditional financial services by providing non-financial services to attract new customers and improve customer satisfaction. The Development Bank of Singapore (DBS) is one of the leading financial platforms that continues to move into non-financial sectors, launching its online property market. It provides Internet and TV services, hotel and flight reservations, free travel insurance, car maintenance services, and more [4]. Recently, financial institutions in South Korea are also providing various services such as telecommunication, delivery, insurance, and used car transactions. Kookmin Bank entered the mobile communication industry for the first time in the financial sector, and Shinhan Bank is also operating a food order delivery app - all attempts to move beyond their original functions as financial institutions [5].

The Big Blur seems to break down the boundaries between industries, and consumers have wider choices and experience greater convenience than before, but it is not without concerns. As this phenomenon intensifies, large-scale enterprises will start to swallow the relatively smaller ones, and giant corporations might be the only survivors in the post-pandemic economy. Small and medium-sized enterprises are most unlikely to join this trend and survive as big businesses replace them. Thus, the government needs to come up with ways for them to co-exist in terms of industrial policy, and smaller companies need to find ways to sustain their businesses and prevent themselves from being overwhelmed.

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New Technology Evades Face Recognition Without Destroying Photos

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The widespread use of facial recognition technology is profoundly impacting privacy. The photos you upload on Facebook, Instagram, LinkedIn, dating apps, or other social media can be screenshotted and downloaded by criminals, who then use reverse search techniques to find your name, workplace, education history, and other platform accounts. How can we prevent private photos uploaded on the Internet from being stolen? Many technology companies have released anti-face recognition services to help protect privacy.

Photo Ninja, a new raw-image converter and photo-processing app by Picture Code, launched an anti-facial recognition service recently. According to test data provided by the company, the anti-image-recognition technology achieves an excellent success rate against face recognition systems developed by mainstream companies such as Amazon, Microsoft, and Google. The core mechanism is to make pixel-level modifications to imperceptible areas of a photo, thereby destroying the critical features on which face recognition systems work, making it impossible for mainstream search engines like Google to recognize

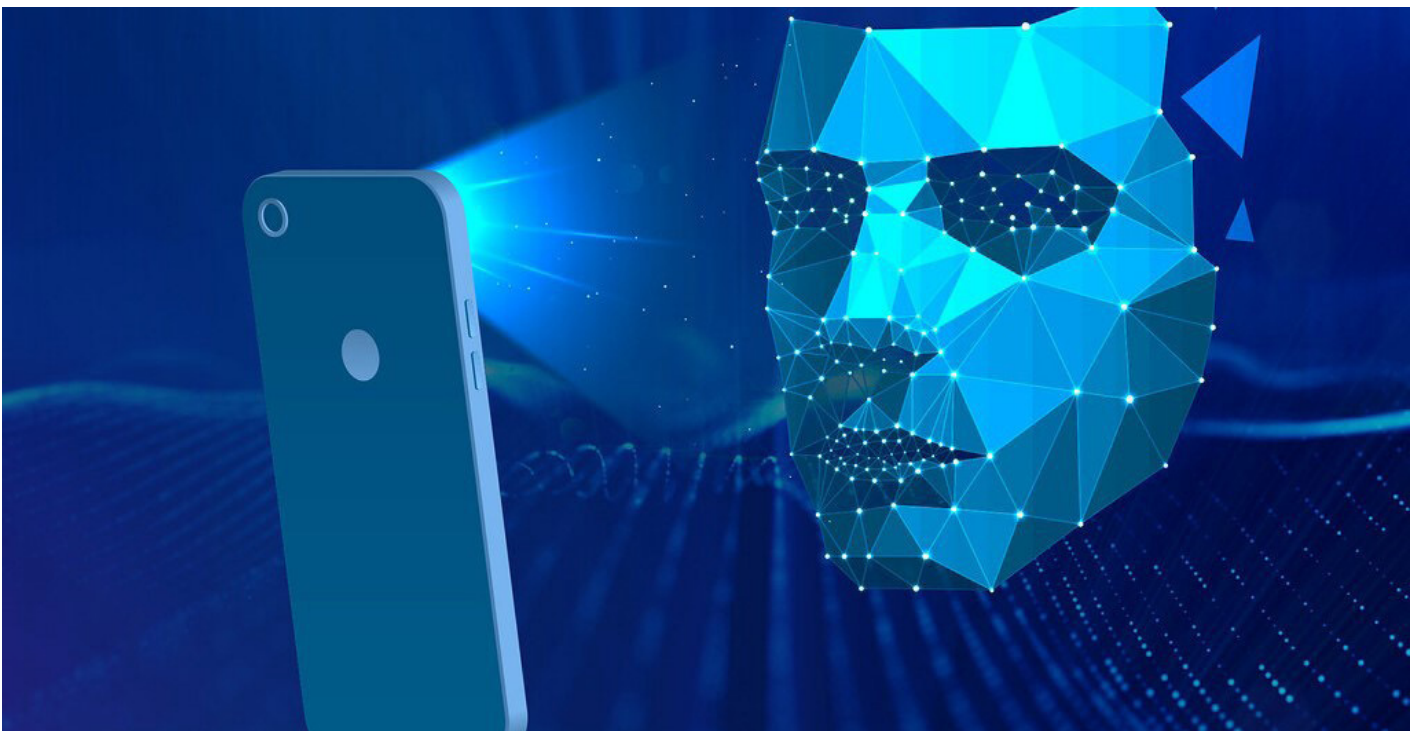


Image from medium.com

images. This technique, called adversarial machine learning, can be used for images and audio. “Photo Ninja uses a novel series of steganography, detection perturbation, visible overlay, and several other AI-based enhancement processes to shield your images from reverse image searches without compromising the look of your photo,” says the company [1].

Since the concept of adversarial machine learning was introduced, AI researchers have treated this technique as the biggest threat and hidden danger to machine learning technology [2]. Data manipulation techniques can make a trained model run in the wrong way; by adding an imperceptible layer of noise to an image, an attacker can fool a machine learning algorithm into misclassifying it. As noted in the 2019 interim report of the U.S. National Security Council on Artificial Intelligence, such attacks that spoof algorithms by manipulating data have been used in real situations. For example, adding a small sticker in the middle of a lane can cause a crash by driving a self-driving vehicle into the opposite lane. Changes that are imperceptible to the human eye can allow a medical analysis system to diagnose a benign mole as a malignant one. A piece of tape can trick a computer vision system into identifying a stop sign as a speed limit sign [3]. With the increase of fake images on the web and infamous deepfake technology, adversarial machine learning is treated as an “evil” artificial intelligence that threatens data security.

Technology itself is not good or evil. “We are in an AI arms race between good and evil,” Browder, the CEO of Photo Ninja said [4]. When used with good intentions, adversarial machine learning is used to combat the theft and abuse of private photos and the invasion of personal privacy by big tech companies, police, and governments, protecting our data and privacy while we carry out our online activities.

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Looking After your Mental Health at Home: Treatment via ICT

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The extended pandemic has caused fatigue and emotional exhaustion for many. Not only has the virus had a direct effect on the brain causing psychological or neurological disorders, but it also changes people's daily routine due to quarantine and social distancing, having raised feelings of fear and loneliness [1]. In fact, the rate of US adults reporting depression and anxiety has tripled throughout the crisis compared to 2019 [2]. Thus, psychological treatments to cope with emotional stress and improve mental health have been receiving worldwide attention.

However, due to social distancing and stay-at-home orders, the demand for online delivery of psychological services has increased as well. Such remote practice of psychotherapy using online technological devices is referred to as “telepsychology” and has been made possible through advances in information and communication technology [3]. These involve real-time video streaming, self-monitoring through mobile applications, web-based interventions, virtual reality therapy, and others [4]. One example is Quenza, which is an online platform that aids therapists and practitioners in designing their content for counseling, coaching, psychoeducation, and even assessment tools [5]. As shown from this example, people can have equal access to diverse forms of ICT-based psychological services regardless of their geographical location or the infrastructure in place. Also, online therapies can be less frustrating for those facing attitudinal barriers toward treatment since it allows them to avoid public stigma [4].

The application of information technology not only allows mental check-ups through real-time counseling but also provides psychological interventions for patients with mental disorders. This includes



Image from med.stanford.edu/news/

cognitive-behavioral therapy used to treat people with developmental disabilities such as autism spectrum disorder. One example is how Google has applied its new technology smart glass to assist autistic children [6]. Children with autism encounter difficulties in social interaction as they struggle to recognize and respond to others' emotions [7]. The updated Google Glass helps these children by interpreting complex facial expressions into simpler cues of emojis, written words, or audio guides whenever it detects a face [6]. The Google Glass also offers cognitive treatments in the forms of games and records the child's activities for self-monitoring purposes, offering opportunities for behavioral interventions [8].

The ongoing crisis of COVID-19 has accelerated the shift toward remote delivery of psychological treatment. However, challenges concerning privacy and the digital divide still need to be addressed. Therefore, researchers and practitioners should put more effort towards preserve confidentiality and enhance the quality of service. The paradigm shift in the provision of psychological services will break down the barriers toward mental health treatment, aiding mental health and making the world a happier place to live in.

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