

The background of the cover is an abstract, glowing composition. It features a central, bright orange sphere that radiates outwards with numerous thin, blue, fiber-like lines. Interspersed among these blue lines are several small, glowing red spheres. The overall effect is reminiscent of a complex network or a stylized atomic structure, set against a dark, gradient background that transitions from deep red at the top to dark blue at the bottom.

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## Diagnosing Diseases With Biosensors

by Dr. Vinanti Cherian

Being able to correctly identify and diagnose diseases as one of the most important things that you can do. If we can identify these diseases, we can prevent them from becoming a problem, or we can start to slow down their development.

Our research into the diagnosis and identification of diseases has led us to investigate the concept of a biosensor. This is a tool which can be used to perform a biometric scan of the person and identify potential diseases.

### Evolving Technology

Evolving technology is one of the most key factors when it comes to biosensors and being able to correctly identify and diagnose diseases. The biometric scans that we could've taken 20 years ago are nowhere near as effective as they are now.

To be able to correctly view and generate information about a person's health underneath a microscopic scan is something which has been experimented on, but more often than not has been confined to the realm of science fiction.

However, it is this science fiction which has pushed people forward. Advancements in the technology has led to the diagnosing of disease with more efficiency and more ease, it has meant that certain conditions can be found early, and the technology generally speaking has developed over time.

### Better Systems

Generally speaking, the systems that we use are much more advanced now. They have been designed to create a more powerful scan or identification of something. Take for example, a magnetic resonance imaging system, known as an MRI.

The MRI has been designed to take a detailed scan of the heart, or any part of the body which requires a close in-depth analysis. The software has evolved to come more precise and accurate which is good.

What we found is that the ability to diagnose the diseases is obviously tied to the type of options that are available in regards to software and hardware.

## **Finding Solutions**

Use of biosensors to correctly identify diseases has also led to a Renaissance in terms of how we approach solutions. What we found is that more creative solutions can be applied when the understanding is better. The quicker that you identify something, the better your understanding of it, as it can be viewed in its early stages.

What is interesting to us is that there are numerous different ways in which things can be applied, and a multitude of options to consider.

Overall, what people don't necessarily understand is that when it comes to diagnosing diseases, it's all about the way in which you choose to utilise software. We have been very interested to see exactly how the technology has progressed, from very crude scans of a body to much more detailed precise readings of a particular body part, like for example, a heart scan. Seeing this progression is pretty fascinating, and does cast a more optimistic light on the future for creating new and exciting ways of dealing with problems, and diagnosing diseases faster.

## Artificial Intelligence in Healthcare

by Dr Terence Mclvor

The role of artificial intelligence in healthcare is something which has been hotly debated for many years now. There are some people who feel that artificial intelligence, being a cold and unfeeling entity, has no place in a very people driven industry.

However, artificial intelligence can be helpful in certain circumstances, and it is an interesting topic of research. How can artificial intelligence be applied to healthcare? We were interested to find out.

### Routine Tasks

There are many routine tasks within the healthcare industry which simply serve to slow down the staff.

People trying to provide care have to fill out paperwork, complete training sessions, fill out documentation, things which simply do nothing but waste time. The actual act of caring for someone is limited to only a few minutes per person.

We've discovered that artificial intelligence can be used to help with this, by doing some of these jobs for care workers. They can fill out paperwork, complete formulas, finish surveys, those types of things. Artificial intelligence can be used to do the manual tasks that take up the longest time.

### Medicine Dispensing

A fundamental truth of care is that normally you're providing medicine. It's a pretty basic tenet of being a care worker, you have to be able to give people medicine that they need to survive.

Artificial intelligence can help with this medicine. Calculating exactly how much each person needs, when they need it, things like that, usually has been wiped out by hand. Artificial intelligence can solve this by generating schedules, adjust where necessary according to certain data, and create a recommended routine of medication to help people feel at their best.

We find it quite interesting that if you put enough data into a machine, it can calculate exactly what medication is required to keep someone fit and healthy, it's a fascinating example of how technology has evolved. Machines generally have a smaller margin of error than a person, so statistically speaking, there is a good chance that the calculations are correct.

## **Empathy Inbound?**

One thing that we did also find quite interesting is that artificial intelligence is capable of being empathic. People don't necessarily know that artificial intelligence can grow and evolve, to create new programs and algorithms that will allow it to connect with the user in a different way. If artificial intelligence could learn to read emotional expressions or tones of voice, it could begin to calculate new ways to become empathic, and actually become a valuable provider in the care industry.

In summary, it's pretty important for artificial intelligence to be allowed to continue to grow within the care industry. They may be just machines at this point in time, but there is every possibility that will grow beyond this and become something that can help, something which would have a bedside manner, be able to support people in care, and indeed the carers themselves. We think it's interesting to see that the technology is developing, and one day a time may come when artificial carers are introduced into the care industry.



## How Virtual Reality and Artificial Reality is Used in Education

by Zita Bertha

Augmented reality and virtual reality both have a role to play in a variety of different industries. Considerable research has been done to identify exactly where these particular topics fit into the world, but not masses of research has been done into the world of education and how augmented reality plays a role. Virtual reality and augmented reality both have a role to play, so we've been doing some research to find out exactly what it all means.

### Virtual Reality - The Upgrade to Typical Learning

During the research process, it became obvious very quickly that the typical education system was steeped in a set of traditions and time-honoured methods.

The typical textbook is designed to make sure that when it comes to it, it is possible to recall facts and figures and information via memory.

That's all well and good, but how does virtual reality play into it? Rote learning is being abandoned for newer learning strategies such as critical thinking exercises, which help the student to understand and apply subject matter to everyday situation. In addition, VR is being used as an immersive technology to envelop the student within a particular situation. Therefore, the student experiences the physical attributes that relate to that situation within a virtual world.

### The Magic of VR

Additionally, a growing number of people are feeling a discontent with the conventional methods. People feel like existing methods of learning are not suitable for them.

Virtual reality offers a safe environment from a health and safety perspective, and according to the VR Einstein experiment, virtual embodiment has the potential to positively impact cognition and executive functioning in the brain.

We found that when students actually want to learn something, they try to visualise it. This is understandably a limited process with a textbook, but when you introduce virtual or augmented reality into the equation, the world becomes real.

We developed our own virtual reality chemistry lab, in which you can carry out specific practicals. Students are provided with step by step guidance, visualising and virtually carrying out the entire experiment.

We discovered that students responded very well to the interactive elements of virtual reality. When given a chance to manipulate and control these elements, students took to the task with great enthusiasm. They learn best by interacting, by doing things rather than just reading about them, and there are some areas of education where practical experience is a superior one. Reading about medical science and the textbook is a lot different to actually performing the procedure on a virtual person.

It was this interactive element that really helped to consolidate the learning process.

In addition, students recall was increased when the memory of learning about the facts and figures was coupled with the interactive element of a virtual experience.

The findings were similar in regards to augmented reality. Students were presented with a poster displaying famous mathematicians, they had to scan a particular inventor's picture with their mobile phone in order to bring up an augmented reality video, which explained how their invention is used in the real world.

To summarise, what we discovered was that the virtual and augmented reality technology that has been applied in so many industries also has a very valid place in the education system. Students benefited from the use of virtual and augmented reality when it came to getting a more detailed understanding of the topic, and they could use the practical, hands-on elements of the virtual reality to engage with the subject matter in a dynamic way. We believe that virtual reality could revitalise and generate a Renaissance when it comes to learning as a whole. The way in which people interacted with and explored different concepts would theoretically be permanently changed.

## The Use of Nanotechnology in the Environment

by Dr. Terence Mclvor

Nanotechnology is something which has seen limited exposure in the scientific world, simply because it's not as prevalent as other types of technology. We found the potential applications of nanotechnology to be quite interesting.

Nanotechnology in the environment is an interesting idea. How can nanotechnology be used in nature, and an environment to influence certain ecological changes? We thought we would take a look.

### Organic Roots

What most people probably don't know is that nanotechnology actually has roots in organic materials, and in nature. When people think of nanotechnology, they think of little robots, like in science fiction shows. But the truth is that they come from nature.

Take a lotus leaf for example. A lotus leaf is considered to be one of the leaves that never gets wet. It looks like it doesn't, and to the naked eye, there is no real explanation for it. But on a nano technology level, there is a very good reason for it.

### Artificial Concepts?

We believe that artificial nanotechnology can be introduced into an ecosystem in order to affect changes within that ecosystem.

For example, let's presume for a moment that there was a bacteria influencing the water and causing a virus to anyone, person or animal. We have discovered that it is possible for said virus to have nanotechnology introduced into it which makes it hydrophobic, that's effectively rendering the virus unable to properly bond with the water, instead resting on top of it.

This is a very random application about nanotechnology, but just highlights the potential impact that nanotechnology can have on nature and the environment. The slightest shift of the characteristics of any part of an ecosystem will have an impact on the entire ecosystem. Everything is interconnected, and we postulate that it is possible to subtly affect the outcome of an ecosystem using nanotechnology.

## **Morality**

With something like nanotechnology, one has to consider the moral implications of affecting an ecosystem. Morality plays a big part in science, it dictates what we can and cannot do. There are some things which are simply immoral to do.

There are obviously natural examples of nanotechnology occurring in the environment, but when it came to introducing an artificial one, one of the main questions that we took away from it all was “can we actually do this?”

In conclusion, nanotechnology is something which could be used to change the very outcome of an ecosystem, and in some ways, there are compelling arguments to do so. You could prevent widespread disease, you could prevent the extinction of a certain species, there are many things that could be done. However, one has to consider morality, and the impact of doing these things. It will be interesting to see you, as nanotechnology develops, whether or not people can start to consider morality. What kind of arguments will be made for the future of nanotechnology when the technology evolves to appoint that it becomes potentially harmful?