Augmented reality - much more than just Pokémon Go!

How clever augmented reality applications will change not only the supply chain.
Barkawi Management Consultants

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Augmented reality – much more than just Pokémon-Go!
How clever augmented reality applications will change not only the supply chain

Augmented reality has been difficult not to encounter since July 2016: in parks and forests, in supermarkets and back yards, in inner cities and at tourist attractions, yes even on busy motorways and military training grounds. Everywhere you go people are wandering around staring at their smart phones, engrossed in the augmented reality of the Nintendo game Pokémon Go, looking for monsters.

What they are seeing is a mixture of their actual surroundings and digital additions to them – and that is precisely the definition of augmented reality. 75 million downloads of Pokémon Go in just three weeks, and with 20 million hits a day, more users than Twitter: numbers that other augmented reality providers can only dream of.

But what is augmented reality capable of? What uses are there for it outside of gaming? For instance in industry? And how does the technology behind it work?

The core of augmented reality lies in embellishing our perception of the real world with digital content. Theoretically, it can be used to appeal to any and all of the human senses, but it is usually restricted to the visual.

Computer-generated additional information and virtual objects are inserted or superimposed on a semi-transparent display, and not only on smart phones and tablet computers, but also on head-mounted displays like the Google Glass (with microdisplay, microphone and camera), the ‘Smart-Helmet’ of the company DAQRI, in stationary mirrors and, one day, even on contact lenses.

So unlike virtual reality, augmented reality is based on the actual environment, which is linked to data, images and other elements. In contrast, virtual reality enables the user to become immersed in an entirely artificial digital simulation, like with the Oculus data glasses.
But in order to enhance the perception of the real world, high-performance software is needed that recognizes and assesses the current surroundings, and links them to the stored digital information. The content created this way then has to be made visible to the user in the right place.

Where is augmented reality used?

Augmented reality has potential applications for virtually all areas of everyday life where the real world can be merged with data. It has made the biggest inroads in the field of entertainment up to now and is a common tool in gaming, fashion and the marketing of products and films.

Providing specific contextual information has added value for users. Tourists can obtain interesting stories about sights they are visiting, or use Google Translate to translate foreign-language street signs instantaneously. Stargazers can find out facts about celestial bodies, passing airplanes or the orbit of the International Space Station.

The fields of medicine and disaster assistance, to name only two, also harbor fascinating possibilities. Areas explored and selected by drones can be transmitted directly to the glasses of the ground forces, complete with the directions for how to get there.

Indeed, we are still in the very early stages of the development of augmented reality, and we are far from recognizing its full commercial potential. Companies place great hopes in this innovative technology, especially in connection with supply chains.

But how can augmented reality be introduced and used in logistics under real conditions? Many an enterprise is faced with this fascinating challenge, and they are trying to sound out the feasibility and limits of augmented reality.
A small number of first movers are driving augmented reality forward

CEP services (courier, express and parcel): One major logistics services provider, for example, is trying to use augmented reality to improve the efficiency of a very labor-intensive warehouse process: order picking; the collecting of various goods and articles and putting them together into a single customer delivery.

In this process, staff members rush around enormous warehouses like worker ants under constant stress. It is not unusual for a storeroom employee at Zalando or Amazon to cover ten miles in a shift; something that is not easy to do without suffering from fatigue and making errors. Here, augmented reality could be a big help:

Within the scope of the ‘Vision Picking’ pilot project, the logistics provider’s employees are equipped with data glasses. The article number, storage location and number of units are displayed in the field of vision. When found, the articles are booked into the system using the integrated camera, instead of the customary handheld scanner.

But the project is still on a very small scale as yet. The three-week test in early 2016 was conducted in a single warehouse, with the staff trying out the data glasses in hourly stints. Initially, the basic functions were tested, such as scanning barcodes. Additional measures for improving efficiency such as automatic stocktaking and internal route optimization have not yet been realized. And the glasses were only connected to a virtual test environment known as a sandbox database instead of to the live warehouse management system (WMS).

Agricultural machinery: Another pilot project is currently underway at a global player, in the field of production supplies. The software reliably recognizes the right part among numerous other very similar-looking components. The key objective here is to prevent errors. Pressure is taken off staff members, while at the same time meeting the exacting demands that the customers place on quality. But a full implementation is still a long way away.

During the test phase, the results are compared manually with a paper list, which at least for the meantime increases the costs and work involved instead of reducing them. For it to be worthwhile, the system has to be not only more reliable than human work, it also has to be faster. To achieve
a noticeable improvement in quality and speed, sensors have to be calibrated carefully, and the staff have to be convinced that this technical aid makes them faster and better, rather than slower because of additional technical work involved!

**Automotive components:** Another innovative first mover is Bosch Diesel Systems in Homburg. By using data glasses, employees in the assembly process receive useful information and direct feedback on everything they do. Highlighting individual components and instructions in color – for instance to show the thread direction – helps to prevent errors.

In order for the operational process to run smoothly, every detail of every single step has to be mapped digitally and – and this is the real challenge – linked to the real elements. This is the only way that the augmented reality system can actually offer a benefit and make printed user handbooks obsolete in the future.

As is typical for the early phase of a technology, when there are numerous ideas and visions in play, there are only very few first movers! Many have been deterred by the unknown quantities like development risks and uncertain life-cycle costs.

As a result, augmented reality is currently only being employed in a select group of activities in the value chain. But not every application that is or would appear to be possible actually delivers added value compared to existing solutions. Each individual case has to be tried out for itself. So it is no surprise that the pilot projects need further analysis before they can provide reliable statements and long-term results.

**The biggest hurdle:**

**The cost of implementation**

A system doesn’t become attractive until its benefits outweigh its total cost of ownership. The required hardware (data glasses or helmets) are merely the obvious tip of the iceberg.

But while B2B devices like the Daqri Smart Helmet can cost up to € 10,000 today, new products are constantly making their way onto the market. Both the data glasses Meta 2 from Meta-vision and the Ora-X from Optinvent will soon be available for less than € 1,000. But what additional costs can be expected when considering an augmented reality concept, and which ones are relevant in the overall scheme of things?
In order to be able to use these expensive gadgets, a fitting software architecture is needed in the backend. As yet, companies have to develop their own. Open standards, platforms and programming systems with prefabricated modules that make a rapid and inexpensive designing and further development of software possible, for example as are used to design smart phone apps, still have to emerge.

Furthermore, companies have a lot of work to do to identify their digital content, processes and requirements, and invest heavily in system integration with the corresponding customer demands. And, once installed, large amounts of data have to be constantly kept up to date. This gives rise to significant ongoing costs in addition to the already large investments required for the implementation, in order to keep the system fully functional. As yet there are no software specialists for these systems. They will develop the required competencies as the technology matures, and they will be heavily sought after by companies.

Machine learning – i.e. systems that teach themselves through artificial intelligence, without requiring specific programming, will reshuffle the deck in not only this field. Linking augmented reality to AI will become a decisive accelerator for the spread of this technology.

In 2015, the computing specialist Nils Petersen wrote that ‘cognitive augmented reality’ systems are already capable of creating the digital content (e.g. instructions) themselves, keeping them up to date and even further developing them. In the future, the system may even be able to offer expert assistance in putting together prototypes.

**Outlook:**

Generalists will become multi-specialists

So data glasses help companies to improve the efficiency and quality of their processes. But augmented reality can do more than that, complementing the employees’ expertise by providing specific information for specific situations.

A mechanic who has already seen many turbines from the inside can be given the blueprints and a repair manual of a model that he has not yet worked with, putting him in a position to be able to fix it immediately. This will improve the ‘first-time fix rate’, with the technician completing the repairs on his first visit, reducing expensive standstills and downtimes incurred when critical components have defects.
Joachim Müller from the German Institute for Labor Market and Occupational Research knows the potential of such concepts: ‘The biggest shortages will be among qualified specialists. The possibilities that digital assistants provide can help alleviate these bottlenecks, perhaps even to the point of eliminating them.’

Building on this, white-label companies that are not bound to a certain manufacturer can also make use of this technology. Customers in India can already today manage all their household devices with the Servify app. In addition to managing guarantee services, they can type repair requests right into this app and Servify passes the order on to a network of freelance technicians, who can take on the orders that fit their qualification and certification and repair the device in the customer’s home. This means that an adept TV repairman might also be able to solve the problem with the washing machine while he is there.

Augmented reality could generate added value for all those involved in this area. The service technicians can expand their range of services as required, making them eligible for more jobs, without having to build up the required infrastructure on their own.

As a platform provider, Servify already offers all of the necessary interfaces. The digital content for numerous devices will be created in collaboration with the OEMs. The technicians rent Servify data glasses, to which they can download the information they require when on site on a pay-per-use basis. Thanks to the flexibility of Servify, the customer gets a fast, expert and inexpensive repair of its equipment.

This is also the approach that the Cologne-based startup Rise Technologies is pursuing. Service technicians (or maintenance staff at the customer) have access to 2nd level support in real time through data glasses. This means they get immediate help with more complex problems than can be dealt with by a mere help desk. For example, generalists on site can call on the services of specialists via video conference. Having a ‘second pair of eyes’ on the defective component is of inestimable value here. Being able to talk with them and having text boxes and graphic elements displayed in the glasses add to the support they provide.
Top-10 core statements from Barkawi Management Consultants:

1. The biggest hurdle to entry is still the enormous cost of implementation and updating.

2. Only a small group of first movers is driving augmented reality forward, so the applications for development and maintenance are still individual and very expensive.

3. As long as the same work still has to be done in parallel on paper, in lists and files, the costs are higher instead of lower and make AR unattractive.

4. Gaming applications help to break down user prejudices against the technology.

5. Applications and functionalities from gaming will pave the way for AR in industry.

6. The technical development of AR applications is (as yet) not based enough on platforms and modules that make it faster, simpler and less expensive.

7. First and foremost we have to break through the vicious circle of little demand so few inexpensive offers, and few inexpensive offers and therefore little demand.

8. Once this Catch 22 situation has been eliminated by achieving a critical mass, the outlook is excellent and the applications many, varied and attractive.

9. Among the first applications will be data glasses that enable generalists to become multi-specialists.

10. App shops and simplified, modular programming systems such as Apple’s XCode and Swift will become the role models for AR applications.
Outlook and prospects for the future

Flexibility is at least as important when managing and planning supply chains as it is when in direct contact with customers. Key prerequisites for this are data availability and transparency. Information in real time is essential – nothing is older than yesterday’s information!

The successful companies will be those that structure their value chain flexibly down to the last detail, and have it under control. If the replacement parts sink in a storm in the middle of the ocean; if war breaks out making production in a country impossible; if unforeseen events occur and the supply chain has to be remodeled as quickly as possible, enterprises that can act fast and proactively instead of reacting when it is already too late will stay ahead of the competition.

What they will need are data and their interconnections, i.e. big data. The Munich IT company ClearOps uses a software for this purpose that identifies and maps every step in the value chain, that enables situations to be identified from second to second and run through, and that simulates scenarios and optimizes cost-benefit ratios.

The champions of the future will profit from these solutions. Their company headquarters will become control towers with high-tech equipment that will make even NASA pale in comparison. The data will come together in a central ‘War Room’, and not on individual laptops or screens, but on a virtual data wall in the middle of the room that is accessible for everyone. Tom Cruise showed us how it will work in Minority Report, sliding the real-time data around the big screen with his fingertips. That is big data powered by augmented reality!

The constant communication with team members around the globe will become more and more of a normal everyday matter as time goes on, with the interdisciplinary turbo task forces not having to be flown in to each meeting at great expense anymore. Instead they will attend the conference as a
hologram, looking the other committee members in the eye from 10,000 miles away.

These augmented reality meetings will one day put an end to those HON Circle miles collectors in airline lounges, and dramatically cut the costs and risks of travelling. In times of political uncertainty, many a meeting, even those outside C level, would probably be better housed in a safe, virtual room. And the environment will benefit from less air traffic, something not to be ignored in view of climate change and pollution.

The cities of the future will become mega-cities. Already today, 30 million people live in the greater Tokyo area. Living space is shrinking and retail space in cities is becoming ever more precious. All these people will have to be supplied with their needs using inventive supply-chain concepts, because retailers will not be able to store every part and every color of every product on location.

It is conceivable, for instance, that customers entering a shopping mall will be given data glasses that show them the innumerable variations on the red sweater on display, in green, yellow, blue, etc. Then, using the personal data that were scanned into their glasses when they arrived, they will be able to buy the product they desire and have it delivered to their home. The prized purchase will already be on its way to their domicile before the buyer has finished her cappuccino in the mall – she won’t even have to carry any shopping bags.

Only Nintendo will have difficulties. Experience shows that a fast-moving consumer society gets bored quickly, and soon starts looking for the next entertainment trend.

But most importantly:

Who will want to just play Pokémon Go with colorful monsters when they could be out there generating true added value for customers in the real world using exciting augmented reality applications?
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But what uses could it have outside of gaming? For instance in industry? What is augmented reality capable of, and how does the technology behind it work?

Read our top-10 thoughts on where augmented reality is now and how exciting its prospects are for the future. Go on a fascinating journey with us to the world of augmented reality!

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