WHITEPAPER

5 ways to push your customer service to the next level with Augmented Reality

The advancements in Augmented Reality (AR), combined with its growing popularity and accessibility, have caught the attention of utilities and telecommunication companies. These businesses have discovered how this technology can help increase customer satisfaction levels by providing top-of-the-line field service and improving their customer experience at the same time.

Before deciding whether to adopt AR, companies need to be well informed of the primary benefits and limitations of this modern technology.

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Introduction

Delivering an excellent field service is a vital part of keeping customers happy. However, technicians often come across jobs for which they cannot provide a satisfactory solution due to lack of information, experience, or skills. In these cases, companies must empower their crews with the right tools to help them perform their tasks quickly and to the highest standards, thereby driving down operational costs and improving customer satisfaction.

One innovative and essential tool that utilities and telecommunication companies are looking into is AR, which represents a significant leap towards workforce and customer service optimization and greatly enhances the relationship and engagement among the field, the office, and the customers.

As a combination of three cutting-edge technologies from the fourth industrial revolution (Internet of Things, digital image recognition, and mobile devices), AR provides an enhanced view of the world that can be seen through specialized glasses or handheld devices. Thanks to important hardware innovations such as integrating cameras to smart glasses or Head Mounted Devices (HMD), AR has achieved significant advances. Nowadays, HMDs use stereoscopic cameras to sense their environment in 3D and translucent screens to visualize virtual and real objects simultaneously. Software is also a critical factor driving rapid improvements in AR technology with image recognition algorithms powered by artificial intelligence at the forefront.

Using this technology, field workers and customers can benefit from having the latest information available at a moment's notice. For example, they can use AR to visualize detailed information about an upcoming job and follow troubleshooting guides, respectively.

What are the required elements to get started with AR?

There are three key elements required for any AR implementation:

Mobile devices such as smartphones or smart glasses

Two main types of mobile devices support AR by providing the interface between the user and the virtual world.

The first type is the conventional smartphone. In addition to their standard features such as internet and GPS, these devices must be equipped with a high-resolution camera to detect objects and a gyroscope to determine the device's orientation . Smartphones have the advantage of being cheap, but their functionality and AR capabilities are limited. It should also be noted that when workers are using a hand-held device, they have less situational awareness since one hand is occupied by the device, making the technology less practical and applicable to real-world situations. Additionally, constantly holding a mobile device may make technicians far more prone to accidents.

The second, far more effective type of AR devices are Head Mounted Devices (HMDs) such as smart glasses. HMDs typically include the following features:

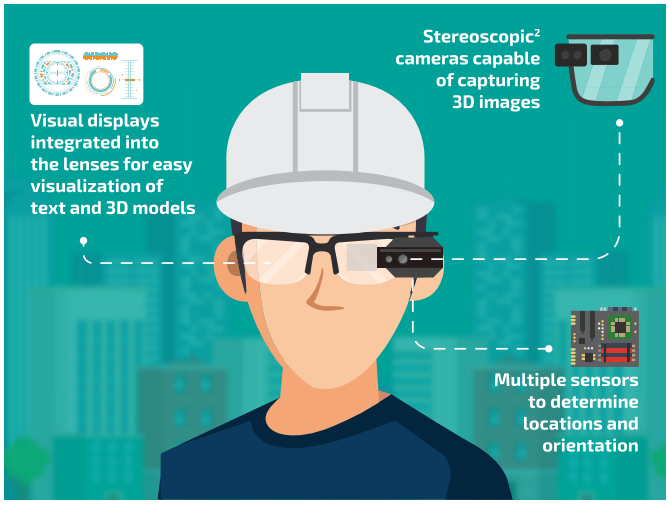

Figure 1. Smart Glasses.

It is important to bear in mind that despite the versatility of HMDs, their ease of use, and their superior AR capabilities, they cost significantly more than smartphones.

AR software

Similar to other new technologies, AR requires a software solution to reach its full potential. Due to the rapid growth of AR over the past years, several AR applications for service providers have entered the market. Still, only a small amount of them currently offer mature solutions.

While these solutions offer object recognition and the superimposition of three-dimensional models, it is important to point out that significant resources (in terms of both financial budget due to software acquisition and man-hours for training sessions) must be invested to implement these advanced features effectively.

A database of equipment and procedures

A functioning AR solution requires a robust database containing organized and updated information about installed equipment and devices as well as their technical specifications. This database should include procedures, videos, images, 3D models, and other relevant documents to support the fieldwork and customer service processes.

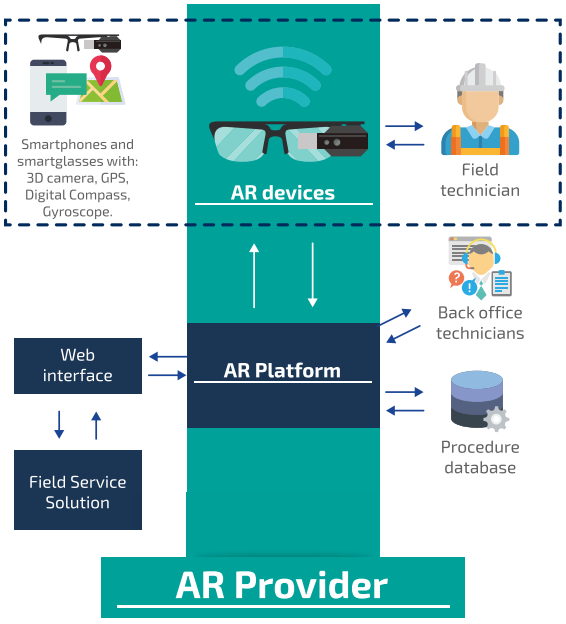

Figure 2. AR Architecture.

What are the main applications of AR?

After working out all the kinks of implementing an AR solution like choosing the right device, picking the software provider, and setting up a robust database, companies can start looking into what use cases suit them the best. There are many AR applications such as remote assistance, procedural guides, presentation of information via Heads-up-Display (HUD), AR drones, and AR user assistance and manuals that companies can explore and apply to their processes and operations.

Remote assistance

A large proportion of America's infrastructure is approaching the end of its useful life[1]. Therefore, service providers across the country are implementing gradual replacement programs to bring their networks up to modern standards. Unfortunately, there is a lack of quality digital records for a large portion of this aging infrastructure, and much of the knowledge is contained within the minds of experienced technicians who are quickly approaching retirement.

Due to this, junior field workers frequently come across aging equipment such as antiquated pumping stations or switchgears, and they need the support to complete their activities and make informed and safe decisions. However, it is logistically and economically impractical to pair every junior technician with somebody who has more industry experience.

AR remote assistance offers an excellent way for experienced workers to help inexperienced staff without having to go all the way out to a worksite for every query. With the confidence of having a direct video link to senior technicians, field employees are more likely to ask for help when they come across something they are not sure about, which improves efficiency and reduces the chance of injury. In the energy industry, having good information is especially important, as mistakes such as bending a paper-insulated cable or operating out-of-date switchgear can be fatal.

In addition to the possibility of streaming video live from the field to the office, employees can send data back to the technician in the form of text, images or even three-dimensional models that appear directly in their field of vision.

1. Infrastructure Report Card, 2017, https://www.infrastructurereportcard.org/

"It's also seen as an easier first step vs. costly AR content creation. In our research, a third of organizations are currently using live video"

The Service Council

Figure 3. Application 1 - Remote Assistance.

Head-up displays (HUD)

With a HUD, a field worker gains access to technical specifications and sees insightful super-imposed data on real objects such as pipes or electrical equipment. This way, relevant information captures the technician's attention more effectively than if it were presented on their phone or written on a piece of paper. For example, in dangerous situations, putting warning messages directly into their field of vision is a very effective way to make them aware of risks.

Figure 4. Application 2 – HUD.

Procedural Guides

Technicians can use AR to access procedural guides to consult the required steps for a particular task. To make this work, it is necessary to have a detailed database, which contains up-to-date information about procedures and equipment relevant to the company's operations. An advanced AR system allows field staff to access the procedural guide for a task by merely looking at equipment registered in the database like photovoltaic systems and meters for the utilities industry, or hardware in a Base Transceiver Station (BTS) in the case of the telecommunications industry.

Figure 5. Application 3 - Procedural Guides.

Drone-enhanced AR

Getting a live, bird's-eye view of the situation at hand was nothing more than a dream of the past generations of field crews. With today's technology however, crews can leverage the power of AR and combine it with the versatility of drones to benefit from augmented information to makee the right decisions while completing jobs on the field.

After arriving at the order's location, crews can deploy a drone to visualize their surroundings and identify life-threatening situations such as floods or sinkholes. Combining the drone's view with AR will allow them to see crucial infrastructure, including roads, utility poles, power lines, and more, even if submerged underwater, giving crews valuable insight when executing field orders.

Figure 6. Application 4 – Drone-enhanced AR

AR User Assistance and AR Manuals

While AR can significantly increase crews' productivity, it can also reduce the amount of physical work needed at the location of the order. AR will allow the customers themselves to resolve their requests, ultimately increasing satisfaction and lowering field operation costs. By providing customers with an AR application for their smartphones, service providers can easily guide them on troubleshooting simple issues such as router or smart thermostat configurations. There are two main ways AR can be used to assist customers remotely:

1. AR user assistance: like remote assistance for crews, a back-office employee provides graphical help through the AR application, guiding customers with on-screen instructions on how to solve their problem.

2. AR Manuals: like in procedural guides for crews, customers are presented with preconfigured step-by-step instructions on how to solve simple issues on their own, without scheduling a visit.

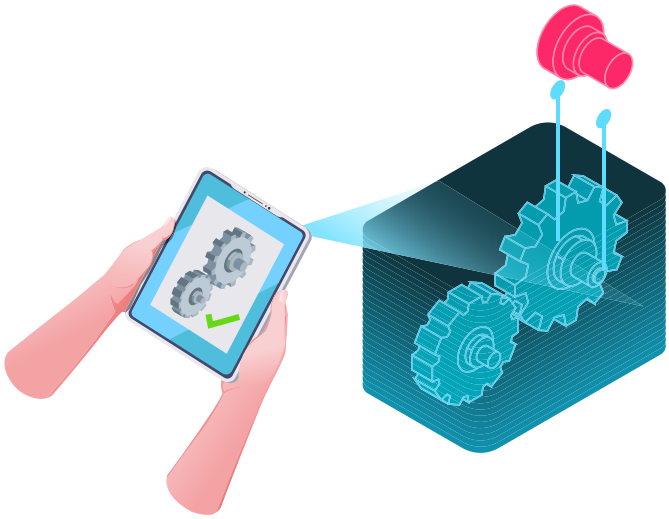

Figure 7. Application 5 - AR User Assistance and AR Manuals.

Why should you use AR in your company?

Many companies can feel intimidated to implement new technologies such as AR. Nevertheless, as the following section describes, there are real reasons why companies should jump into the AR universe.

1. Improve the execution of field work

The application of AR has further empowered technicians by supporting their daily work and increasing the precision and effectiveness with which they complete their tasks, therefore boosting customer satisfaction. Likewise, AR reduces the time invested in work execution by showing relevant information about the steps required to complete a task. With this information available, crews can also respond faster to different orders, including unforeseen events.

2. Benefit from the rapid development of AR technology

Another consequence of the technological advancements of AR is the reduction of overallcosts. This results from constantly increasing the quality and number of hardware and software options on the market and reducing prices due to competition and economies of scale. In turn, this has pushed more and more companies to venture into the world of AR. However, the cost of acquiring and deploying AR solutions continues to be significantly higher when compared with conventional options such as video calling.

"Nearly 60% of the population believe that currently available AR applications are ready or near-ready for primetime. Another 30% aren't convinced"

The Service Council

3. Mitigate the impact of the skills shortage

For any company, the tasks done by experienced personnel is a vital resource for their operations. However, due to the large number of baby boomers retiring in the coming years, service providers are losing their most experienced workforce at an alarming rate. This phenomenon has left them with no other option other than to invest heavily in the acquisition and training of new staff.

AR is a useful tool capable of greatly reducing the impact of an aging workforce. By providing digital training, it is possible to quickly enhance the skills of new employees in a more intuitive and visual way at a lower cost. As mentioned previously, AR is also an excellent tool for providing junior staff with remote assistance from more experienced technicians. Despite this, some skilled workers could feel threatened by new technology and the automation that comes with its implementation.

4. Make your life and the life of your customers easier

Thanks to its intuitive interface and its ability to respond to voice commands with natural language processing, AR is becoming a daily part of our lives, both at work and at home.

The user-friendly nature of AR breaks down traditional learning barriers and makes training processes easier for everyone. AR has the flexibility to present information interactively in various formats, thereby making a wide range of learning methods available and decreasing the time required to get the workforce acquainted with new procedures and services. It also allows customers to access updated and easily understandable procedures to quickly resolve their issues in a pain-free manner.

Conclusion

AR is a quickly developing technology that can bring significant benefits to customers and companies alike, thanks to its numerous applications that range from real-time crew support to automatic customer-facing troubleshooting guides.

The success of a company's AR implementation depends greatly on their commitment to producing and constantly improving company documentation, processes, images, 3D models, and videos that support AR functions. Furthermore, they must leverage technological advancements by looking for a software provider with a proven track record of incorporating the latest AR innovations.

With enough financial investment and perseverance, an AR implementation strategy could yield a company's field operations safer and more productive and could also push customer service to the next level, by giving meaningful information to rapidly solve all service inquiries while reducing operational costs and unnecessary displacements on the field.

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