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AUGMENTED REALITY FOR HEALTHCARE

ENVIVENT INTERACTIVE DEVELOPMENT

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CHALLENGE

Pharma, medical instrumentation, and genetics/genomics-focused companies traditionally take a more conservative approach with any marketing tactics based on the newest technologies. Nobody wants to take a risk until the larger companies try it first, and get it approved by their legal teams and the Food and Drug Administration (FDA). The field of Augmented Reality (AR) has been going through its renaissance for the last couple of years as we see the market inundated with more and more wearable devices, helmets, glasses, and haptic sensors. Unfortunately, wearable devices do not necessarily provide too many valuable use cases for the healthcare marketers. So what are we to do?

SOLUTIONS

Fortunately, the overwhelming majority of the healthcare professionals and patients already owns the latest and greatest devices capable of delivering amazing AR experiences. We are talking about tablets and smart phones, of course.

While the "wow" factor of donning futuristic devices on one's body is not there, mobile devices offer many significant advantages over wearables:

- Mobile devices are always "on"
- Potential audience already owns them
- No complicated set up
- No need for tedious configuration based on individual's physiology (e.g., height, pupillary distance)
- Most people upgrade their mobile devices every 1-2 years, giving us access to the latest technology
- Google and Apple incorporate the Augmented Reality frameworks directly into their mobile operating systems (ARCore and ARKit)

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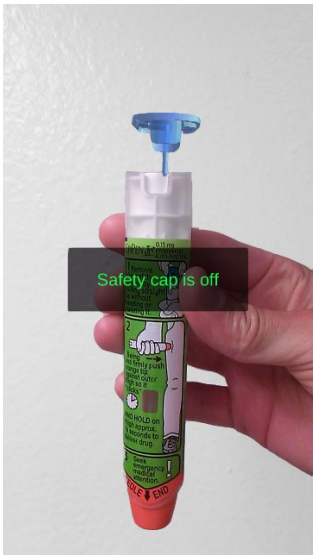
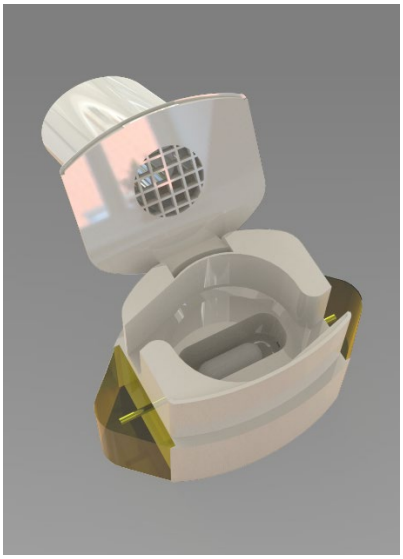
CURRENT USAGE OF MOBILE DEVICES FOR AUGMENTED REALITY IN THE HEALTHCARE INDUSTRY (USE CASES)

1. Interactive Instructions for Use in AR
    - **Injectors, inhalers, etc.** – Patients can point their phone/table at the physical device to get an interactive walk-through of its features. The camera can detect and recognize the physical device and its orientation in space. We can then display messages specific to the device orientation (e.g., instructions indicating that an injector needs to be positioned vertically with the safety cap pointing up). Animated arrows and 3D models of individual features, such as buttons, caps, needles, and mouthpieces, can be overlapped and synchronized with what the camera "sees" in real time.

      As of February 2019, the recognition capabilities of physical objects by tablets and phones are fairly limited. If the object does not have very distinctive features visible from multiple angles, it may be difficult or impossible for the camera to recognize it. An alternative strategy in these cases is to either apply adhesive stickers or print special patterns on the actual device, similar to the QR and bar codes. These markers can then be recognized by the camera.



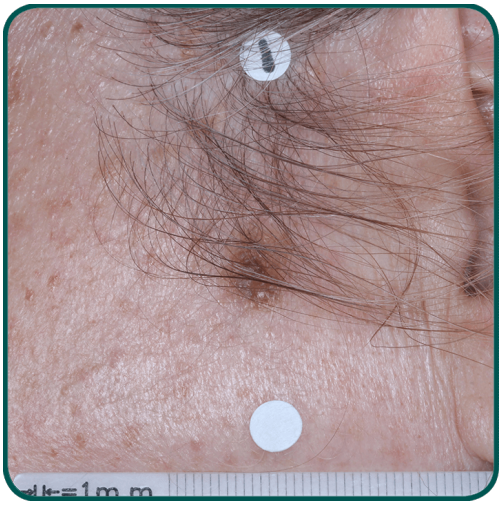


2. AR Apps to highlight vision impairment
    - This type of apps can demonstrate how certain conditions may affect eyesight, both directly related to the loss of sight (myopia/presbyopia), and neurological conditions, such as the migraines. In the example below, a patient can talk to their doctor during the diagnostic process of a silent migraine, and choose one of several specific types of halo effects from the app. This visual effect is then applied on top of the camera view in real time, helping the patient and the doctor understand each other.

    - In reference to the figure below the AR apps can help people with different types of color blindness see what the unaffected people can see by changing some of the colors in real time.

3. AR Apps to aid in the medical device maintenance
    - Imagine you are a support technician, who walks into a hospital facility full of large sterilizer machines, which require periodic maintenance and replacement of refillable chemicals. Where do you begin? What if some of the machines are in critical condition and require more immediate attention? You simply point your phone or tablet at the room and get an instant view of the chemicals levels, maintenance alerts, etc. – displayed directly over each individual machine's components.

4. AR apps for "Before and After" visualization
    - Surgeons can help their patients visualize the outcomes of the procedures by letting them see the results of the medical imaging overlapped directly onto their body. Cosmetic surgery application allows to see the potential outcomes of the procedure directly.



5. Surgical assistance with the aid of AR apps
    - Mobile devices can act as a looking glass to highlight specific areas during the procedure in real time. Real time communication with secondary experts is also available.

CONCLUSION

There is a number of innovative things that can be done today with Augmented Reality (AR) in the field of healthcare using mobile devices as the target platform.

Envivent can help you with the concept, design, implementation and rollout of an AR solution for your healthcare clients.