Custom Surgical developed the first AR smartphone application that guides and scores capsulorhexis in Cataract surgery.

Cataract surgery is currently the most commonly performed surgery on humans worldwide and treats a disease that results in the clouding of the human lens. If left untreated, cataract can lead to blindness, as light is no longer able to reach the retina. The world health organization (WHO) estimates that 65.2 million people were affected by vision loss due to cataract in 2019.

The main causes of cataract are trauma, congenital disease, and especially age. Demographic changes lead to an increasing incidence of cataracts and, thus, to a higher demand for ophthalmologists who can perform cataract surgery. However, cataract surgery is a challenging procedure, as it must be performed under microscope guidance and requires micrometer-level precision. Hence it has a long learning curve.

Learning with the support of an expert surgeon is very costly. Students usually rely on constant support from expert surgeons to enhance their techniques. Currently, VR training systems are being used to help surgeons and students improve their outcomes. Nevertheless, these systems are costly and lack feedback from real physical instruments and eyes, limiting their use to well-funded hospitals and training institutions.

“There is a need to develop tools to help train surgeons and assist the entire population needing ophthalmic surgeries.”

The most critical step in cataract surgery is capsulorhexis, and mastering it takes time and practice. We are presenting *iTrain Rhexis* in collaboration with Bioniko*,* an accessible augmented reality system to use as a training and evaluation solution for capsulorhexis for any surgeon worldwide. In contrast to the current simulators, our proposed solution is much easier to set up, can evaluate the surgeon’s performance based on predefined criteria, and provides the possibility for further research based on the collected data through this training system.

Research made in conjunction with the University of Zurich and the Ludwig Maximilian University of Munich, Dr. Muth showed very promising results using the AR application for training capsulorhexis. Nevertheless, the more interesting discovery was that the expert support group performed worse than participants with no support. Together with the fact that this group took the least amount of time per run, it could indicate that when in the presence of a mentor, students feel more pressured, which limits their learning experience. Tools like ours could enable hybrid data-driven education. Students can train alone at the beginning and use a mentor’s time when they are comfortable with the basics and need support mastering the procedure.

“*We can continue implementing Augmented Reality applications that guide students on the different steps of microscopic surgical procedures. This will allow us to create affordable, portable, and highly customizable Augmented Reality setups to train large numbers of students in microscopic surgical procedures. Thus, decreasing the learning efforts and time, and therefore increasing the number of qualified personnel to operate.”*

iTrain Rhexis is the first AR app to train eye doctors to perform cataract surgery on their own smartphones. Now the training can be much more efficient and use experts' time more productively.

Students can take their time to understand how it works and get accurate guidance before an expert is ready to give more advanced advice.

In conjunction with Bioniko and Ophthalmo University, Custom Surgical is now able to empower students and use experts' time more effectively through an Augmented Reality app to do their own capsulorhexis for cataract surgery.

How does it work?

The student needs a MicroREC, a Bioniko OKULO eye model, and a smartphone. The setup takes no more than 5 minutes, and everything you need is on the app to guide you through the process!

The app will be available soon. To any questions or to be in the waiting list, please send an e-mail to: giuliana@customsurgical.co

AT ESCRS

At **booth B30**, Custom Surgical will make a competition for capsulorhexis through the AR app with a Bioniko Eye and in a Leica Microscope M822 F40. Every ophthalmologist, student, or resident is welcome to try out for the first time the first AR app for rhexis on the smartphone and see their score through Artificial Intelligence.

The winner *will get a prize* at the end of the congress.

Here you can schedule your spot.

AT AAO

At **booth 5104** Custom Surgical and Bioniko will make a competition for capsulorhexis through the AR app. Every ophthalmologist, student, or resident is welcome to try out for the first time the first AR app for rhexis on the smartphone and see their score through Artificial Intelligence.

About the company

Custom Surgical is modernizing ophthalmology through Augmented Reality and Artificial Intelligence software that helps train eye surgeons, improve surgical outcomes and allow early diagnosis of eye pathologies.

Using the MicroREC optical system, Custom Surgical is currently allowing ophthalmologists to digitize any microscope with their own smartphone, cost-effectively and universally.

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