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technologies

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aiworks

AIWorks is an artificial intelligence software that automates repetitive learning and discovery through data, aids in decision making, and performs frequent high-volume computing tasks without fatigue or error.

AI - assisted – cholangioscopy

Standard cholangioscopy

AIWORKS – CHOLANGIOSCOPY

Computer-aided detection (CADe) software that works with a standard white-light endoscope and any brand of cholangioscopy probe to identify areas that suggest neoplasia in the bile duct. This software is capable of detecting mucosal abnormalities with high precision, using macroscopic malignant features proposed in the Carlos Robles-Medranda (CRM) and Mendoza classifications.

The software performs detection at an average of 60 frames per second, which allows it to be applied during cholangioscopic procedures in real-time, or on previously recorded cholangioscopic procedures, both of which can be used to train less experienced endoscopists to recognize neoplastic lesions in the bile duct. When it detects a lesion, the software automatically highlights the area and emits a beeping sound. Additionally, it can take screenshots of its detection during the procedure and save them in a ZIP file to review them at any other time.

The potential benefits of this software include:

- Provide a real-time artificial intelligence second opinion on areas suggestive of neoplasia.
- Improve efficiency to analyze data and reduce analysis time.
- Improve cost-effectiveness by assisting in the proper acquisition of specimens through AI-assisted sampling.
- Reduce risk errors among experts.
- Educate trainees and less experienced endoscopists to identify neoplastic lesions with greater precision by automatically identifying and highlighting areas that suggest neoplasia.
- Decrease variance between visual impression and histological diagnosis.
- Improve consistency in decision-making.
- Reduce interobserver agreement mismatch between endoscopists.

The diagnosis of malignancy in indeterminate biliary strictures is challenging. Endoscopic retrograde cholangiopancreatography (ERCP) is the most used procedure to evaluate the biliary system, but it has low diagnostic accuracy and imaging limitations. While several malignancy classifications (Monaco, Carlos Robles-Medranda, and Mendoza classification) have been proposed based on cholangioscopic features observed during digital cholangioscopy, even among experts, interobserver variability in the detection of potential neoplastic lesions using these classifications still exists.

To overcome the diagnostic accuracy limitations of ERCP and cholangioscopy visual impression mismatch, the Instituto Ecuatoriano de Enfermedades Digestivas (IECED; Guayaquil, Ecuador), in conjunction with mdconsgroup (Guayaquil, Ecuador), created and perfected the AIWorks-Cholangioscopy software. This software is a novel

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visualization tool that enables direct, high-resolution of the pancreaticobiliary system, and is capable of overcoming existing clinical practice paradigms because computer-assisted detection of areas suggestive of neoplasia could potentially impact the treatment of indeterminate biliary strictures. In addition, the software can assist in proper AI-guided tissue sampling, which can lead to earlier treatment, fewer patient reinterventions caused by inadequate tissue sampling, and reduced healthcare-related costs.

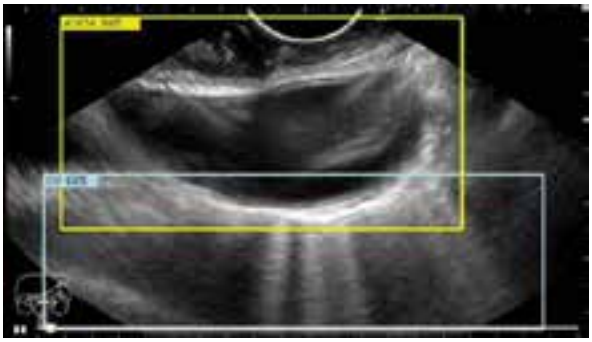
AIWORKS – EUS

Endoscopic ultrasound (EUS) is a highly skilled procedure that requires training in endoscopy and image interpretation. Globally, there are a limited number of formal training facilities for this advanced endoscopic procedure, resulting in a shortage of endosonographers, which in turn limits the number of procedures offered to patients. The American Society of Gastrointestinal Endoscopy and the British Society of Gastroenterology have proposed, separately, detailed training programs to achieve competency, but the steep learning curve of EUS requires trainees to perform hundreds of procedures before achieving competency. The ASGE recommends that trainees complete 150 supervised EUS procedures prior to competency assessment, with at least 50% of procedures evaluating the biliopancreatic system. The British Society of Gastroenterology (BSG) recommends trainees complete 250 EUS procedures, from which 150 should evaluate pancreaticobiliary cases, 20 should include subepithelial lesions, and 80 should include

luminal cancers. However, more than 20% of advanced-year fellows do not receive hands-on training, and less than 50% of fellows performed more than 200 EUS procedures, highlighting the need for objective training.

To overcome this limitation, the Instituto Ecuatoriano de Enfermedades Digestivas (IECED) in Guayaquil, Ecuador, in conjunction with mdconsgroup (Guayaquil, Ecuador), created and perfected AIWorks-EUS, a novel computer-assisted detection (CADe) software that allows anatomic structure recognition during EUS procedures. AIWorks-EUS works in conjunction with a standard white light endoscope and any endoscopic ultrasound probe. The software was trained to detect twenty-one anatomic structures observed during the different stages of EUS (mediastinal, gastric, and duodenal stages).

It was trained using over 200.000 images of EUS procedures in healthy patients, making it able to detect normal anatomical structures observed during the procedure with high precision and recall. When a structure is detected, the software automatically highlights it with a bounding box, takes screenshots of the detected structures, and saves the detections in a separate folder as a ZIP file. Furthermore, the system performs detection at an average of 60 frames per second, allowing the software to be applied during real-time EUS procedures and on previously recorded EUS videos.



Benefits

- Provides highly accurate AI technology that can assist trainees in recognizing complex structures detected during EUS, an advanced endoscopic procedure.
- Reduces interobserver agreement mismatch.
- Provides objective quantitative training metrics for immediate evaluations and continuous monitoring and comparison of performance with AIWorks-EUS offline training software.
- Improves observers' competency and efficiency in image recognition.
- Provides important landmarks to take into consideration when performing an EUS in real-time.
- Improves trainees and less experienced endoscopists assistance in real-time, increasing competency and efficacy.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HXTEND

HXtend System

Traditional monitors lack versatility in terms of screen size and movement, and their placement in operating rooms can be time-consuming and a possible source of cross-contamination. Additionally, visual input monitors may not always be ideal or ergonomic due to screen location, screen brightness in a dark operating room could cause ocular fatigue, and the high energy consumption of monitors could result in high carbon emissions that increase pollution. To address these issues, the Institut

o Ecuatoriano de Enfermedades Digestivas (IECED), a tertiary gastroenterology and endoscopy center from Guayaquil, Ecuador, collaborated with mdconsgroup (Guayaquil, Ecuador), to create the HXtend system, which aims to replace surgical monitors within endoscopy units. The system works utilizing the dedicated HXtendprocessor and software, paired with the HoloLens (Microsoft Corporation; Redmond, WA, USA).

Real-time global connectivity
The HXtend system is Wi-Fi enabled, allowing for real-time virtual global connectivity and in-hand interaction with multiple endoscopists during a procedure. The system's compatibility with real-time global connectivity and voice commands allows for more efficient collaboration between multiple endoscopists, which can lead to better outcomes and improved patient care.

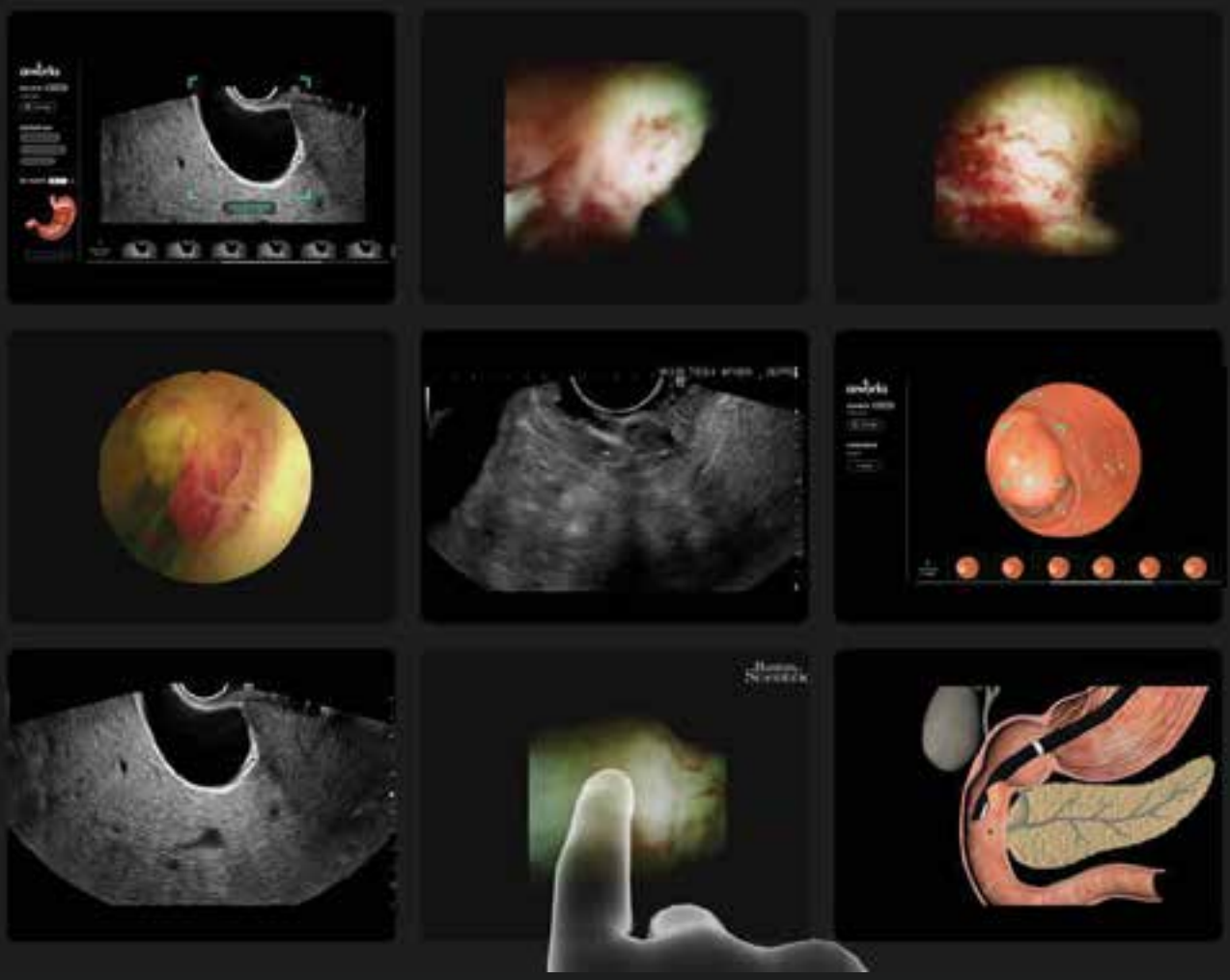
HOLOGRAMS

HXtend is a system designed to fully digitalize and integrate visual input, replacing monitors and other visual resources used in operating rooms for advanced procedures such as gastrointestinal endoscopies and surgeries. The HXtend system employs Mixed Reality (MR) technology based on holograms, which can be controlled by the endoscopist and/or the endoscopist's assistant during procedures, avoiding risk of infection.

This system detects hand gestures and adapts to each user's needs. The holographic screens are customizable and can receive input from up to nine video processors of any brand, showing a corresponding number of up to nine Full-HD holographic screens with various tailored features such as layout relocation, resizing, brightness, and saturation. This system is compatible with voice commands, allowing the operators to personalize the screens during the procedures upon request but may also be done manually with screen buttons.

Furthermore, the software detects the adjacent area through spatial mapping, so that the chosen operative screens constantly follow the user's visual field, making it easier to stay in touch with the reality.

The HXtend system could be the cornerstone for remote assistance, remote training for gastrointestinal endoscopy fellows, and remote endoscopic procedures.



Replacing monitors with HXtend MR technology within operating rooms could provide the following benefits:

Versatile screen size:

The HXtend system provides customizable holographic screens that can receive input from up to nine video processors, allowing for up to nine customizable Full-HD holographic screens. This allows for a flexible and versatile screen size than can be tailored to the user´s need. ens with various tailored features such.

Improved ergonomics

Traditional monitors may not always be ergonomically designed, impacting the operator's comfort level during a procedure. The HXtend system's holographic screens can be controlled by the endoscopists and assistants during procedures, allowing for a more comfortable and autonomous interaction.

Reduced risk of infection

Since the HXtend system is operated using hand gestures and voice commands, avoiding the need for the operator to touch monitors or other visual resources during a procedure, reducing the risk of cross-contamination.

Real-time global connectivity

The HXtend system is Wi-Fi enabled, allowing for real-time virtual global connectivity and in-hand interaction with multiple endoscopists during a procedure. The system's compatibility with real-time global connectivity and voice commands allows for more efficient collaboration between multiple endoscopists, which can lead to better outcomes and improved patient care.

Eco-friendly:

Traditional monitors have a high energy consumption and carbon emission, contributing to pollution. The HXtend system reduces electricity consumption and carbon emission, making it more eco-friendly.

Cost-effective

Replacing all the monitors within operating rooms with the HXtend system is not only profitable, but it also reduces endoscopy suites costs by improving workflow, saving space and reducing electricity consumption.

Improved work efficiency

The HXtend system allows for an ergonomic, fast, and autonomous interaction, which optimizes work pace and procedural times. This makes the operator more efficient and productive.

More immersive and interactive experience

The use of MR technology and hand gesture recognition allows for a more natural and intuitive control of the holographic screens, which can lead to increased precision and accuracy in performing the procedure.

AITROL

Welcome! Today I want to talk to you about a solution we have developed to help medical centers optimize their patient care and administrative processes. This is AITROL, a software that has been designed to meet the needs of outpatient clinics and ambulatory procedures.

Organization and accuracy in the medical field are the most important, which is why you will have complete control of your patients. We cover the entire process of medical and administrative areas including the clinical history, HD image storage, admission process, purchases, accounting, finance, everything is stored in the cloud on servers strategically located around the world.

This way we can provide our clients with concrete and reliable statistical data so that they can make a Medical, Financial, Laboratory analysis and make the right decisions at the right time.

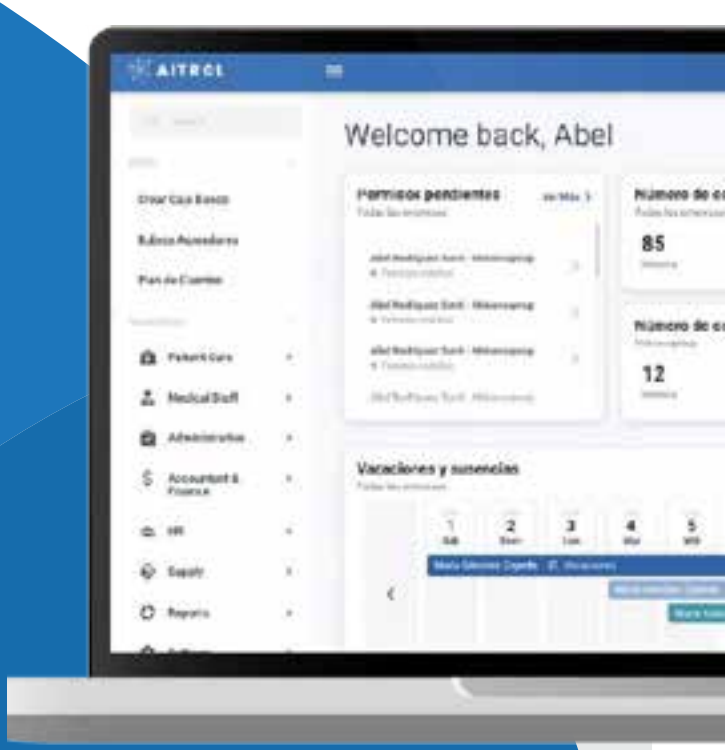
You will have access to a bank of HD images and videos of all your patients in the Cloud and always available to consult the diagnoses from anywhere you need it with any device.

What is AITROL?

AITROL is a comprehensive software designed to meet the needs of medical centers regarding patient care and administrative processes.

AITROL consists of about 60 modules that cover the entire patient flow and necessary options to streamline medical processes.

From scheduling a patient, collecting documents necessary for billing or legal requirements, patient tracking in each room, to entering medical supplies for cost accounting, cash receipts, billing, payroll, anesthesia registration with tablet data entry for graphs, laboratory tests, medical history, patient satisfaction surveys, statistical graphics, and much more.



Benefits of AITROL

1. **Process automation:** With AITROL, medical centers can automate many of their processes and reduce patient wait times. Reception staff can easily access patient information and medical history, allowing them to provide a more personalized service. In addition, the software allows for unlimited image storage, capture of images through the endoscope, digital zoom to images, simultaneous video recording while taking photos, and much more.

2. **Reduction of errors:** AITROL has been designed to minimize human errors in patient care and administrative processes. Electronic records and digital forms are more accurate than paper records and reduce the need for manual input.

3. **Time and money savings:** AITROL allows medical centers to save time and money by reducing manual processes, optimizing administrative processes, and reducing the costs of printing and storing paper records.

4. **Greater security:** AITROL has security protections against ransomware, SSL security certificates, and protections against SQL injections. In addition, the software has been web-based, which means it can be accessed from anywhere in the world with an internet connection and from any device they want.

AITROL feature

Patient scheduling: With AITROL, medical centers can easily schedule patient appointments. The software displays available time slots and sends reminders to patients.

Patient medical history: With AITROL, medical center staff can easily access the patient's medical history. This allows them to provide more personalized and effective care.

Document management: AITROL allows for the collection of documents necessary for billing or legal requirements, reducing the amount of paper documents and facilitating their storage and access.

Medical supply management: AITROL allows for the entry of medical supplies for billing.

with cost accounting, facilitating inventory management and reducing errors in the billing process.

Capture of images through endoscope: AITROL allows for the capture of images through the endoscope, meaning medical centers can capture high-quality images of procedures performed with an endoscope. This can be especially beneficial for medical centers that perform endoscopic procedures frequently.

Digital zoom for images: AITROL offers the digital zoom function for images, allowing medical professionals to obtain a more detailed view of the images and identify potential issues or details that may otherwise go unnoticed.

Simultaneous video recording while taking photos: AITROL allows for simultaneous video recording while taking photos, enabling medical professionals to capture not only static images, but also videos that may be useful for diagnosis or documenting patient progress.

Security protections against ransomware: AITROL features security protections against ransomware, ensuring that medical centers can be confident that their information is safe and protected against potential ransom threats.

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