KIMI: an innovative approach to medical distance learning

The KIMI platform for "Knowledge sharing in Medical Imaging" is a tool for monitoring professional training in gastroenterology. Organized around endoscopic images, it allows remote collaboration in real time between learners and specialists, with advanced ergonomics.

The KIMI project proposes a novel approach to professional medical training. The idea is to offer participants a "real-time" software platform for learning and exchange, based on images provided by endoscopy. Dedicated to gastroenterology, KIMI is thus different from other online educational tools.

"As a general rule, we are often confronted with several difficulties in terms of continuing education in medicine" explains Cédric Dumas, a teacher-researcher in computer science at IMT Atlantique, a specialist in human/machine interfaces and the project's leader. "It takes time, it's expensive, availability is limited... And in small hospitals, doctors don't always have good contacts. Worse still: very often, the skills acquired during the training are diluted because they are not applied... In short, there are losses at all levels." KIMI aims to alleviate these difficulties by giving participants access to remote training, in real time, in addition to face-to-face sessions. The objective is to foster knowledge sharing between specialists and learners, based on endoscopic images.

Antoine Bonneau, CEO of Zenika Nantes, Yasmine Doghri, research engineer recruited for the project and Cédric Dumas, professor at IMT Atlantique.

High quality images

The platform benefits from the considerable progress made in medical imaging. "Improvements in the quality of CCD sensors, lighting, zooming capabilities and filtering techniques now make it possible to obtain excellent quality high-definition images" says Cédric Dumas. "We can clearly see the vascularization of tissues, and this provides information on the pathologies encountered - we can detect cancer very early on, for example."

And above all, KIMI users - learners and specialists, a few dozen in number - can annotate and comment on these images. The platform's ergonomics offer many possibilities: it is possible to select a specific area of the image, to write a comment, to discuss it in real time... KIMI also integrates a pathological analysis result input. This allows the community of doctors and experts to make a relevant diagnosis and to decide on the treatment of the patient.

Specialists can also use KIMI to question the learners and evaluate their answers. When a problem is detected on the image, they can also order a complementary examination - a biopsy, for example. In a few days, an indisputable diagnosis can be established and shared.
Remote collaboration and diagnostic assistance

The platform thus functions both as an interactive forum bringing together students and specialists, and as a tool to assist in diagnosing and caring for patients. In the future, KIMI will be able to use the image bank and the accumulated knowledge to develop a diagnostic assistance tool using artificial intelligence techniques.

The origin of the project dates back to 2011: it all began with a collaboration between doctors who used endoscopy - first for the thorax, then in gastroenterology. Initiated in 2014, the platform was built in stages, notably with funding from the Pays de la Loire Region. A training tool, called Medimq, was tested and presented, before a first version of KIMI appeared in 2015. Little by little, its designers have perfected it. KIMI was used by the 2018 and 2019 classes of the University Diploma (DU) in Advanced Diagnostic Endoscopy at Nantes University Hospital, the reference course in France on this subject. And by 2022, KIMI should be adopted by the DU alumni.
The human dimension is paramount

"We are primarily interested in how people can work together," says Cédric Dumas. "This human dimension is now essential. To develop collaborative tools on real-time platforms, you have to understand the needs of users, customers, and the various players... The technical aspects alone are not enough. Designers and ergonomists, who were absent from IT companies a few years ago, now occupy a key position."

What remains now is to take the KIMI project from research to a more operational stage. To do this, the team signed a partnership in the summer of 2021 with Zenika, an ESN for technological and managerial innovation. The goal is to refine the platform and make it more reliable, in order to make it an "industrial" quality product... and if possible to market it. KIMI could, for example, interest a company operating in medical training, a medical equipment manufacturer, or an academic society...

IMT Atlantique and Zenika have already been able to recruit a research engineer, thanks to the financial support of the French post-Covid-19 Recovery Plan. In the longer term, KIMI could also be adapted to other medical specialties: the technologies used are easily replicable. "This type of "real-time" collaborative tool has considerable potential for development," says Cédric Dumas. "The human, collective dimension is a major benefit. Working with peers, observing, discussing solutions together... This is one of the ways forward for complex projects - in medicine as in many other fields."

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