

HemoLens: Non-Contact Optical Screening for Fecal Occult Blood

HemoLens is a non-contact optical screening method for the detection of fecal occult blood in stool samples. The presence of fecal occult blood can be a sign of a number of serious conditions, from colorectal cancer to inflammatory bowel diseases and chronic anemia. Through advanced data collection and processing algorithms, HemoLens uses nothing but a smartphone and external LED to achieve sensitivities comparable to some laboratory methods, showing promise for broadening the availability of these crucial screenings.

What is the Problem?

Colorectal cancer is one of the leading causes of death in the United States, making early screening and detection of crucial importance. This can be done through a colonoscopy for best results; however, the high cost and invasive nature of the procedure leads to nearly 50% of patients referred to colonoscopy screenings failing to follow through. Lab-based screenings are done through the detection of fecal occult blood in stool samples, through tests such as fecal immunochemical testing (FIT) and guaiac testing for fecal occult blood (gFOBT). Fecal occult blood presence found through these screenings can not only help detect colorectal cancers but are also associated with other serious conditions such as inflammatory bowel diseases and chronic anemia.

While more accessible than a colonoscopy, these laboratory methods still present issues. Patients must physically collect, package, and transport stool samples to labs for testing. Each step of this detracts from the number of patients following through. Therefore, if these requirements could be circumvented through an at-home, non-contact and accessible method for fecal occult blood screening, significant progress could be made in getting screening for millions worldwide who would benefit from it.

What is the Solution?

HemoLens is a non-contact optical method for detecting occult blood in stool samples, consisting of a smartphone and an external LED light to achieve detection rates comparable to gFOBT laboratory testing. Its algorithm is the heart of the innovation, using spectral imaging to correct for various background conditions to arrive at a quantitative result. Depending on the reflectance characteristics measured, the algorithm determines a "blood score" which is mapped to the content of fecal occult blood within the sample. This screening test can be done without handling the sample or sending it to a laboratory and can therefore be conducted as often as every bowel movement of a particular patient.

Technology ID

BDP 8614

Category

Selection of Available Technologies

Authors

Babak Nazer

Learn more



What is the Competitive Advantage?

HemoLens offers greater convenience, availability, and frequency of use along with quantitative detection comparable to some laboratory studies. HemoLens offers results 100 times more sensitive than can be detected visually, on par with the sensitivity of the gFOBT laboratory method. While HemoLens is not meant to replace very high sensitivity methods such as colonoscopies or FIT testing, the ease of use and non-contact nature of the screening can only serve to help get screening to more patients who need it.

HemoLens, unlike other optical approaches to detecting fecal occult blood, has a unique advanced algorithm for data collection and processing. Through proprietary spectral imaging methods, the device is capable of estimating quantitative measures of fecal occult blood instead of qualitative estimations offered by other methods.

Customer discovery has shown substantial interest in HemoLens. Screening patients prefer it to colonoscopies, and patients routinely monitoring their own health (especially colon cancer survivors) would prefer it due to screening frequency possible with this tool. Health professionals also see opportunity as an adjunct test to colonoscopies or between annual FIT tests particularly among more anxious patients, and among patients averse to invasive colonoscopies or physically manipulating their stool. These above advantages put HemoLens in an excellent position to increase screening rates worldwide, combatting some of the leading causes of death.