

# C-SCOPE

## Low-cost endoscope design for AI-based cervical cancer detection

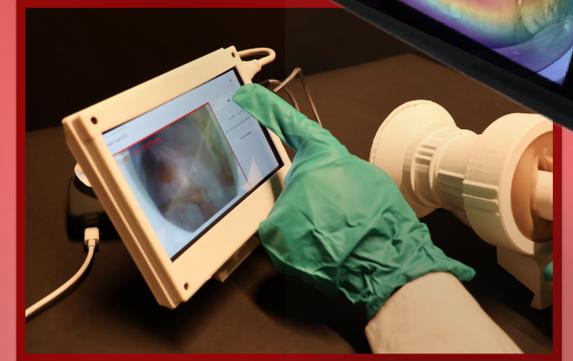
Cervical cancer is a leading cause of death for women in low- and middle-income countries (LMICs) like Ethiopia, where barriers such as cost, distance, and a shortage of specialists prevent effective screening. Existing visual inspection methods in local clinics often lack the reliability needed for early detection, leading to preventable deaths. To address this, we have developed an integrated, low-cost (<€200) AI-assisted cervical imaging system. The device uses a novel cross-polarization filter on an off-the-shelf endoscope to capture glare-free, high-quality images. A removable hardware guide ensures safe, repeatable positioning, while an AI model running on a portable Raspberry Pi provides real-time sharpness feedback and diagnostic classification support to non-specialist users. This system is designed to function as a "digital endoscope," empowering local healthcare workers to perform accurate screenings without expensive equipment. By enabling a "screen-and-treat" workflow, our solution aims to decentralize care, reduce the burden on overwhelmed referral hospitals, and provide women in remote communities with immediate access to life-saving diagnostics, transforming a multi-week ordeal into a single, confident clinical encounter.



Sterilizable endoscope camera



Real-time image quality prompts



AI analysis and classification

Arjun Gopkumar

Low cost endoscope for AI based cervical cancer detection

15.08.2025

Integrated Product Design

Committee

J.C.Diehl

Stefan Persaud

  
**TU Delft**

Delft University of Technology

Faculty of Industrial Design Engineering