

# Building Ethical, Scalable, and Sustainable AI for Child nutritional monitoring: The SAM Photo App Experience

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**Background.** Severe Acute Malnutrition (SAM) remains a critical cause of morbidity and mortality among children under five in low-resource settings. Despite decades of intervention, diagnostic delays persist, primarily due to reliance on manual anthropometry.

The **SAM Photo App** offers an innovative, AI-based screening solution that estimates malnutrition probability using a single photograph of the child's left arm.

## What is SAM Photo App?

The **SAM Photo App**, developed by **Action Against Hunger**, is revolutionizing how acute malnutrition is detected. This cutting-edge digital tool, grounded in rigorous scientific research, uses a simple photograph of a child's left arm taken with a smartphone to diagnose malnutrition with unparalleled speed, ease and an accuracy of >90.0% in last trials.

## How does it work? Intuitive Technology, Powerful Results

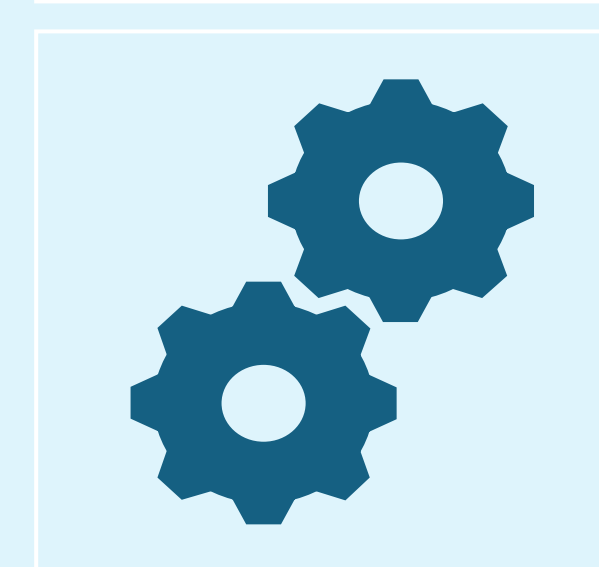
Using the SAM Photo App is simple and efficient. The process:

- Capture a photograph of the child's left arm—no internet connection required.
- A validated algorithm then analyzes the image to determine the child's nutritional status.
- Once the assessment is complete, the photo is automatically deleted to ensure privacy.
- When an internet connection is available, anonymous data is uploaded to a centralized database.

The development and scale-up of SAM Photo App is thought into three main principles:



**Ethical and interpretable AI.** Its geometric morphometric algorithm maintains clinical transparency, ensuring that healthcare workers can understand and trust its outputs. The system respects data privacy, minimizes sensitive data collection, and aligns with GDPR and local data protection frameworks, safeguarding children's rights and data sovereignty.



**Scalable and modular design.** The tool operates both offline and online, adapting to varying levels of digital infrastructure. Region-specific classifiers trained on locally sourced datasets enable equitable performance and promote ownership within national health systems.



**Adapted sustainable business model.** Its architecture allows partnerships with governments, NGOs, and private actors through localized licensing models and cost-effective deployment strategies. These agreements are thought to be profitable but only to cover operating and maintenance costs.

The project exemplifies how **AI for global health can be ethical, collaborative, and sustainable**—bridging innovation with equity. By strengthening early detection and enabling system-wide integration, SAM Photo contributes to more resilient health systems and healthier lives for children worldwide.



**SAM**  
SEVERE ACUTE MALNUTRITION  
**PHOTO**  
DIAGNOSIS APP



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