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artificial intelligence for monitoring malnutrition



07 July 2026

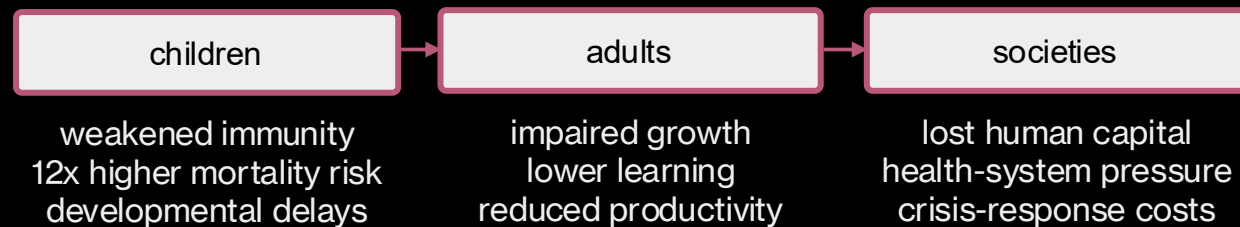
Ravi Bhavnani and Nina Link



[01]

Motivation

Episodes of child undernutrition – especially acute malnutrition or wasting – have immediate, lifelong and societal consequences.



35.5 million children

aged 6-59 months were acutely malnourished in 2025

\$3.5 trillion

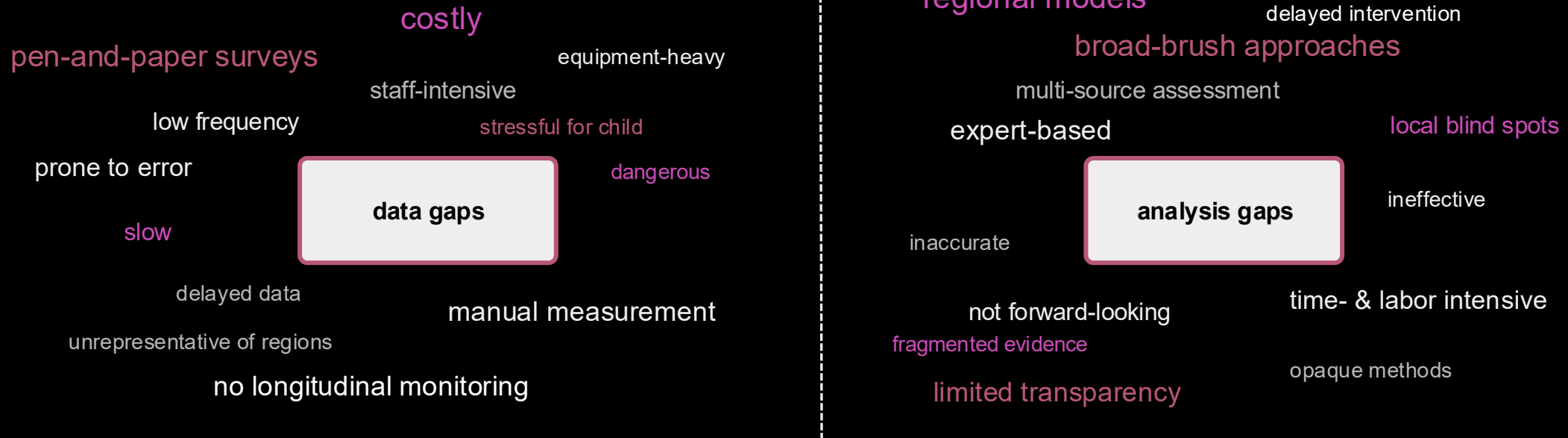
estimated global cost of undernutrition per year

23 regions

were affected by nutrition crises in 2025

Problem

In crisis-contexts, spiraling acute malnutrition prevalence is an early warning indicator for humanitarian emergencies and famine. Yet temporally and geographically granular information on local nutrition dynamics is usually scarce. If data is available, it lacks transparent analysis.



Smartphone-based nutrition monitoring is a low-cost, scalable tool to bridge evidence gaps and enable timely intervention.

State-of-the-art

AI is gaining increasing traction in app-based nutrition monitoring.
Approaches differ substantially in focus, key features, and functionalities.

	WELT HUNGER HILFE	 ACTION AGAINST HUNGER	WADHWANI	 GENEVA GRADUATE INSTITUTE
app name	Child Growth Monitor	SAM Photo App	Nuture Net	AIMM
child age group	24-59 months	24-59 months	newborns	6-59 months
stunting	✓	—	✓	✓
wasting	✓	✓	—	✓
underweight	—	—	✓	✓
height	✓	✓	✓	✓
weight	✓	✓	✓	✓
MUAC	—	—	—	✓
low-spec phones	—	✓	✓	✓
working prototype	—	—	✓	✓
household monitoring	—	—	—	✓

[04]

AIMM approach

AIMM combines computer vision, anthropometric measurements and deep-learning models to develop and test the first fair and community-led child nutrition screening app. AIMM works on every Android smartphone and can be understood by rural households in less than 5 minutes and used over time.

Common challenges

- › Limited accuracy from imprecise weight approximation
- › Limited scalability due to expensive hardware

Key innovations

self-assessment

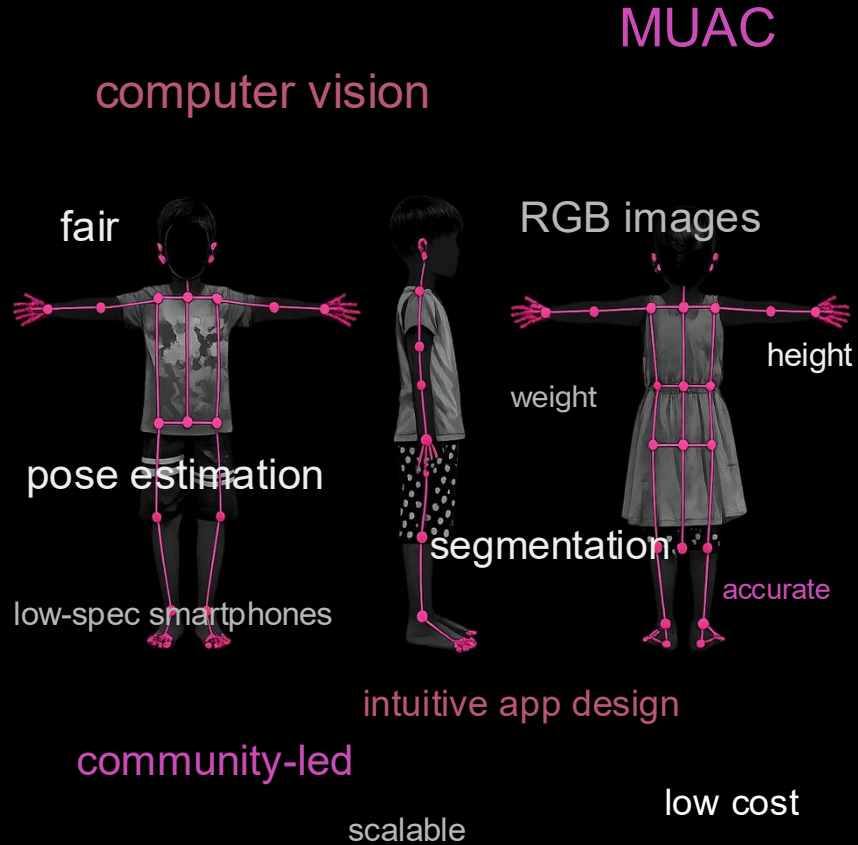
MUAC

low hardware cost

scalable

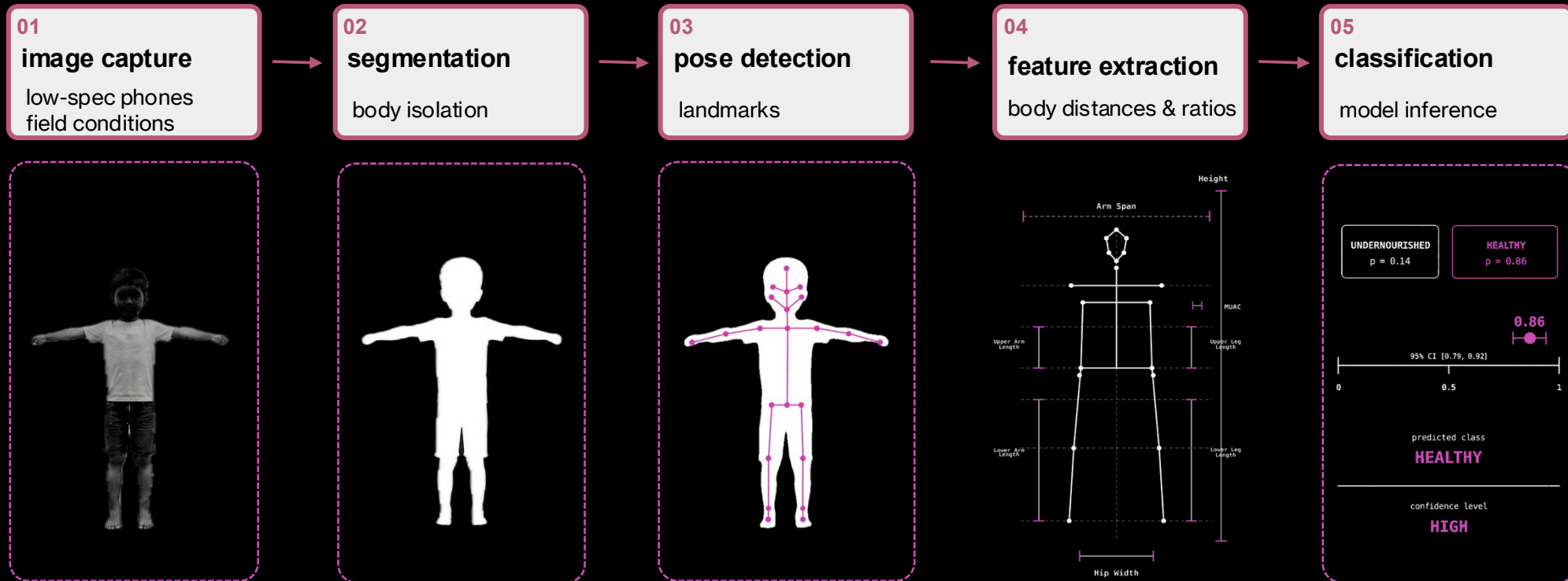
offline mode

high accuracy



Model pipeline

From RGB images to body isolation, pose landmarks, feature extraction and nutrition-risk feedback.



[06]

Pilot study

Proof-of-concept validation with 126 children in Nashik, Maharashtra in April 2026 supports our approach to app-based nutrition screening.

82.9% specificity

Normal recall

90.6% sensitivity

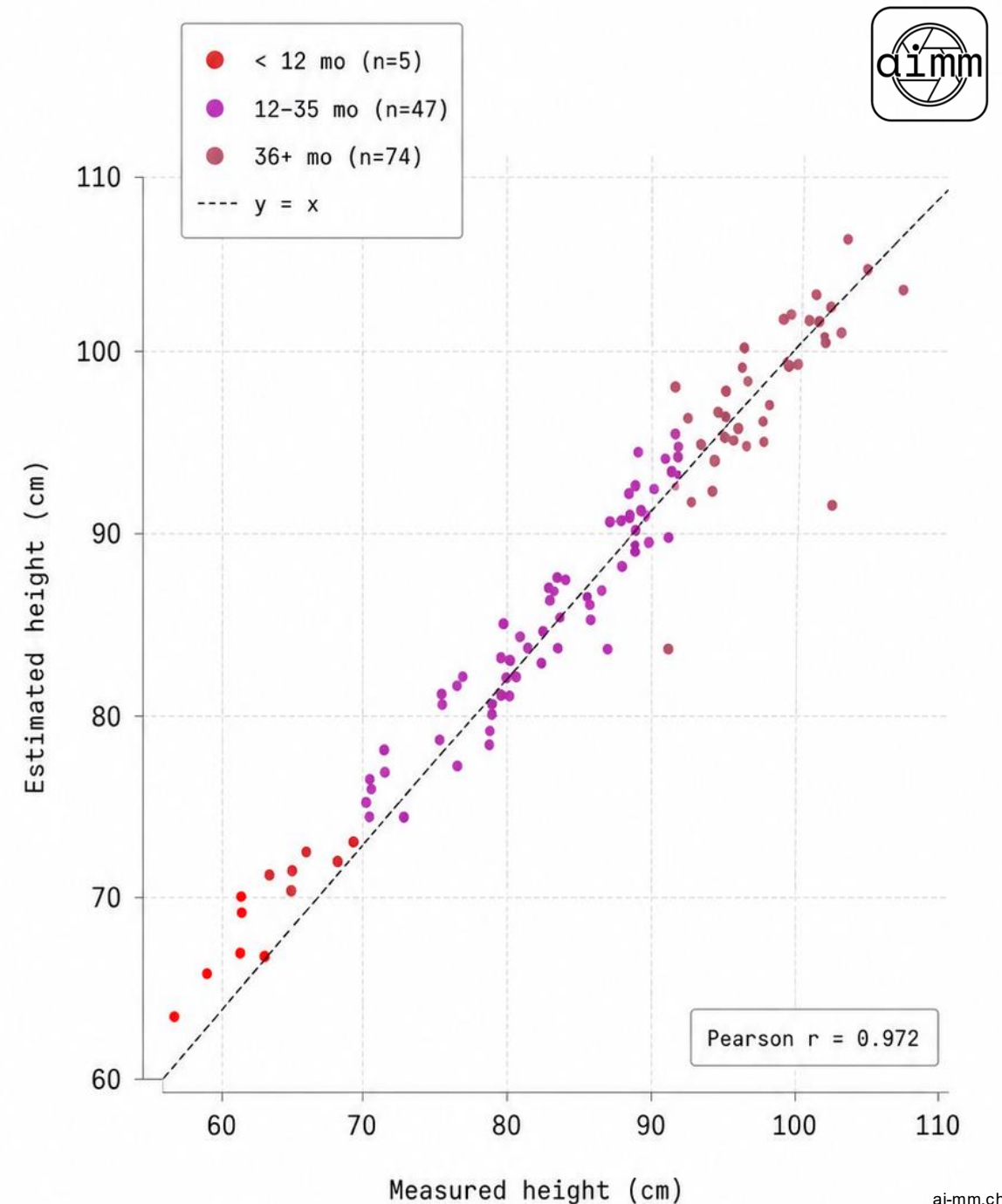
At-risk recall

1.78 cm MAE

Mean absolute error between manual and estimated height

Key takeaways

- › Photo-based height estimates closely matched manual measurements
- › Photo-based height estimates preserved nutrition-risk classification
- › Next step: age-specific capture for recumbent length in younger children



POSE
VARIABILITY

LIGHTING
VARIABILITY

BACKGROUND
VARIABILITY

CLOTHING
VARIABILITY



[07]

AIMM can make a difference

Designed for limited-access settings where information is scarce, staff time is constrained and repeated manual measurement is difficult.

hard-to-reach

crisis

resource constraints

conflict

rural communities

households

+90% sensitivity

Correct identification of malnourished children (true positive rate)

+90% specificity

Correct identification of non-malnourished children (true negative rate)

-80% cost to administer

A fraction of pen-and-paper nutrition surveys



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The AIMM app is the first low-cost, household-operated child nutrition monitoring tool that uses image-based AI to empower women, caregivers and communities, enable local early warning and early action capacity, and data-driven nutrition policies and interventions.

A black and white photograph of a woman holding a young child in a rural setting. The woman, wearing a patterned sari and a bindi, has a somber expression. The child, wearing a patterned shirt, looks off to the side with a serious expression. In the background, there are traditional thatched-roof huts.

1 in 3 children
in India is at
risk of undernutrition.