

One Call, Two Outputs.

Multilingual voice-based injury reporting and surveillance for Ghana.

KNUST • INJURY PREVENTION CONFERENCE • MAY 2026

THE PROBLEM

Most road deaths in Ghana leave no record.

2,949

Ghanaians killed on the road in 2025.

The highest death toll in 35 years.

Source: National Road Safety Authority, Ghana (2025).

VoiceTrace · KNUST Injury Prevention Conference · 2026

16,714

injured in the same year.

Most incidents leave no trace in any health database.

Most emergency lines in Ghana require English.

95% of Ghanaians don't speak it natively.

Ghana — VoiceTrace Language Coverage



“If you call for help in Twi, you may get silence.”

Source: Ghana Statistical Service, 2021 census.

One phone call.

*First aid back to the caller. A surveillance record in the health system.
Automatically.*



A phone call

in Twi, Ga, Ewe, Fante or
Dagbani



Spoken first aid

guidance returned
in the same language

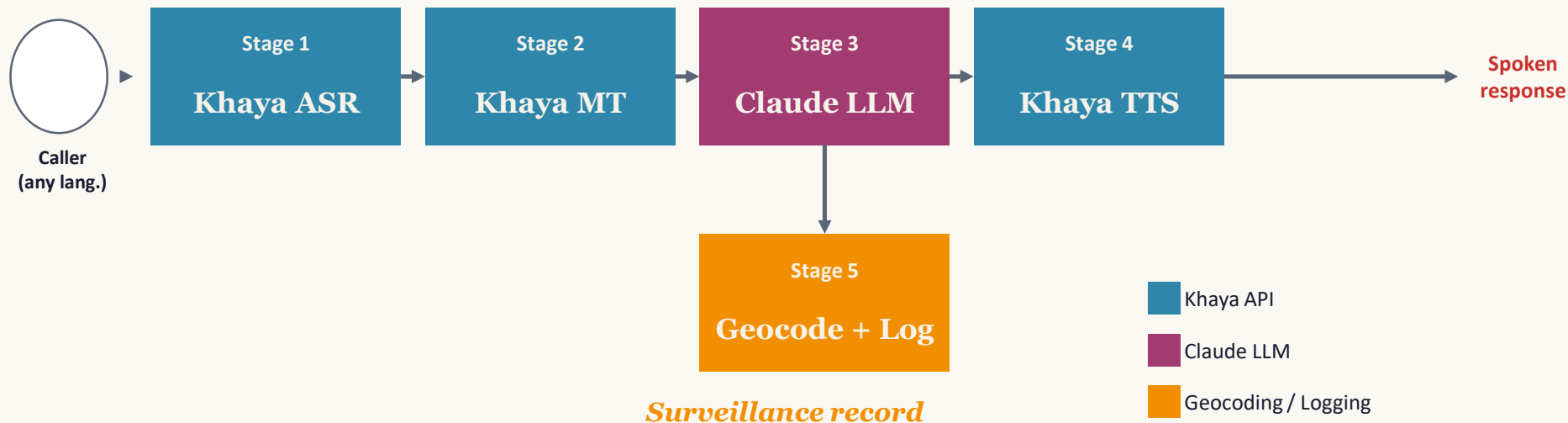


A surveillance record

structured, geocoded,
filed to DHIMS-2

HOW IT WORKS

Five stages. One spoken response. One filed record.



HOW WE TESTED IT

No real injury-call corpus exists in any Ghanaian language.

So we built one grounded in hospital records.

126

synthesised emergency
narratives

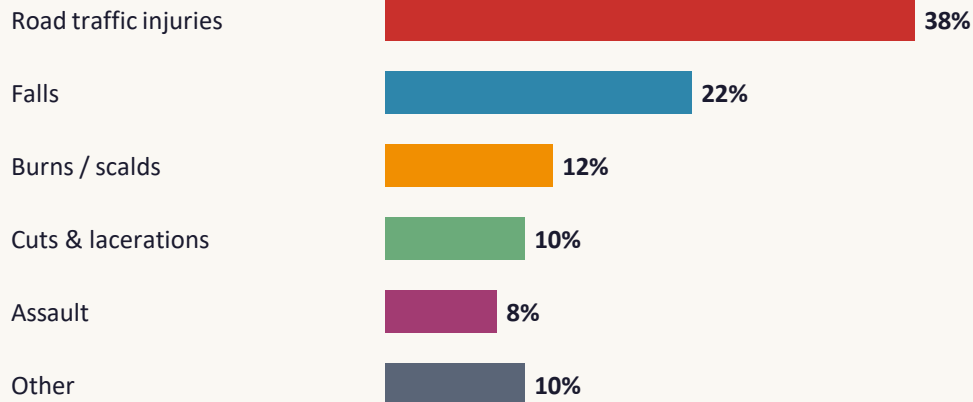
5

languages translated and
evaluated

9

structured fields per
record

Injury type distribution in the test set



Distribution mirrors injury presentations at Ghanaian hospitals (Boateng et al. 2017; Opoku & Forjuoh 2014).

For Twi, the system agrees with expert reviewers *at a level comparable to manual hospital coding.*

COHEN'S κ · TWI

0.80



Near-perfect agreement.

COHEN'S κ · FANTE

0.52



Moderate — useful but needs review.

Cohen's κ — > 0.60 substantial agreement · > 0.80 near-perfect agreement.

Ga, Ewe, and Dagbani failed *but not because of the AI.*

Ga

$\kappa = 0.08$

Ewe

$\kappa = 0.11$

Dagbani

$\kappa = 0.13$



The extraction logic is identical for every language.

The gap is upstream — in translation quality.

Translation fidelity vs. record agreement

Fante fidelity 0.695 → $\kappa = 0.52$

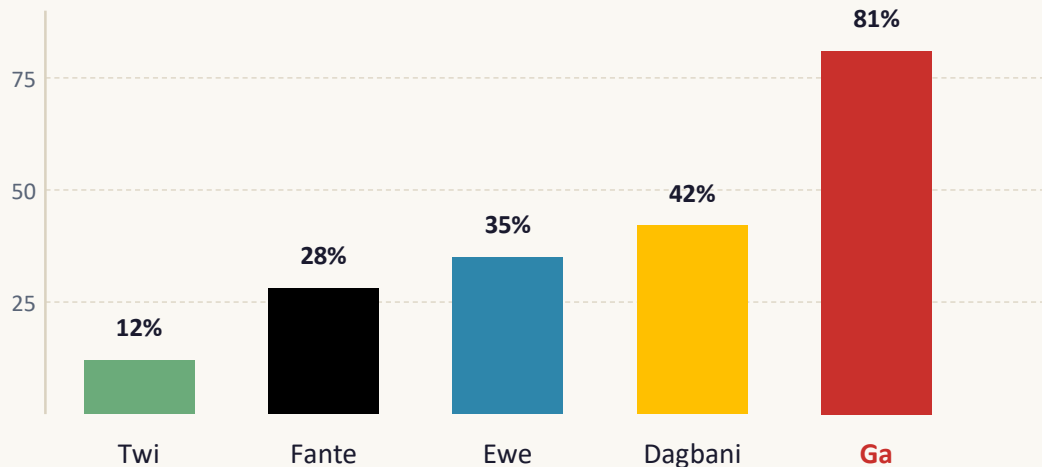
Ga fidelity 0.513 → $\kappa = 0.09$

THE GA OUTLIER

Ga speech recognition was 81% wrong.

Why?

Word error rate (%)



Honest caveat

Our test audio was synthesised. Ga ASR may simply not match what it expects from a real human voice.

Real-world performance is an open question.

The system never diagnoses.

It always sends the caller to a qualified facility.



No diagnosis

The model never names an injury type or severity to the caller.



No medication

It never suggests drugs or dosages, even when prompted.



Always defer

Every response routes the caller to a trained health professional.

“Go to the nearest health facility immediately.”

The technology is ready.

Three decisions turn it into a national service.

1

Allocate a 3-digit shortcode

From the National Communications Authority (e.g. 888) — universal, free to call.

2

Open an integration to DHIMS-2

So every filed record reaches the Ghana Health Service surveillance pipeline.

3

Enable forwarding to 193

Route confirmed emergencies to National Ambulance Service dispatch.

THANK YOU

**Built entirely from Ghanaian
language technology, for
Ghanaian communities.**

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