Identifying Roads with 75% Travel in LMICs

Exploring Novel Data Sources

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iRAP

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

2010 Have A Kip

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

2010 MAST Online

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

2014 Safer Roads, Berkshire

CIHT AWARDS 2010

INNOVATION AWARD: HIGHLY COMMENDED
MAST ONLINE

CIHT AWARDS 2011

ROAD SAFETY AWARD WINNER
MAST ONLINE

HIGHWAYS MAGAZINE EXCELLENCE AWARDS 2011

Commended
Road Safety Project of the Year

MCA CLARION AWARDS 2011

HIGHLY COMMENDED

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Brake FLEET SAFETY Awards 2018

Highly Commended

BIKES, BIG TRUCKS & YOU
ROAD SAFETY IN THE COMMUNITY

roadsafetyanalysis

CIHT AWARDS 2018

JOHN SMART ROAD SAFETY AWARD WINNER
DRIVESTART

CIHT AWARDS 2020

JOHN SMART ROAD SAFETY AWARD WINNER
RIDESTART

CIHT AWARDS 2022

HIGHLY COMMENDED, TEAM OF THE YEAR
TEAM LEMUR

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

2020 SUPPORTING UK ROAD SAFETY

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

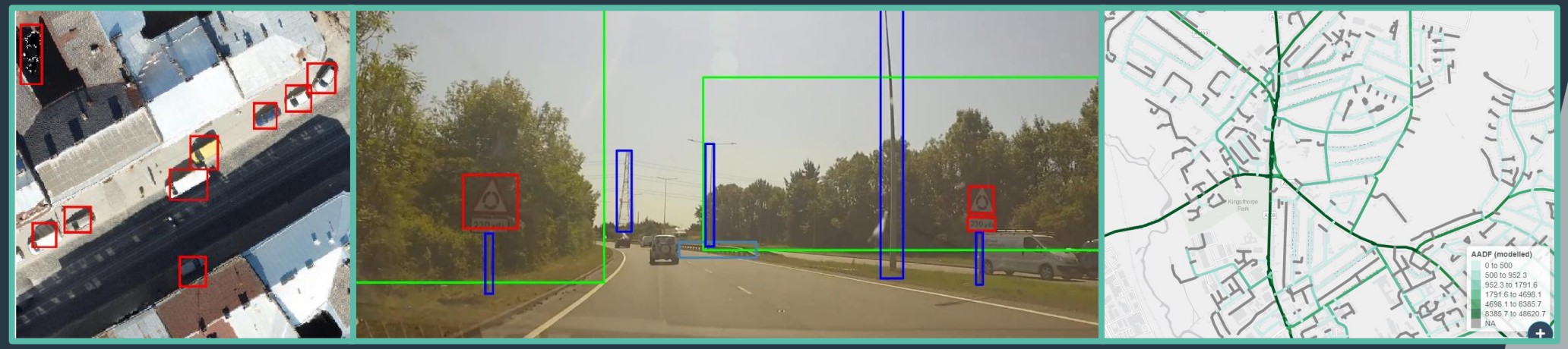
2019 RIDEFREE

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS

2017 DRIVESTART

FIRST CAR YOUNG DRIVER ROAD SAFETY AWARDS 2018

DRIVESTART
BEST PARTNERSHIP SCHEME



History

- Long history of geospatial data & analytics
- Projects on data modelling and use of neural networks
- Preliminary work on deep learning for attribute identification

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An R&D project to explore novel sources of road safety data

- Explored potential of widely available data sources
- Developed extraction techniques for important road infrastructure, traffic speed and road user flow data
- Focussed on two target countries, Kenya and Ethiopia

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UN Road Safety Targets

TARGET 4 2030

75%

Target 4: By 2030, more than 75% of travel on existing roads is on roads that meet technical standards for all road users that take into account road safety.

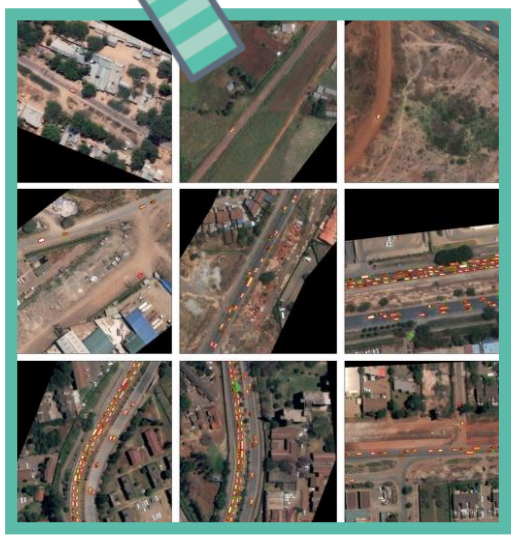
TARGET 6 2030

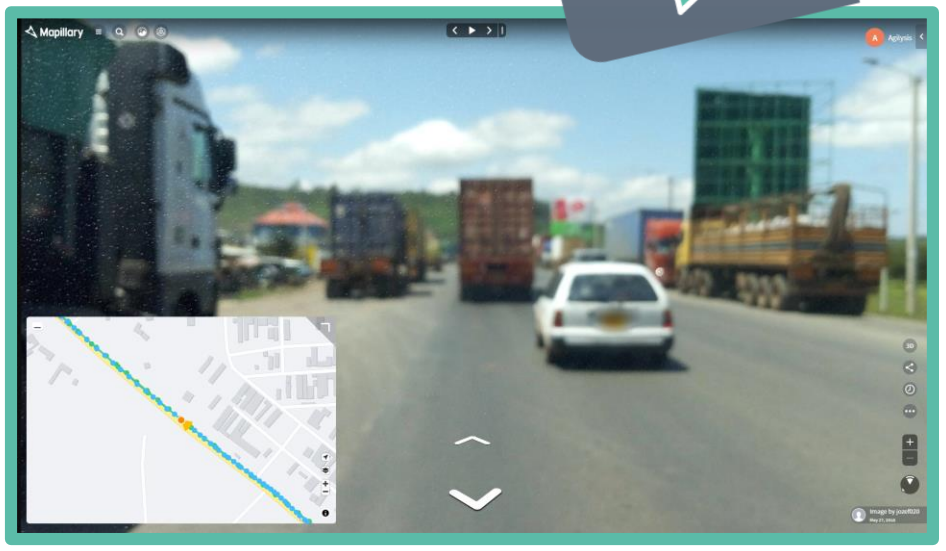
50%

Target 6: By 2030, halve the proportion of vehicles travelling over the posted speed limit and achieve a reduction in speed-related injuries and fatalities.

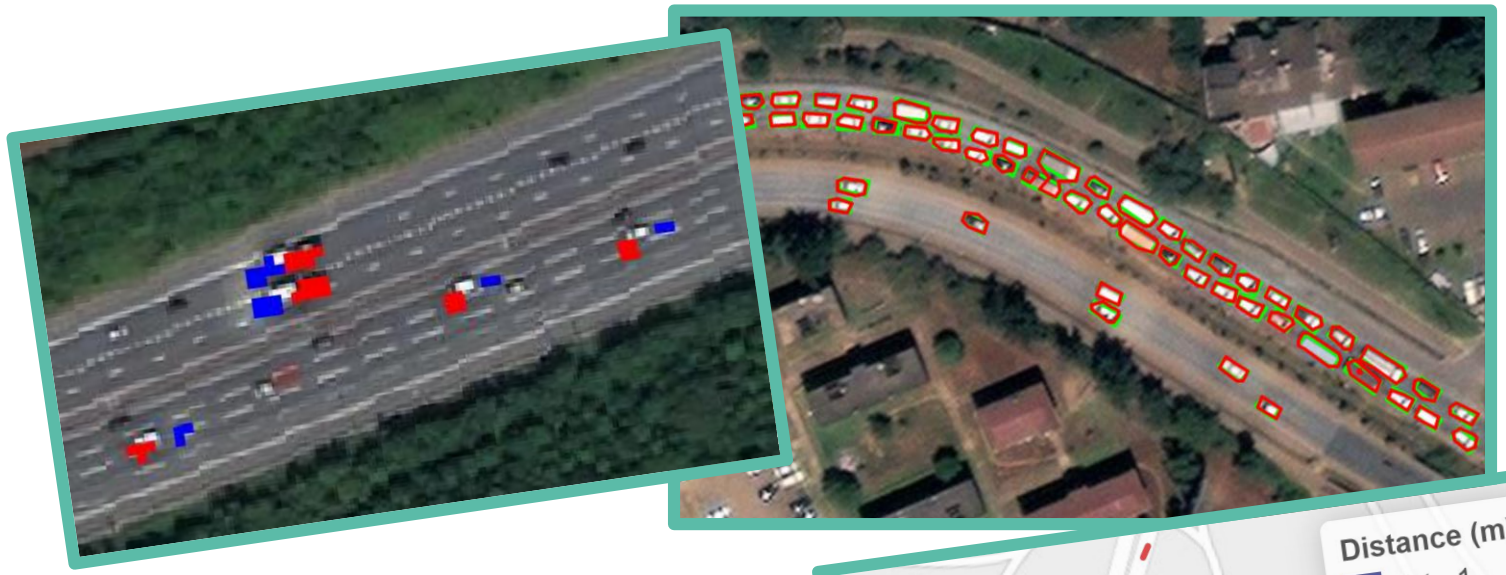
Data Sources

- Earth observation
- Mapillary
- Open Street Map



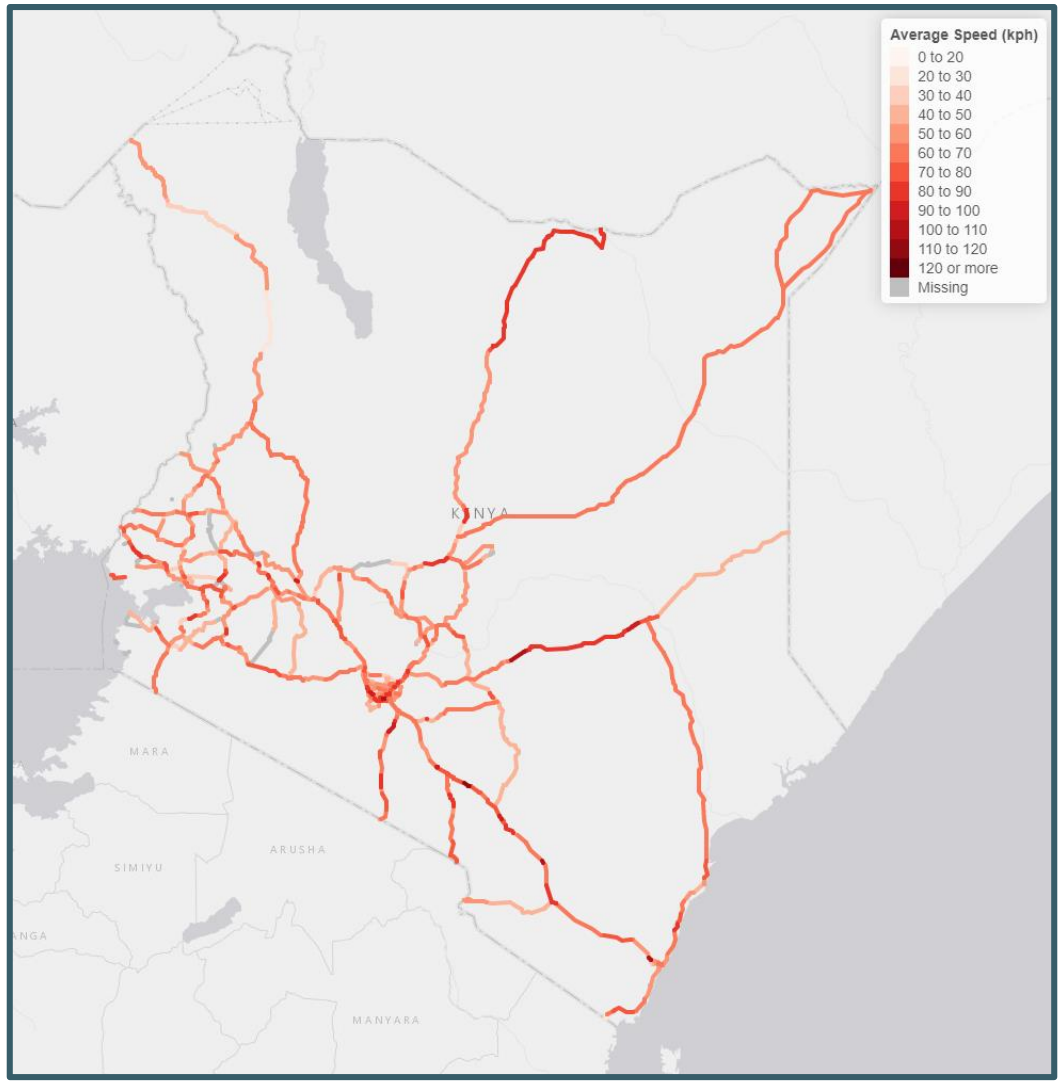


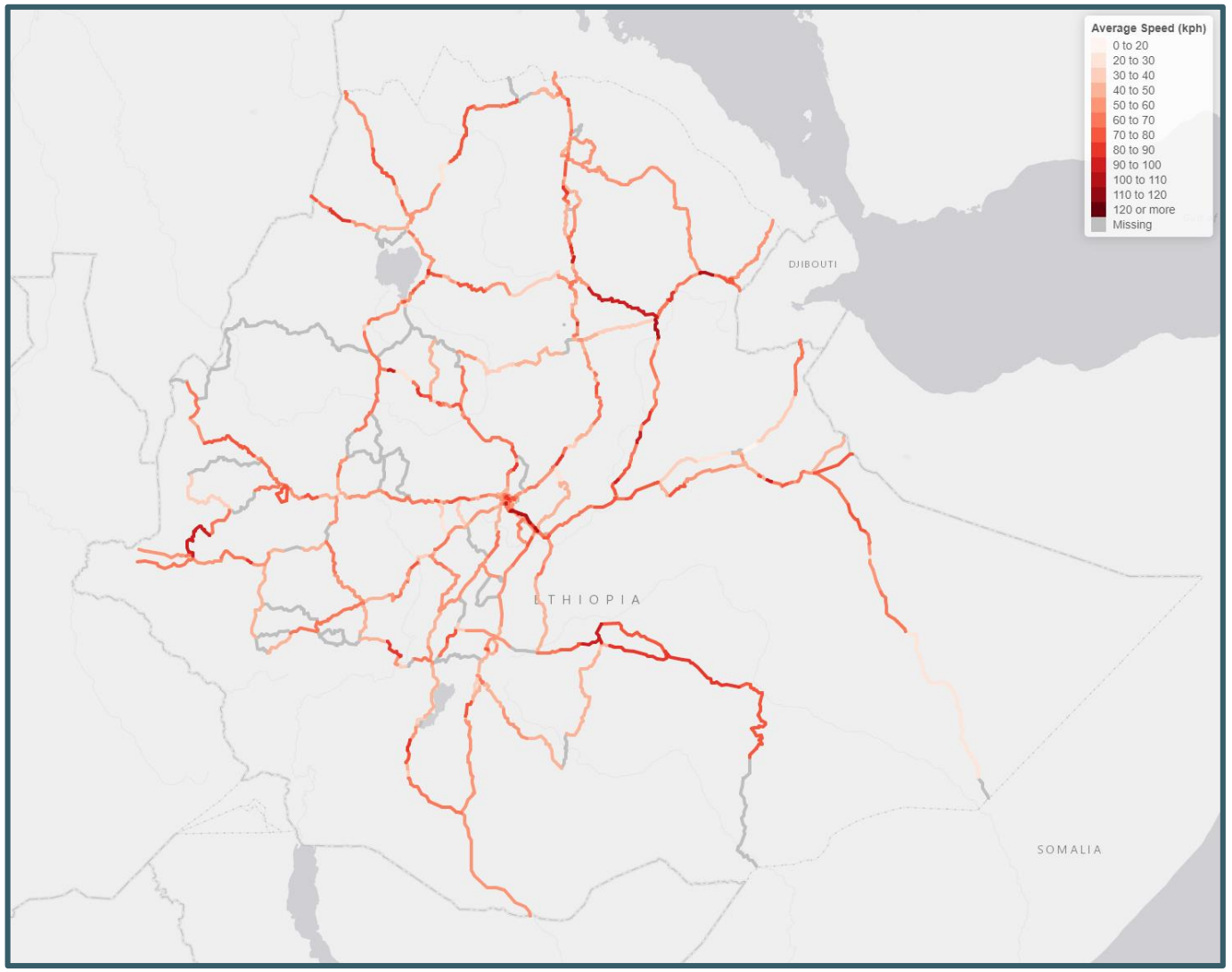
Speed and Traffic Flow



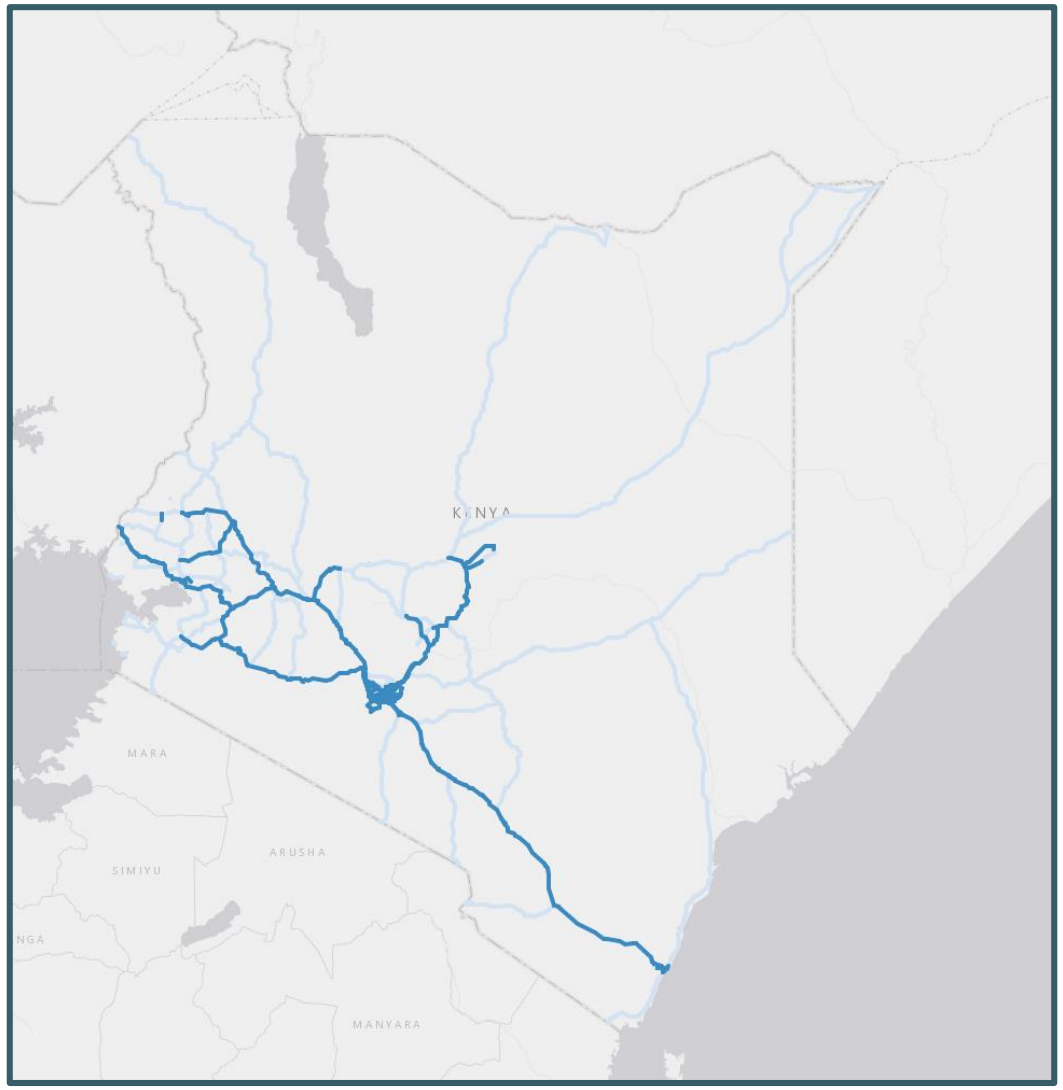
- Earth Observation
- Detect Vehicle Locations
- Measure Vehicle Movement
- Calculate Vehicle Speed

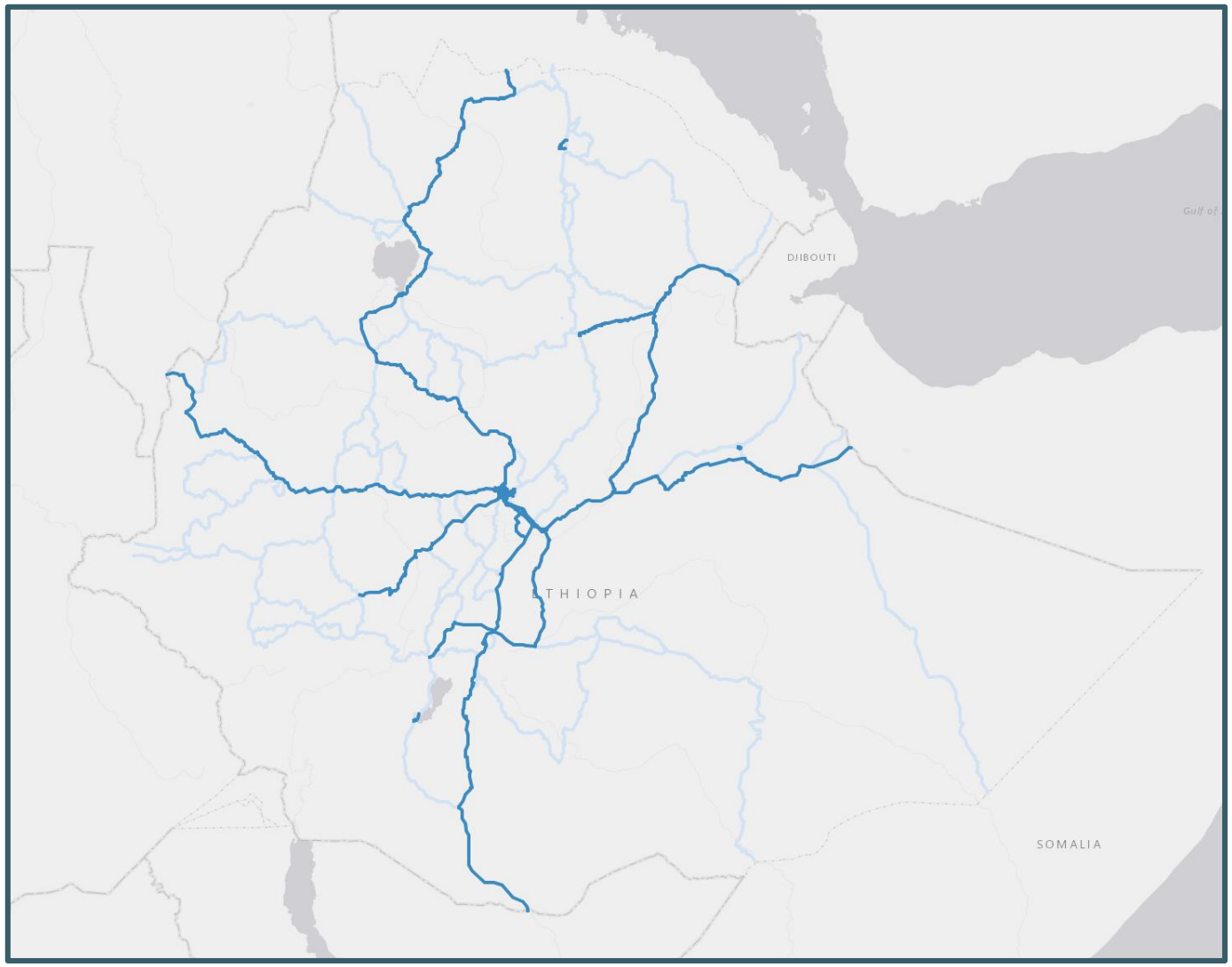
Vehicle Speeds





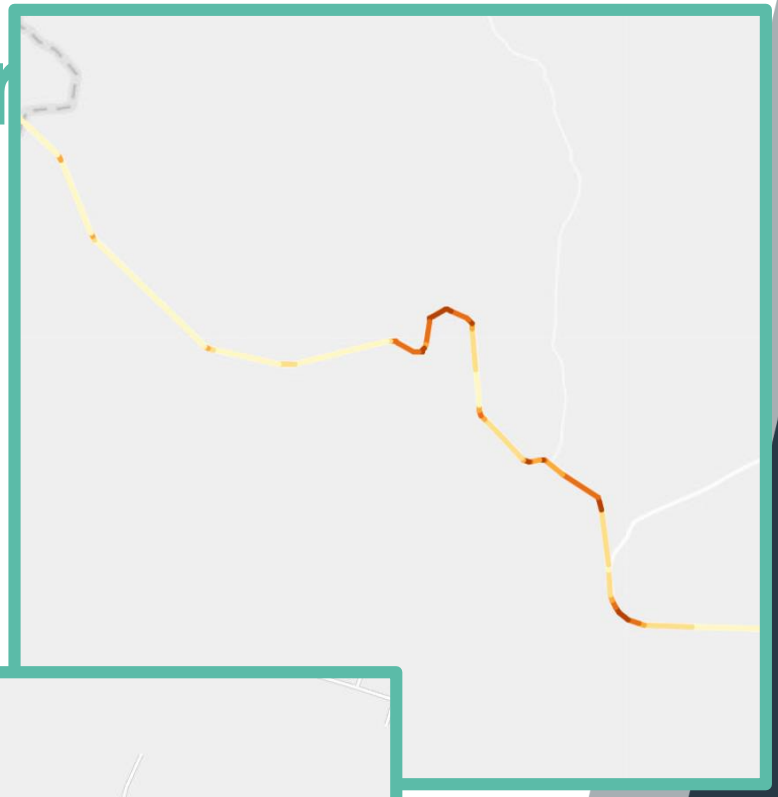
75% of Travel

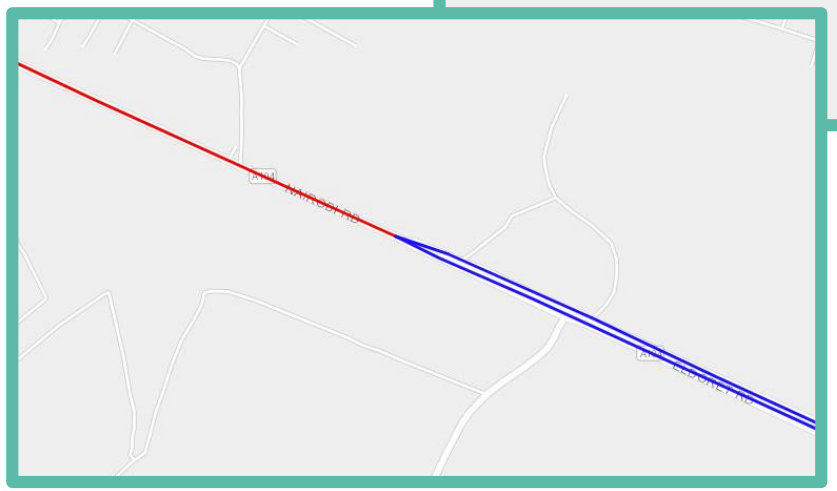

KENYA
MARA
SIMIYU
ARUSHA
MANYARA


DJIBOUTI
ETHIOPIA
SOMALIA

Network Geometr

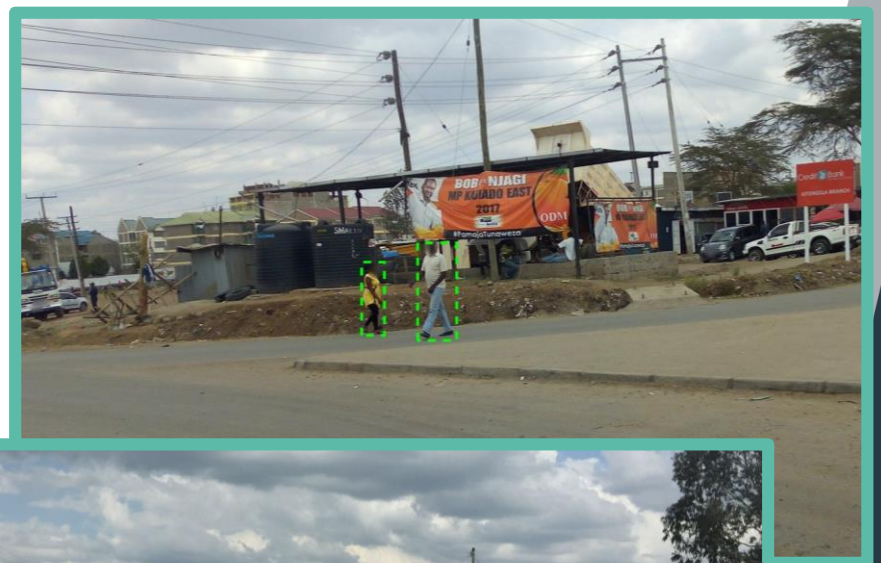
- Bends
- Carriageway Separation
- Junction Type

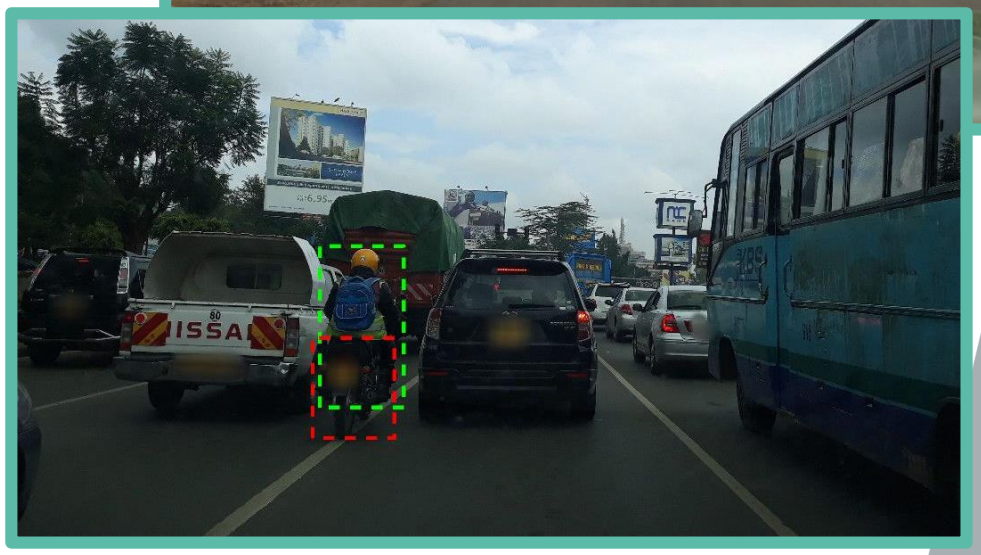




Vulnerable Road Users

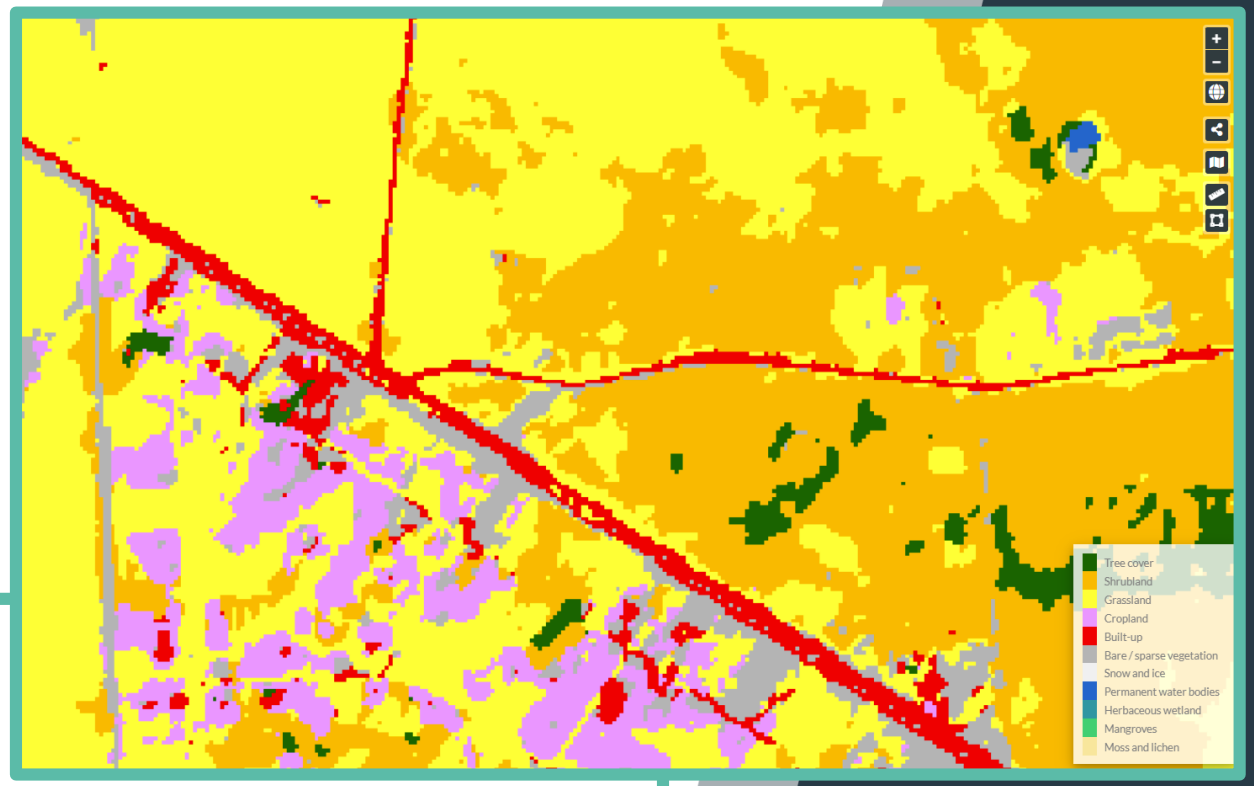
- In-Vehicle Video
- Computer Vision
- Detect:
  - Pedestrians
  - Pedal Cyclists
  - Motorcyclists

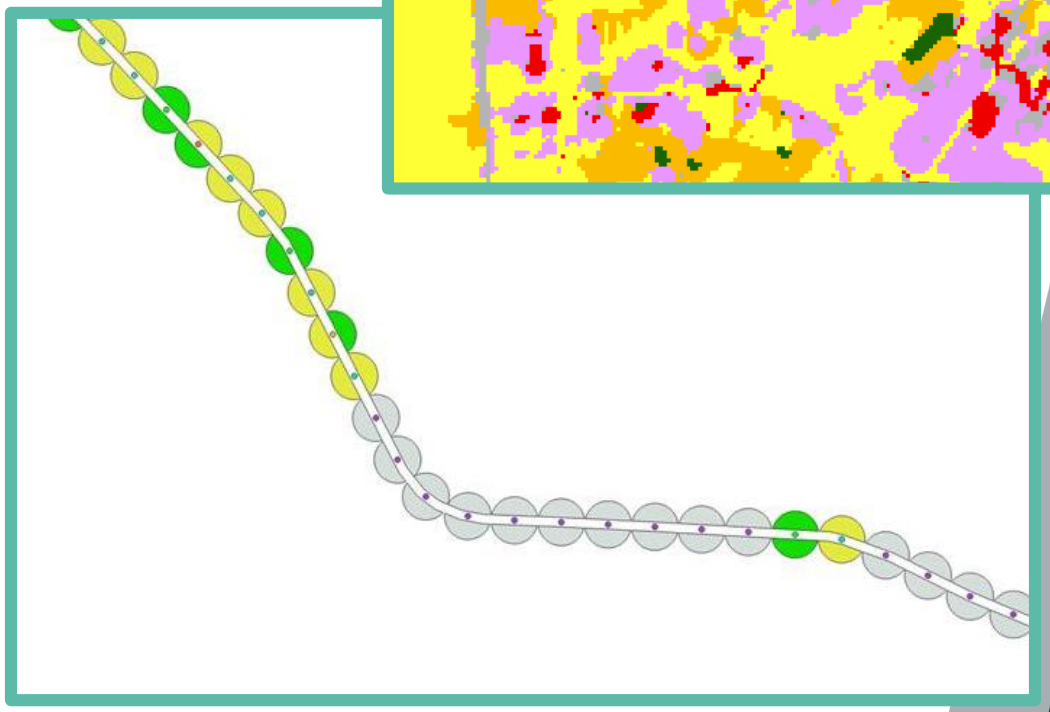




Land Use

- ESA WorldCover
- Enriched with OpenStreetMap
- Strips out misclassified carriageways
- Either side of road





Road Infrastructure

- Zebra Crossings
- Speed Limits

- In future:
  - Road Surface Quality
  - Road Width
  - Number of Lanes
  - Delineation

Strong results for 7 indicators

Road User Groups

Road Safety Indicators with Strong Results	Area Types
% of roads where speed limit is under 30km/h	
% of road where land use is commercial or educational and speeds are under 30km/h	
% of roads where traffic flows at 80km/h or more have divided carriageways	
% of roads where traffic flows at 80km/h or more do not have sharp curves	
% of intersections with potential side impacts between car with operational speed below 50km/h	
% of roundabout intersections where speed limit is between 50km/h and 100km/h	
% of roads where operating speed is below the posted limit (UN Target 6)	

Area Types

Progress towards 6 indicators

Road User Groups

Road Safety Indicators with Progress	Area Types
% of roads where pedestrians cross and traffic flows at 30km/h or more have pedestrian crossing facilities	
% of pedestrian crossings that are adequately signed or maintained	
% of urban roads with street lighting	
Average distance between safe crossing opportunities	
% of roads where land use is educational and there are crossing facilities	
% of intersections with speed limit above 80kmh and grade separation	

Area Types

Limitations

Earth Observation

Mapillary

OpenStreetMap

Granularity

Coverage

Geospatial

Age of Imagery

Temporal

Sun Synchronous

Accuracy

Geometry

αiRAP Accredited

- Accreditation for the conversion of source data into iRAP attributes
- Using AI or machine learning methods

✓ aiRAP accredited 3 road safety attributes in rural areas:

- ✓ Average Speed
- ✓ 85th Percentile Speed
- ✓ Traffic Flow

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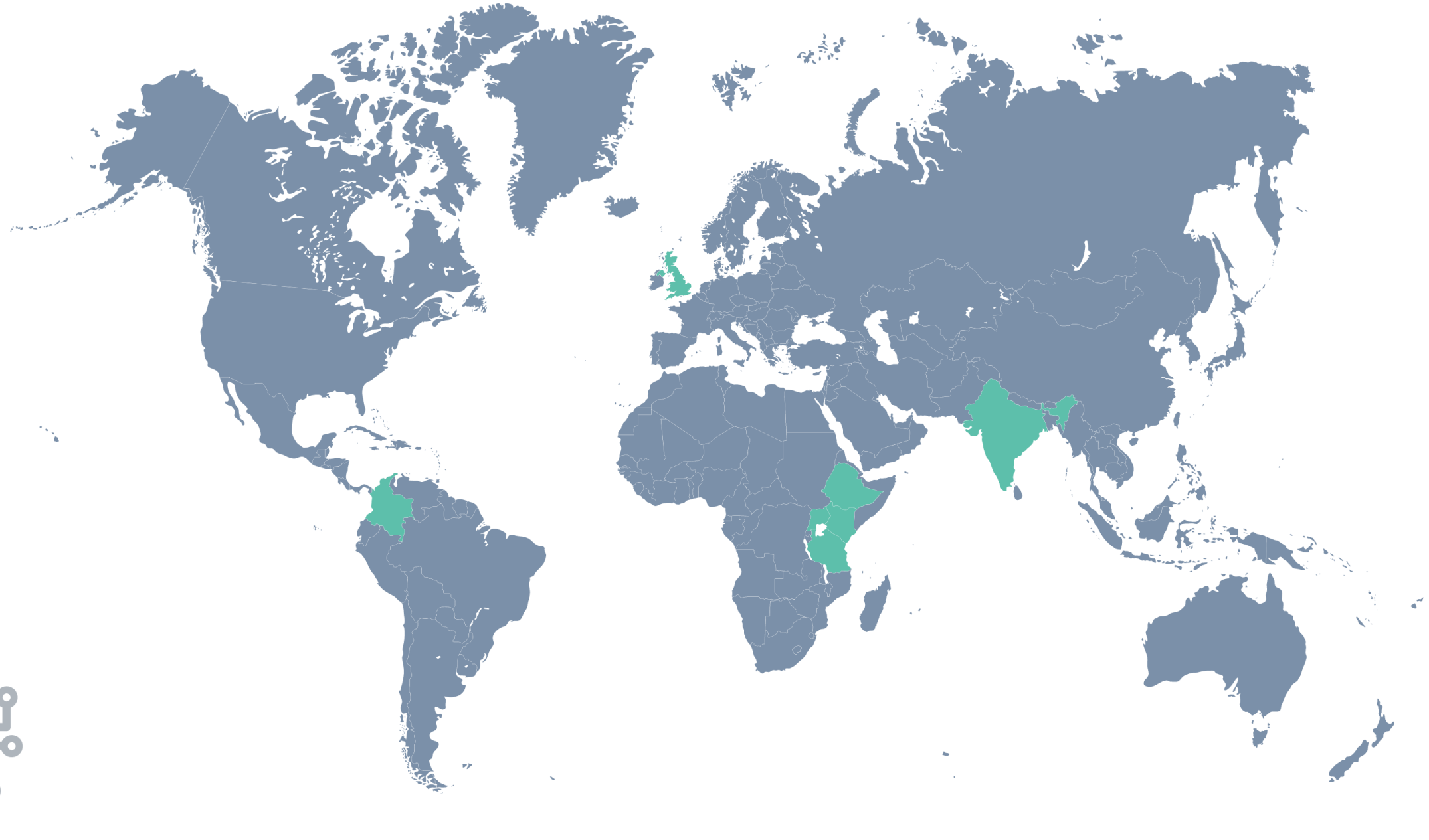

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