Identifying Roads with 75% Travel in LMICs
Exploring Novel Data Sources
History

- Long history of geospatial data & analytics
- Projects on data modelling and use of neural networks
- Preliminary work on deep learning for attribute identification
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
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: 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
75% of Travel
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
### Road Safety Indicators with Strong Results

<table>
<thead>
<tr>
<th>Road Safety Indicators</th>
<th>Area Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of roads where speed limit is under 30km/h</td>
<td>🏕️ 🏢 🏥 🌳 🎈</td>
</tr>
<tr>
<td>% of road where land use is commercial or educational and speeds are under 30km/h</td>
<td>🏢 🚴‍♂️ 🚶♂️</td>
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<tr>
<td>% of roads where traffic flows at 80km/h or more have divided carriageways</td>
<td>🏢 🍃 🐾 🎈</td>
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<tr>
<td>% of roads where traffic flows at 80km/h or more do not have sharp curves</td>
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<tr>
<td>% of intersections with potential side impacts between car with operational speed below 50km/h</td>
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<tr>
<td>% of roundabout intersections where speed limit is between 50km/h and 100km/h</td>
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<tr>
<td>% of roads where operating speed is below the posted limit (UN Target 6)</td>
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# Progress towards 6 indicators

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

- Earth Observation
- Mapillary
- OpenStreetMap

- Granularity
- Coverage
- Age of Imagery
- Sun Synchronous

- Geospatial
- Temporal
- Accuracy
- Geometry
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