A Machine Learning Algorithm for Building Structure Detection from Aerial Imagery

REPUBLIC OF ARMENIA
CADASTRE COMMITTEE
Legislative Changes in Creation Of Real Estate Tax Bases in the Republic of Armenia

Before 2021

- Land tax
- Building tax

≈ 9.0 billion AMD

Real estate tax

After 2021

Positive impact on the economy

≈ 16.5 billion AMD

2022 30%

≈ 48.0 billion AMD

2026 100%

municipalities
The purpose

Develop and implement machine learning algorithms for detection and mapping of objects on aerial images, which will enable automatic detection and classification of buildings in an online environment.
The model was tested for settlements with different highland zones in RA.

- Ararat marz, settlement Pokr Vedi
- Syunik marz, settlement Khot
- Vayots Dzor marz, settlement Aghavnadzor
The accuracy of this model is 91.5%. However, it is necessary to use a digital relief model in large, highly fragmented, coastal, hilly areas, where the margin curve accuracy is 70%, for the improvement of which a digital model of the relief will be used.

The comparison was carried out for the settlement of Pokr Vedi, for which we have the following indicators:

<table>
<thead>
<tr>
<th>Learning data</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validation data</td>
<td>14</td>
</tr>
<tr>
<td>combination</td>
<td>1</td>
</tr>
<tr>
<td>total</td>
<td>26</td>
</tr>
</tbody>
</table>

Comparison with cadastral maps

Comparison with layer of cadastral building - construction Disclosure of buildings
Comparison with layer of cadastral building

*Disclosure* of buildings

- Work automation;
- Reduction of time and resources,
- Disclosure of buildings that are missing from the property tax base
About 64,500 buildings found using AI tools

About 40,000 included in the property tax base