Poverty Estimation in the MENA Region

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Introduction

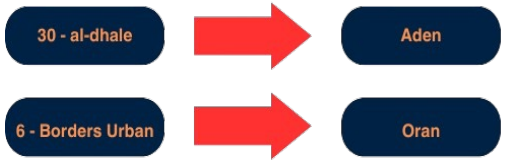
- Poverty is relatively cheap to address and incredibly expensive to ignore.
- Coverage for household surveys in MENA region has dropped:
  - 82% (2012) -> 45% (2019)
- Current poverty estimates for these countries lack necessary spatial and temporal detail.
- Goal: Can we build a machine learning model using public geospatial information to predict poverty levels across Middle East and North Africa (MENA)?
- Current Iteration: Syria

Fuzzy Merging

- Fuzzy matching - technique used to merge datasets that may have slight variations or discrepancies in the values being compared.
- Preprocessing, scoring, matching, post-processing

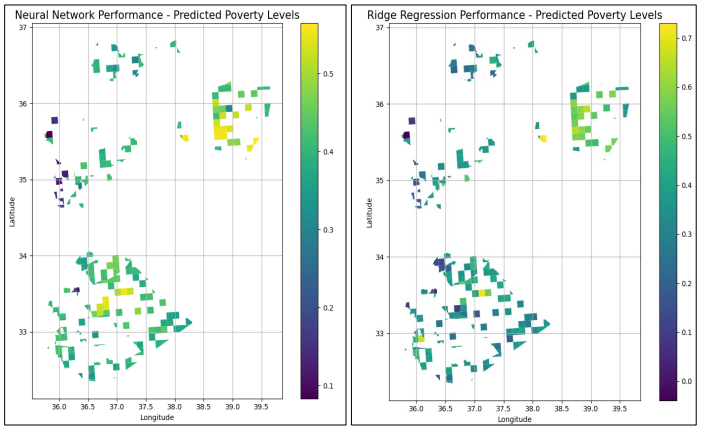
Correct Fuzzy Merge

Incorrect Fuzzy Merge



Machine Learning

- Ridge Regression | **MSE = 0.0348**
  - L2 Regularization: Implements L2 regularization to enhance model generalization.
  - Optimal Alpha: Uses cross-validation to determine the best regularization strength... **α = 0.1**
- Neural Network | **MSE = 0.0394**
  - TensorFlow Configurations: Features ReLU activation, dropout at 0.2 for robustness.
  - Efficient Training: Trained for 100 epochs with a batch size of 32 using Adam optimizer.



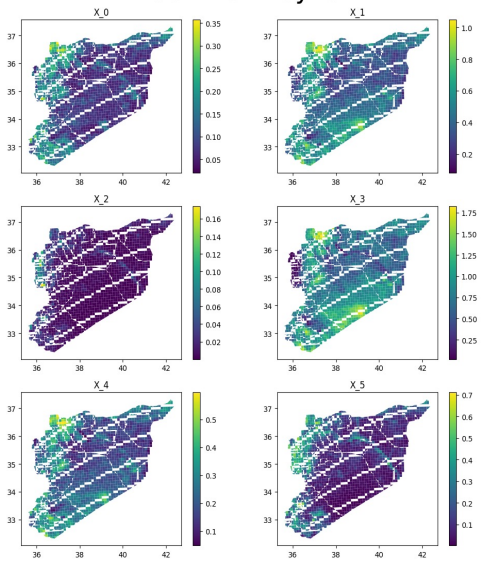
Next Steps

- Finalize fuzzy merging process on MENA region.
- Iterate models on more countries.
- Incorporate other geospatial explanatory variables and time variation.

MOSAIKS

- "Multi-Task Observation Using Satellites and Kitchen Sinks"
- Satellite imagery tool containing global geospatial information
- Frequency of RGB wavelengths contained in 4000 numerical variables
- Utilized this dataset for our explanatory variables.

MOSAIKS in Syria



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