REAL ESTATE VALUATION

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THE BACKGROUND

Real estate industry is a hundred billion dollar industry in United States

However, the valuation of an individual real estate is still based on experience of a single real estate agent.

In this capstone assignment, a novel neural network –based regression algorithm for predicting real estate valuation is presented

DATA

The data used in this work is provided by UC Irvine Machine Learning Repository

The data consist in total 506 examples collected in 1993 from Boston Metropolitan area

The dataset has in total 13 explanatory parameters and the target variable: valuation

	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTAT	MEDV
501	0.06263	0.0	11.93	0	0.573	6.593	69.1	2.4786	1	273.0	21.0	391.99	9.67	22.4
502	0.04527	0.0	11.93	0	0.573	6.120	76.7	2.2875	1	273.0	21.0	396.90	9.08	20.6
503	0.06076	0.0	11.93	0	0.573	6.976	91.0	2.1675	1	273.0	21.0	396.90	5.64	23.9
504	0.10959	0.0	11.93	0	0.573	6.794	89.3	2.3889	1	273.0	21.0	393.45	6.48	22.0
505	0.04741	0.0	11.93	0	0.573	6.030	80.8	2.5050	1	273.0	21.0	396.90	7.88	11.9

METHODOLOGY

The neural network regression algorithm was implemented using TensorFlow2 library

First data was splitted into train and test sets with 80/20 split ratio

Then a neural network model was defined and trained

```python
def build_model():
  model = keras.Sequential([
    layers.Dense(64, activation='relu', input_shape=[len(train_dataset.keys())]),
    layers.Dense(64, activation='relu'),
    layers.Dense(1)
  ])

  optimizer = tf.keras.optimizers.RMSprop(0.001)

  model.compile(loss='mse',
                optimizer=optimizer,
                metrics=['mae', 'mse'])
  return model
```

RESULTS

Traditional True value – prediction plot was drawn for test data

Based on the results, the model can predict real estate valuation with sufficient accuracy

The statistical goodness-of-the-fitting parameter R2 was approximately 0.9
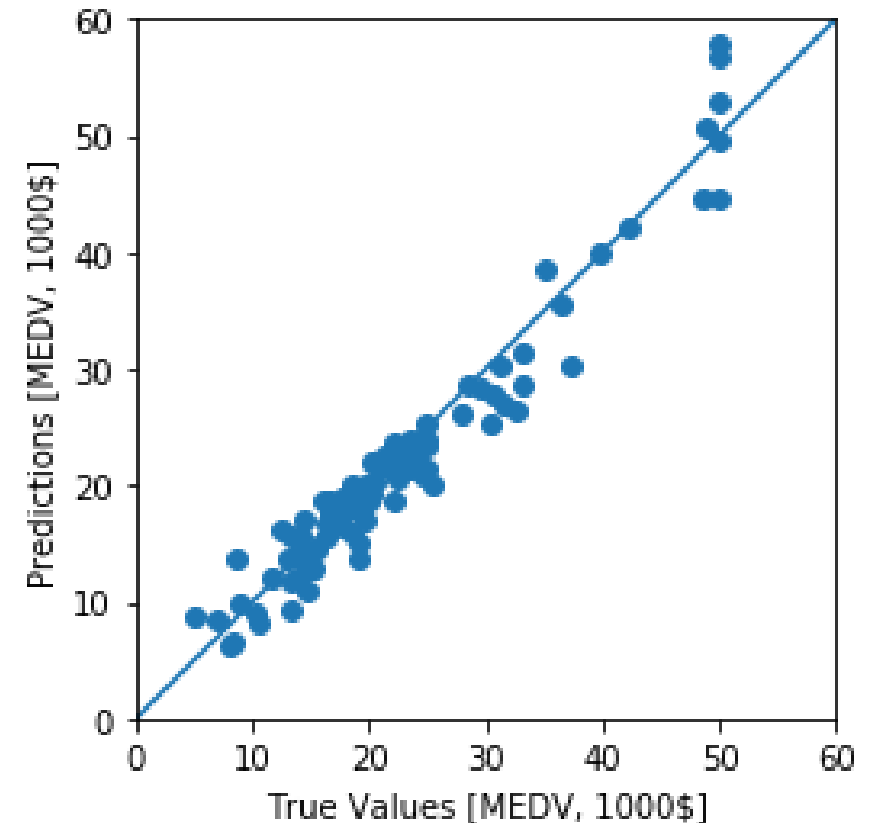
DISCUSSION AND CONCLUSIONS

Based on the results, one can use neural network regression in order to predict real estate valuation with sufficient accuracy

In order to explain the model, one must apply LIME or other model-agnostic calculator as the next step