Title: Reliable machine learning region predictions for Automated Valuation Models

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Abstract:

Accurate property valuation is important for property purchasers and banks to assess credit risk in the mortgage market. Traditional property valuation using a surveyor is expensive and may not be accurate or entirely objective. Therefore, Automated Valuation Models are increasingly being used to provide cheaper, objective valuations that allow dynamic updating of property values over the term of a mortgage. A useful feature of automated valuations is that they should give a range of plausible price estimates for each individual property, rather than just a single point estimate. This would allow mortgage providers to include conservatism in their credit risk assessments. In this study, a machine learning algorithm known as the Conformal Predictor is used to provide such a range of price estimates called a “region prediction”, whilst controlling strictly for predictive accuracy. We show how an Automated Valuation Model can be constructed using a Conformal Predictor, based on an underlying local adaptive nearest neighbours approach and test on a rich set of US housing data with sales prices. We show that the region predictions are reliable and also investigate their efficiency. In particular, we consider how the uncertainty in house price prediction is linked to property characteristics.