ATTOM™

ATTOM AVM™

WHITE PAPER

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INTRODUCTION

ATTOM AVM is a state-of-the-art AVM focused on providing hyperlocal valuations with increased transparency and robust statistical procedures. This paper explains the core concepts and functionality of ATTOM AVM.

DATA AND COVERAGE

Powered by ATTOM's nationwide residential property and sales database, ATTOM AVM provides valuations on more than 84 million homes across all 50 states. Coverage includes the 2,194 counties where 98% of the U.S. population resides. Valuations are currently limited to single family homes and condominiums, though new data is always being added as models are updated to broaden our coverage.

Individual value estimates rely on ATTOM'S best-in-class neighborhood boundaries and recent sales transaction data, therefore capturing the micro-location deviations in the local real estate market. With a few exceptions for rural areas and others with low sales activity, all transactions used in the valuation models have occurred within 24 months of the AVM valuation date.

VALUE ESTIMATES

AVM values are estimated in multiple ways, including:

- **Robust statistical models**
- **Market metrics derived from small clusters of similar properties**
- **Ensemble (value blending) approaches**

For properties that are able to be valued with more than one method (68% of the properties we value), we use a cascading model selection algorithm to choose the modeling approach that is most accurate in the geographic area surrounding the individual property. As an example, if properties in ZIP code 90210 show the best results (AVM value is closest to known sale price) with valuation method type A, then all properties in that ZIP code are valued with method A.

CONFIDENCE SCORE AND FORECAST STANDARD DEVIATION

Every property receives a unique confidence score. This confidence score represents the precision of the AVM estimate and measures the deviation between the range of values and the point value itself. To provide the most transparent measure of variability in the estimates, we provide the larger of the differences between the low and high value and point estimate. The low and high values represent a 68% confidence range around the point estimate given the set of values generated in the bootstrapping process. In this way, asymmetrical distributions of potential values are conservatively represented by the confidence score.

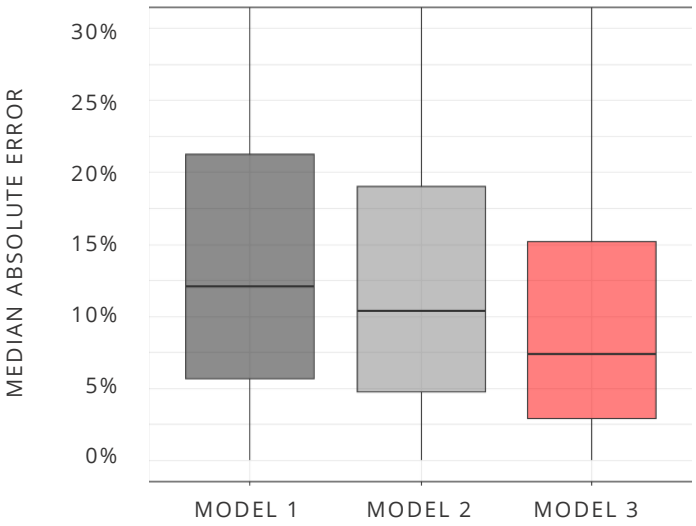
Confidence scores are calculated as 100 minus the forecast standard deviation, where the forecast standard deviation is the greater of the difference between the low range and the high range value and the point estimate divided by the point estimate. This is an industry-standard way of computing confidence scores.

ACCURACY

To gauge the accuracy of ATTOM AVM, we have compared our AVM values to actual sale prices over a recent three-month period. The median difference between our values and the sale price was 6%, meaning that one half of all valuations are within 6% of the sale price of the property. Additionally, 70% of valuations are within 10% of the sale price and 85% within 20%.

MEDIAN ABSOLUTE ERROR	**6.0%**
VALUES WITHIN 10% OF SALE PRICE	70%
VALUES WITHIN 20% OF SALE PRICE	**85%**

The chart below highlights the overall distribution of the absolute differences between our AVM values and observed sale prices. The left two columns show error distributions for two of our individual models within the AVM, while the right hand (red) column shows the improvements – down to 6% median error – as a result of our model cascade:



VALUATION PROCESS

To provide some insight on the AVM process, the following outlines the process used to value a typical home with ATTOM AVM:

1. **Find "Comparable" Sales:** We begin by selecting comparable sales based on distance and bounded within a geospatial area like neighborhood, school district, census block or tract. This creates a geostack where more hyperlocal areas are favored over larger ones. (For clarity, we view "hyperlocal" as meaning: An area more local than a zip code and no larger than a neighborhood, occasionally even as small as a few blocks.) We start by modeling the most recent sales that are nearest to the subject property and build subsequent models by expanding these parameters.

2. **Employ Valuation Models:** Multiple valuation models are then used to create an estimate of value for the home. Through the use of robust statistical metrics and clustering algorithms, many models are down weighted or eliminated due to dissimilarity with the subject property or other issues with the sale. Not all properties are valued with all models as the use of particular models is determined based on local data.

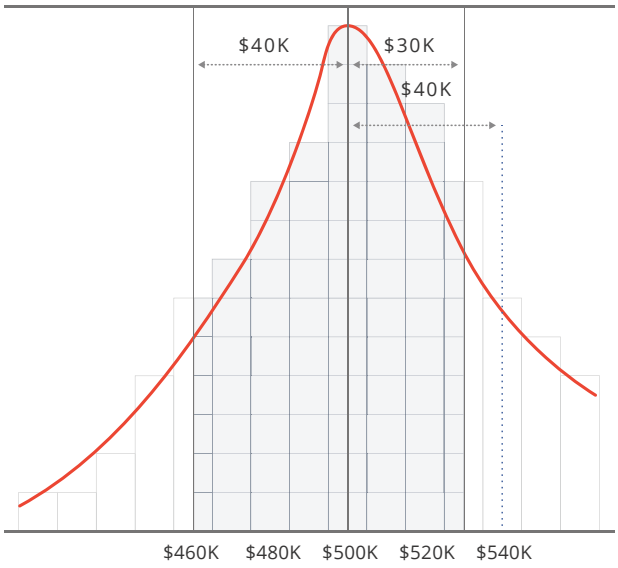
3. **Determine the Confidence Score:** Next, we look at the model percentage difference between the low (16th percentile) and high (84th) values and the median value estimate. We take the larger of the two (the forecast standard deviation) and subtract from 100 to create a confidence score. By taking the larger of the two, our confidence score accounts for skewed distributions of values and offers a conservative measure of our confidence in the AVM value.

4. **Choose a Model:** Prior to valuing properties each cycle, we conduct regular AVM accuracy tests where we compare our AVM values to the actual sales prices of properties that recently sold (see the accuracy test on the previous page). Using this information, we then employ a cascading method to determine which of the valuation models is the most accurate in each subject's neighborhood. The value from the most accurate local model becomes our estimated AVM value, along with its respective low and high values, forecast standard deviation, and confidence score.

VALUATION AND CONFIDENCE SCORE EXAMPLE

To put our methodology into practical terms, suppose we are valuing a home at 123 Main Street, Somewhere, ST 12345. We begin our model by creating a geostack that's ordered from the most local areas to the larger surrounding areas.

Geostacks are particularly important in calculating hyperlocal valuations because they allow you to draw your sample from within a single neighborhood, even when properties in other neighborhoods are physically closer. For example, if we were to do a 5-mile search and some of the properties within that 5-mile radius were in a different county than the subject property, the geostack would constrain the search to the same county, resulting in a more accurate valuation.



Once our geostack is created, we then employ our robust statistical models and determine that this property has an AVM value of $500K, a forecast standard deviation max of 0.08, with a confidence score of 92%. We calculate our confidence score using the forecast standard deviation max as follows:

Confidence Score = 100 – (0.08 x 100) = 92

In this case, we calculated a 92, or 92% for our confidence score. This tells us that we can expect a property to sell at a price within 8% of the property's estimated value, either above at $540K or below at $460K. If our confidence score was 90%, we would expect it to sell within 10%, or using the same AVM value, above at $550K or below at $450K.

This means that with a higher forecast standard deviation, the range of probable sales price will be wider and the confidence score will be lower. Conversely, with a lower forecast standard deviation, the range of probable sales price will be narrower, and the confidence score will be higher. What our confidence score communicates is that we are confident we've estimated the value of the home within a percentage of the sales price. So, a score of 92 means we are confident that our estimated sale price is within 8% (100 - 92) of the true market value.

PROPERTIES WE DON'T VALUE

There are several property types we intentionally don't value or include in our comparable selection. We eliminate these property types for two reasons. First, these property types typically have a negative impact on the predictive value of other homes. Second, these property types require different data and modeling; therefore, they really don't belong in an AVM for standard single-family residences.

- **Mobile Homes:** In the case of mobile homes, a two-bedroom, two-bathroom home should value lower than a standard fixed foundation of the same configuration.

- **Homes on Farm or Agricultural Land**: In this case, the land and its use influence the value of the home because they are sold as a single unit of real property. So, the valuation requires data and modeling from similar comparable properties.

- **Multi-Unit Homes:** These properties rely on rental data to determine value because they are most typically investment properties that are under multi-tenant lease. As such, they require different data and modeling to derive a value.

THE ATTOM AVM DIFFERENCE

Property Data
ATTOM is the curator of the nation's premier property database, which is updated daily.

Sales Data
The sale of a single property in a neighborhood can impact the value of dozens or even hundreds of properties. ATTOM uses the most up-to-date sale data available, ensuring that our AVMs reflect current market conditions.

Highly Accurate Location Data
ATTOM sources the highest accuracy geocodes from multiple sources to ensure that we know with pinpoint accuracy where each property is located because even small discrepancies can have a big impact.

High-Fidelity Measurements and Geospatial Integration
ATTOM's in-house team of Geospatial Information System (GIS) experts build fast and accurate geospatial systems from the ground up and our high-fidelity neighborhood boundaries are, without question, the most accurate available. Our advanced GIS platform leverages over a dozen geospatial layers, each uniquely influencing the value of a property. The pinnacle of this platform is our four neighborhood layers which group properties in a way that closely matches how buyers and sellers view the value of properties.

POTENTIAL USE CASES

With the advent of highly accurate AVMs, it's now possible to use home value information across multiple functions. The following are example use cases, though more are emerging as this data becomes increasingly more accurate.

Real Estate Investments
Access highly accurate estimated values, ranges, and confidence scores for one property or an entire portfolio.

Real Estate Portals
Display the most accurate estimated home values and detailed property profile information on your page to drive more traffic and higher conversion rates.

Insurance
Calculate an insurance quote with a property's most accurate and current estimated value, profile, location, neighborhood and risk information.

Mortgage
Pinpoint a home's estimated market value to help determine the best borrower and lending program fit.

Appraisal Management
Create broker price opinions (BPOs) that deliver high quality estimates and ranges with a confidence score that can be relied on for data-driven business decisions.

Marketing
Create targeted prospect lists where prospective market value is a key demographic filter and enrich your marketing collateral with recipient-relevant values.

Sales and Customer Service
Reduce customer friction during the sales process by using AVM data to produce pre-filled forms and prequalify customers. You can also increase sales effectiveness by using property values to focus your sales efforts on the most relevant opportunities.

Operations
Use property values to drive workflow, validate risk on real estate transactions, and improve quality control.

Analytics
Use property values to understand the risk of particular transactions, analyze portfolios of properties, and do market research or selection.

FOR MORE INFORMATION CALL 800-462-5125 OR VISIT WWW.ATTOMDATA.COM

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