

AUTOMATED VALUATION MODEL

National, high quality and cost effective instant valuation

The RPS Automated Value Model (AVM) delivers cost-effective, commercial grade, and instant automated home valuations for residential properties across Canada. It is a national solution built using highly advanced machine learning systems and tree-based models, which can take into account extensive and diverse data sets, learn from the data in their environment, as well as incorporate new and different situations, as the market evolves.

Whether for use at origination or for portfolio reviews, the RPS AVM provides clients with the information they need to make better and more informed decisions.

Solution Overview

A National Solution	National coverage, including areas where automated valuations typically do poorly as a result of limited information
Commercial Grade and Statistically Accurate	Accuracy rate of +/-10% across the country (78% of the time), which is in line with commercial grade AVM standards across North America. Furthermore, in major cities, RPS can provide values with accuracy rates of up to 91%
Leverages Sophisticated Technology	Built using highly advanced machine learning systems and tree-based models, which can take into account extensive and diverse data sets, learn from the data in their environment, as well as incorporate new and different situations, as the market evolves
All Encompassing Reports	Meaningful, supporting information provided such as multiple confidence scores, homogeneity scores, and market price trend charts
Flexible for Your Needs	The RPS AVM can be provided by batch, real time through a browser or via an XML integration
Part of a Complete Solution	A full suite of valuation products are available via a customizable cascade, including other market-leading AVM providers and desk-top appraisals (desk-top, drive-by and full) to help balance cost, risk, and detail
Access to Our Data Experts	We provide our clients with complete access to our data and valuation experts, to understand the inputs and outputs

Why RPS?

- National coverage and robust hit rate
- Commercial grade and statistically accurate
- Built using sophisticated, machine learning systems
- Cost-effective
- Support from our data experts



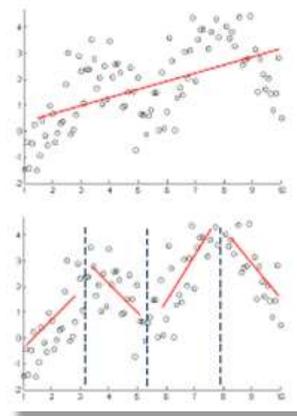
Foundation: Extensive Underlying Proprietary Database

Our solution leverages our unique, proprietary database that includes detailed property price and attribute information on millions of unique properties across the country, is regularly updated, with hundreds of thousands of records added annually and incorporates important neighbourhood information and proprietary analytics such as proximity indices and segmentation models, amongst others.

Approach: Machine Learning

The RPS AVM is built using machine learning, which is a branch of artificial intelligence and is rooted in early research on cybernetics and robotics.

Due to the fact that the factors which drive property values differ from place to place, for different property types and over time, traditional linear regressive functions tend to be too general for accurate estimates across the diverse housing stock in Canada. To solve for this, we use a Gradient Boosting Tree (GBT) based approach. GBT models differ fundamentally from conventional techniques that aim to fit a single parsimonious model. Boosted regression trees combine the strengths of two algorithms: regression trees and boosting, which is an adaptive method for combining many simple models to give improved predictive performance.



Three Available Models

1. Machine Learning Regression

A direct address match is found and the property's specific attributes are used to compute an AVM value using RPS' most-advanced machine learning GBT model

2. Index Model

A direct address match is found and the property's original value is indexed forward using a proprietary algorithm based on the RPS House Price Index (HPI)

3. Local Market Average

No direct address match, so local market attribute averages are used as inputs into the MLR model; match via postal code and returned values represent an average property value for the micro-neighbourhood

Accuracy: Commercial Grade

In addition, RPS has developed both a classifier and confidence function:

- **Classifier:** Determines if the record can be accurately predicted (hit) or not (miss)
- **Confidence:** A function which provides an indication of how confident the model is in the returned result

Currently, the models being utilized at RPS can predict property values across Canada within +/- 10% of their actual value, 78% of the time, which is in line with commercial grade AVM standards across North America. In major cities, the RPS AVM can provide values with accuracy rates of up to 91%.

Other Innovations: Rental AVM

The RPS Rental AVM is a national, commercial grade AVM that can provide instant estimates of monthly rental income on residential properties. It is the first of its kind in Canada using machine learning and offers a reliable, instant and cost-effective solution to expedite underwriting decisions. The Rental AVM delivers a value, a range and confidence score and can be provided in real time via an API, a portal or in batch. It can be accompanied by an RPS AVM estimate of market value on the property, and forms part of RPS' full suite of valuation products that help balance cost, risk, and time.