

MGH Valuation Algorithm KPIs

This document shows the KPIs of the MGH DAO Valuation Algorithm and gives an overview of its accuracy.

Key Performance Indicators (KPIs)

To analyze the valuation Algorithm performance, we use the following metrics:

- **MAPE (Mean Absolute Percentage Error)**
- **MedAPE (Median Absolute Percentage Error)**
- **Standard Deviation**
- **Skewness**
- **R2 (Coefficient of Determination)**

Summary

Project	MAPE	MedAPE	Std Dev	Skewness	R2
Sandbox sold LANDS	4.82%	3.62%	4.67%	2.72	98.69%
Sandbox non-sold LANDS	6.99%	5.14%	8.26%	11.49	96.70%
Decentraland sold LANDS	7.13%	4.60%	10.23%	8.09	98.25%
Decentraland non-sold LANDS	8.59%	6.34%	8.86%	4.92	97.51%

Sandbox Lands

The Sandbox algorithm developed by the MGH DAO is used to estimate the fair price for LANDS in that metaverse. While developing the model, two cases were identified: LANDS that have been sold, and LANDS that have not been traded. Taken this specification into account, an AI was trained for each case. Here is an overview of its performance:

The MAPE of the pricing model for LANDS that have been traded is 4.82%, meaning that if a LAND is priced at 3 ETH, the price at which the LAND will be sold should be around 3 ± 0.1446 ETH. The MedAPE, on the other hand, indicates that the errors tend to be clustered around 3.62%, which is lower than the MAPE. This is confirmed by the positive skewness of the error distribution. Finally, the model has an R2 of 98.69%, confirming that the algorithm is very accurate at replicating prices.

Statistic	Value
MAPE	4.82%
MedAPE	3.62%
Standard Deviation	4.67%
Skewness	2.72
R2	98.69%

To estimate the probability of an error being lower than a specific value, four levels commonly used in distribution analysis were chosen. These levels are based on the MAPE (μ) and the σ standard deviation (σ). Probabilities are shown in the table below:

Error	Value	Probability
μ	4.82%	62.62%
$\mu + \sigma$	9.50%	87.78%
$\mu + 2\sigma$	14.17%	96.13%
$\mu + 3\sigma$	18.84%	98.20%

Regarding the LANDS that have not been traded in the past, the algorithm shows a MAPE of 6.99% which means that if a LAND is valued at 3ETH, the price at which the land will be sold should be around 3 ± 0.2097 ETH. The MedAPE indicates that the errors tend to be clustered around 5.14%, which is lower than the MAPE. This is again confirmed by the positive skewness of the error distribution. In this case, the model has an R2 of 96.70%, confirming that the algorithm is in both cases very accurate at replicating prices.

Statistic	Value
MAPE	6.99%
MedAPE	5.14%
Standard Deviation	8.26%
Skewness	11.49
R2	96.70%

Here is some data regarding the probability of error for the analysed distribution:

Error	Value	Probability
μ	6.99%	63.22%
$\mu+\sigma$	15.26%	90.96%
$\mu+2\sigma$	23.52%	97.42%
$\mu+3\sigma$	31.78%	98.99%

Decentraland

The valuation model designed for Decentraland uses the same methodology applied for The Sandbox LANDS. This model uses \$MANA as the main reference for the AI. Here is an overview of its performance:

The MAPE of the pricing model for LANDS that have been traded in the past is 7.13%, meaning that if a LAND is priced at 1000 MANA, the price at which the LAND will be sold should be around 1000±71.3 MANA. The MedAPE, on the other hand, indicates that the errors tend to be clustered around 4.60%, which is lower than the MAPE. This is confirmed by the positive skewness of the error distribution. Finally, the model has an R2 of 98.25%, confirming that the algorithm is very accurate at replicating prices.

Statistic	Value
MAPE	7.13%
MedAPE	4.60%
Standard Deviation	10.23%
Skewness	8.09
R2	98.25%

To estimate the probability of an error being lower than a specific value, four levels commonly used in distribution analysis were chosen. These levels are based on the MAPE (μ) and the σ standard deviation (σ). Probabilities are shown in the table below:

Error	Value	Probability
μ	7.13%	67.35%
$\mu+\sigma$	17.36%	92.15%
$\mu+2\sigma$	27.59%	97.09%
$\mu+3\sigma$	37.82%	98.60%

Regarding the LANDS that have not been traded in the past, the algorithm shows a MAPE of 8.59% which means that if a LAND is valued at 3ETH, the price at which the land will be sold should be around 1000 ± 85.9 MANA. The MedAPE indicates that the errors tend to be clustered around 5.14%, which is lower than the MAPE. This is again confirmed by the positive skewness of the error distribution. In this case, the model has an R2 of 97.51%, confirming that the algorithm is in both cases very accurate at replicating prices.

Statistic	Value
MAPE	8.59%
MedAPE	6.34%
Standard Deviation	8.86%
Skewness	4.92
R2	97.51%

Here is some data regarding the probability of error for the analysed distribution:

Error	Value	Probability
μ	8.59%	62.25%
$\mu+\sigma$	17.46%	88.99%
$\mu+2\sigma$	26.32%	96.28%
$\mu+3\sigma$	35.19%	98.56%