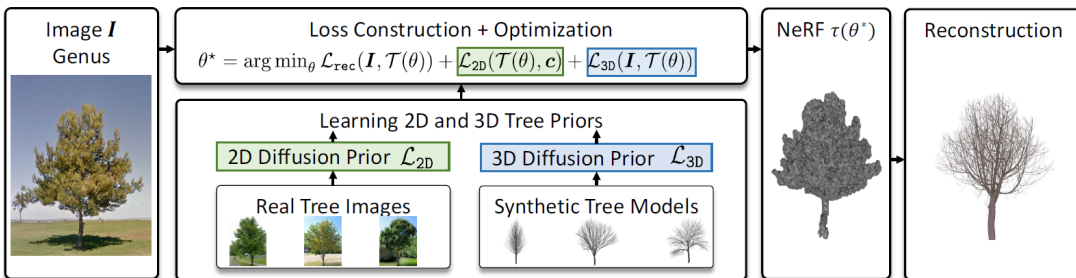
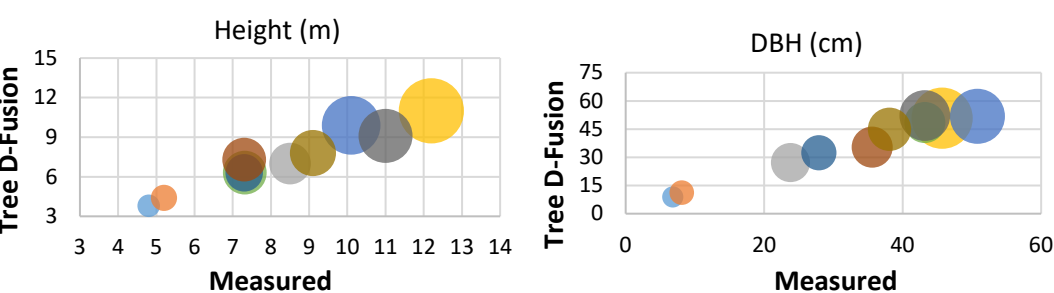




Overview

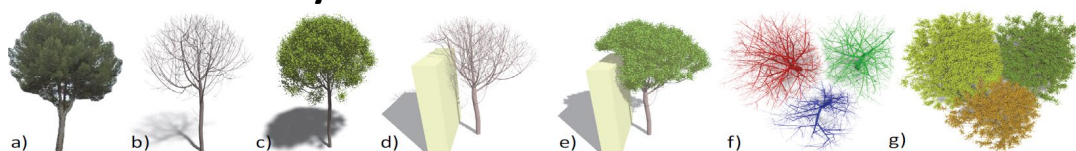


Predictions vs. Actual Measurement

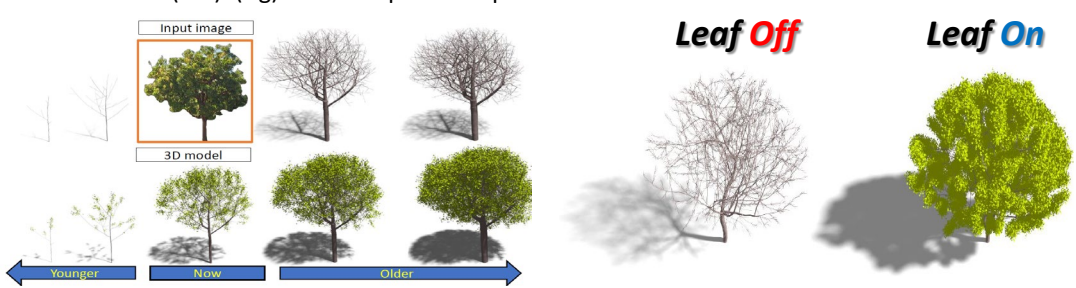


Our model shows **height** and **Diameter at Breast Height (DBH)** close to measured values. The radius illustrates the projected amount of shade.

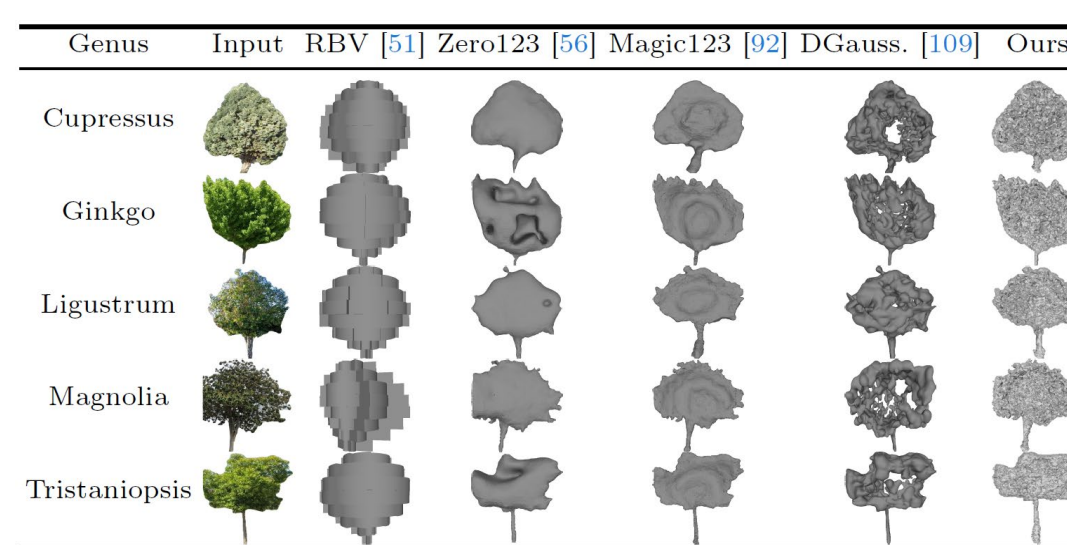
Simulation Ready Growth Model



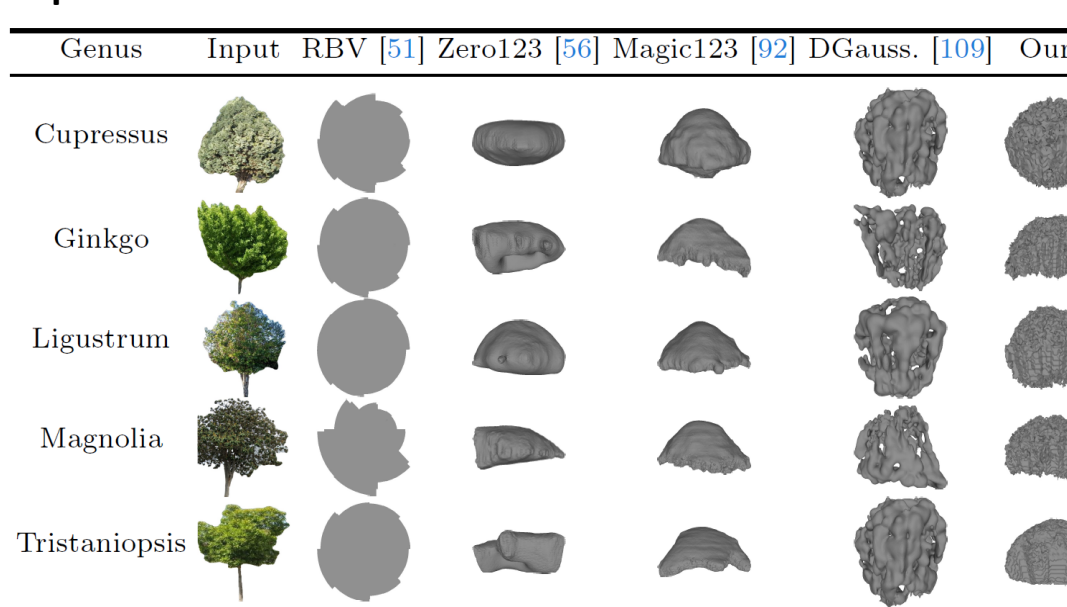
The input image (a) is reconstructed into a digital twin (b-c) that responds to the environment such as a wall(d-e). (f-g) shows a space completion.



Front View



Top View



Realism Score

Table 1: ICTree is the perceived realism scores of generated trees. *Tree-D Fusion* shows an average improvement of 44.83%±25.9%.

Genus	Input	RBV [51]	Zero123 [56]	Magic123 [92]	DGauss. [109]	Ours
Cupressus						
Ginkgo						
Ligustrum						
Magnolia						
Tristaniopsis						

ICTree [83]↑	DGauss [109]	Magic123 [92]	Zero123 [56]	RBV [51]	Ours
Cupressus	0.46±0.03	0.45±0.05	0.46±0.04	0.75 ± 0.09	0.65 ± 0.07
Magnolia	0.46±0.04	0.45±0.03	0.46±0.03	0.616 ± 0.16	0.71 ± 0.08
Pinus	0.44±0.04	0.46±0.03	0.44±0.04	0.627 ± 0.16	0.69 ± 0.08
Ligustrum	0.45±0.04	0.45±0.03	0.45±0.04	0.665 ± 0.16	0.71 ± 0.07
Cinnamomum	0.45±0.02	0.47±0.02	0.46±0.02	0.658 ± 0.16	0.71 ± 0.08
Total	0.45±0.03	0.45±0.03	0.45±0.03	0.67 ± 0.12	0.71 ± 0.05

Perceptual Image Similarity Score

Table 2: LPIPS [132] between a frontal view of a tree envelope from RBV [51] and *Tree-D Fusion* shows 20.21%±8.89% improvement.

Genus	Input	RBV [51]	Zero123 [56]	Magic123 [92]	DGauss. [109]	Ours
Cupressus						
Ginkgo						
Ligustrum						
Magnolia						
Tristaniopsis						

LPIPS [132]↓	DGauss [109]	Magic123 [92]	Zero123 [56]	RBV [51]	Ours
Cupressus	0.68± 0.02	0.68± 0.02	0.69±0.02	0.53 ± 0.01	0.52 ± 0.02
Magnolia	0.73± 0.03	0.72± 0.03	0.73±0.03	0.59 ± 0.05	0.55 ± 0.06
Pinus	0.70± 0.01	0.69± 0.02	0.70±0.02	0.55 ± 0.04	0.50 ± 0.05
Ligustrum	0.74± 0.03	0.74± 0.02	0.74±0.03	0.59 ± 0.04	0.56 ± 0.05
Cinnamomum	0.74± 0.02	0.73± 0.02	0.74±0.02	0.59 ± 0.05	0.56 ± 0.05
Total	0.72 ± 0.03	0.71± 0.04	0.72 ± 0.03	0.58 ± 0.05	0.54 ± 0.06

Semantic Image Similarity Score

Table 3: CLIP-Similarity [94] between four views of a tree envelope shows an improvement of 45.34%±23.86%.

Genus	Input	RBV [51]	Zero123 [56]	Magic123 [92]	DGauss. [109]	Ours
Cupressus						
Ginkgo						
Ligustrum						
Magnolia						
Tristaniopsis						

CLIP-Sim. [94]↑	DGauss. [109]	Magic123 [92]	Zero123 [56]	RBV [51]	Ours
Cupressus	0.47±0.05	0.49±0.03	0.38±0.04	0.54 ± 0.04	0.67 ± 0.06
Magnolia	0.46±0.04	0.46±0.03	0.39±0.04	0.54 ± 0.04	0.65 ± 0.07
Pinus	0.38±0.04	0.38±0.04	0.34±0.03	0.54 ± 0.04	0.64 ± 0.08
Ligustrum	0.45±0.03	0.45±0.9	0.35±0.06	0.54 ± 0.04	0.65 ± 0.06
Cinnamomum	0.40±0.08	0.42±0.05	0.34±0.05	0.54 ± 0.04	0.65 ± 0.06
Total	0.43±0.06	0.44±0.06	0.36±0.05	0.54 ± 0.04	0.63 ± 0.07

LIDAR Scanned 3D Point Cloud Similarity

Table 4: A Chamfer distance (CD) from real LIDAR scanned trees shows an improvement of 32.62%±6.44%.

CD(10 ⁻²) ↓	DGauss. [109]	Magic123 [92]	Zero123 [56]	RBV [51]	Ours
Tree 1	5.09	6.05	5.31	6.44	4.62
Tree 2	5.13	4.53	6.09	4.71	2.81
Tree 3	2.52	3.87	4.13	4.36	2.31
Total	4.25	4.82	5.18	5.17	3.25