Video2GUI: Synthesizing Large-Scale Interaction Trajectories for Generalized GUI Agent Pretraining

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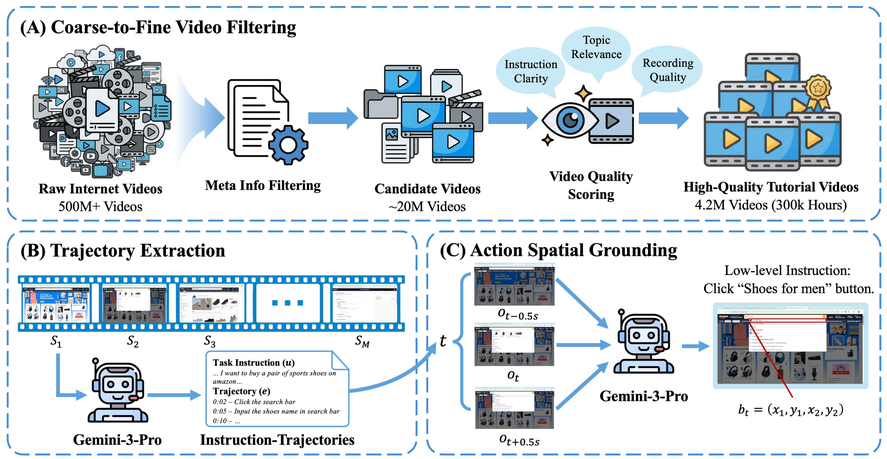
Introduction

- **TL;DR:** We present **Video2GUI**, a fully automated framework that extracts grounded GUI interaction trajectories directly from unlabeled Internet videos.
- **Motivation:** Generalized GUI agents depend on large-scale, diverse trajectory data spanning real-world applications. But existing datasets rely on costly manual annotation and are confined to narrow domains or single platforms — a key bottleneck for agent generalization.
- **Key Challenges:** Internet videos are a rich, free source of real GUI usage — but hard to exploit:
  - Filtering: identifying high-quality GUI tutorials among billions of noisy videos
  - Annotation: raw videos lack interaction labels and precise grounding coordinates
- **Here's what we get: WildGUI** — the largest open-source GUI pre-training dataset across web / mobile / desktop platform. Pre-training Qwen2.5-VL & Mimo-VL yields 5–20% gains, matching or surpassing SOTA.

Dataset	Platform			Scale & Statistics				Inst. Level
	Website	Mobile	Desktop	Environments	Instructions	Images	Turns	
MiniWoB++ (Liu et al., 2018)	✓	✓	✗	114	100	17,971	3.6	Low-level
MIND2WEB (Deng et al., 2023)	✓	✗	✗	137	2,350	2,350	7.3	High-level
AITW (Rawles et al., 2023)	✗	✓	✗	357	30,378	715,142	6.5	High & low
AndroidControl (Li et al., 2024)	✗	✓	✗	833	14,538	15,283	4.8	High & low
GUI-World (Chen et al., 2024)	✓	✓	✓	-	12,379	83,176	6.7	High-level
GUI-Odessey (Lu et al., 2025c)	✗	✓	✗	201	7,735	118,791	15.4	High-level
GUI-Act (Chen et al., 2025)	✓	✗	✗	50	67k	13k	7.9	Low-level
GUI-Net (Zhang et al., 2025a)	✓	✓	✓	280	1M	1M	4.7	High-level
MONDAY (Jang et al., 2025)	✗	✓	✗	-	20K	313k	15.7	High-level
GUI-360° (Mu et al., 2025)	✗	✗	✓	3	13,750	105,368	7.6	High-level
WildGUI (Ours)	✓	✓	✓	1,500+	12.7M	124.5M	9.7	High & low

Method



Experiments

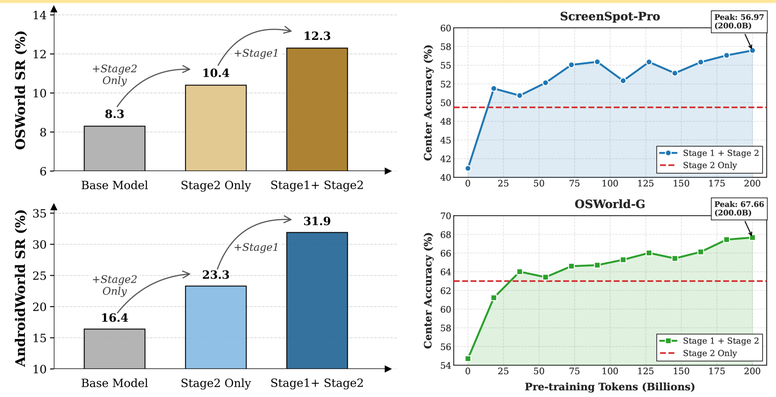
GUI Grounding Evaluation

Agent Model	ScreenSpot-Pro			OSWorld-G				
	Text	Icon	Avg	Text Match.	Elem. Rec.	Layout Und.	Fine-grained	Avg
Proprietary Models								
Gemini-2.5-Pro	-	-	11.4	59.8	45.5	49.0	33.6	45.2
Seed1.5-VL	-	-	60.9	73.9	66.7	69.6	47.0	62.9
Open-Source Models								
Qwen3-VL-2B* (Bai et al., 2025a)	56.1	18.9	41.9	61.7	45.8	54.2	39.6	45.9
GTA1-7B (Yang et al., 2025)	65.5	25.3	50.1	42.1	65.7	62.7	56.1	55.1
UI-Venus-7B (Gu et al., 2025)	67.1	24.3	50.8	74.6	60.5	61.5	45.5	58.8
OpenCUA-7B (Wang et al., 2025)	-	-	50.0	-	-	-	-	55.3
GUI-Owl-7B (Ye et al., 2025)	69.4	31.5	54.9	64.8	63.6	61.3	41.0	55.9
Qwen3-VL-8B* (Bai et al., 2025a)	67.6	21.3	49.9	69.0	55.5	59.7	47.7	54.8
Qwen3-VL-32B* (Bai et al., 2025a)	73.4	25.0	54.9	72.8	63.3	66.4	51.7	60.6
UI-TARS-72B (Qin et al., 2025)	50.9	17.5	38.1	69.4	60.6	62.9	45.6	57.1
Effectiveness of WildGUI (Ours)								
Qwen2.5-VL-7B (Bai et al., 2025b)*	-	-	26.8	41.4	28.8	34.8	13.4	27.3
+ WildGUI	57.0	17.6	41.9 (↑15.1)	70.0	54.6	57.7	46.2	53.7 (↑26.4)
Mimo-VL-7B (Xiaomi, 2025)	55.7	18.4	41.2	65.0	59.2	59.0	40.2	54.7
+ WildGUI	70.1	33.6	**56.9** (↑15.7)	80.8	68.3	71.1	61.4	**67.6** (↑12.9)

Offline GUI Agent Evaluation

Models	AndroidControl-Low		AndroidControl-High		CAGUI	
	Type Acc.	Step SR	Type Acc.	Step SR	Type Acc.	Step SR
Closed-source Models						
GPT-4o (Hurst et al., 2024)	74.3	19.4	66.3	20.8	3.7	3.7
Open-source Models						
OS-Genesis-7B (Sun et al., 2025)	90.7	74.2	65.9	44.4	38.1	14.5
OS-Atlas-7B (Wu et al., 2024)	73.0	67.3	70.4	56.5	81.5	55.9
Aguvis-7B (Xu et al., 2024)	93.9	89.4	65.6	54.2	67.4	38.2
UI-TARS-7B (Qin et al., 2025)	98.0	90.8	83.7	72.5	88.6	70.3
Effectiveness of WildGUI (Ours)						
Qwen2.5-VL-7B* (Bai et al., 2025b)	94.1	85.0	75.1	62.9	74.2	55.2
+ WildGUI	94.9 (↑0.8)	90.3 (↑5.3)	74.6	64.5 (↑1.6)	88.3 (↑14.1)	65.4 (↑10.2)
Mimo-VL-7B (Xiaomi, 2025)	92.9	87.9	76.3	65.6	82.2	63.4
+ WildGUI	**95.5** (↑2.6)	**91.8** (↑3.9)	**80.6** (↑4.3)	**71.4** (↑5.8)	**90.3** (↑8.1)	**71.0** (↑7.6)

Online Evaluation & Scaling Effects

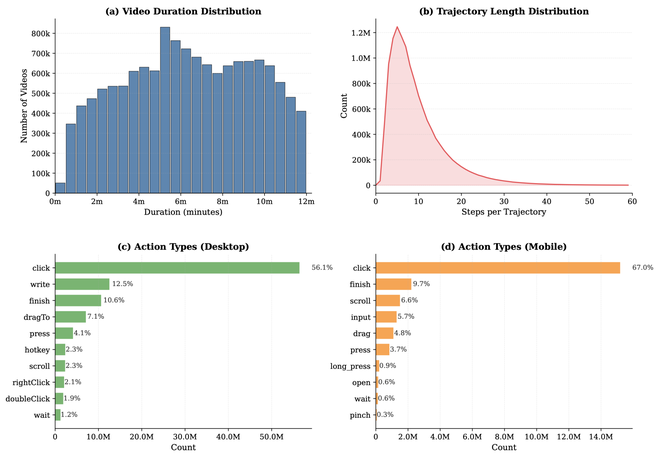


Discussion

D1: Ablation Studies

Setting	ScreenSpot-Pro	CAGUI	AndroidWorld
Ours	**56.9**	**71.0**	**31.9**
w/o $\mathcal{L}_{ground}$	49.8	69.8	28.4
w/o $\mathcal{L}_{action}$	50.5	65.3	27.6
w/o $\mathcal{L}_{traj}$	54.6	70.2	24.1
w/o Stage 1	49.3	64.2	23.3
w/o Stage 2	28.2	45.7	6.0

D2: Dataset statistics of WildGUI



Contact Info

Paper

Dataset

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