



# Recovering Dynamic 3D Sketches from Videos

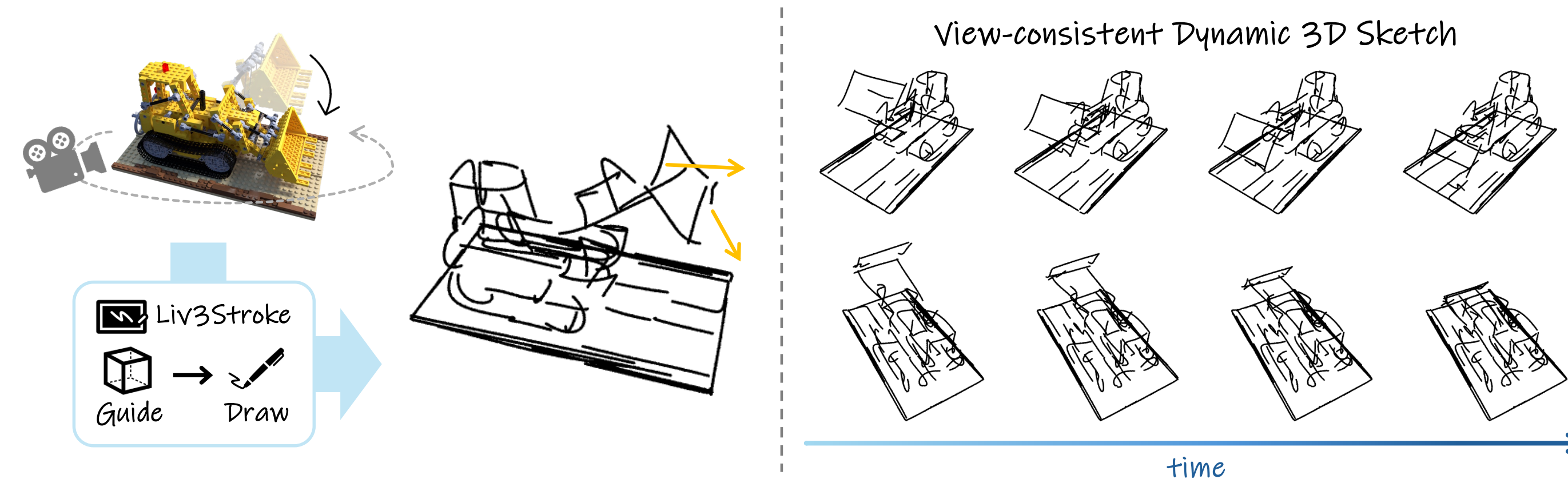
Jaeah Lee<sup>1</sup> Changwoon Choi<sup>2</sup> Young Min Kim<sup>2</sup> Jaesik Park<sup>1</sup>  
Seoul National University



Project Page

## TL;DR

- ✓ Liv3Stroke is a novel approach for reconstructing **dynamic sketches** with **deformable 3D strokes** directly from video frames.

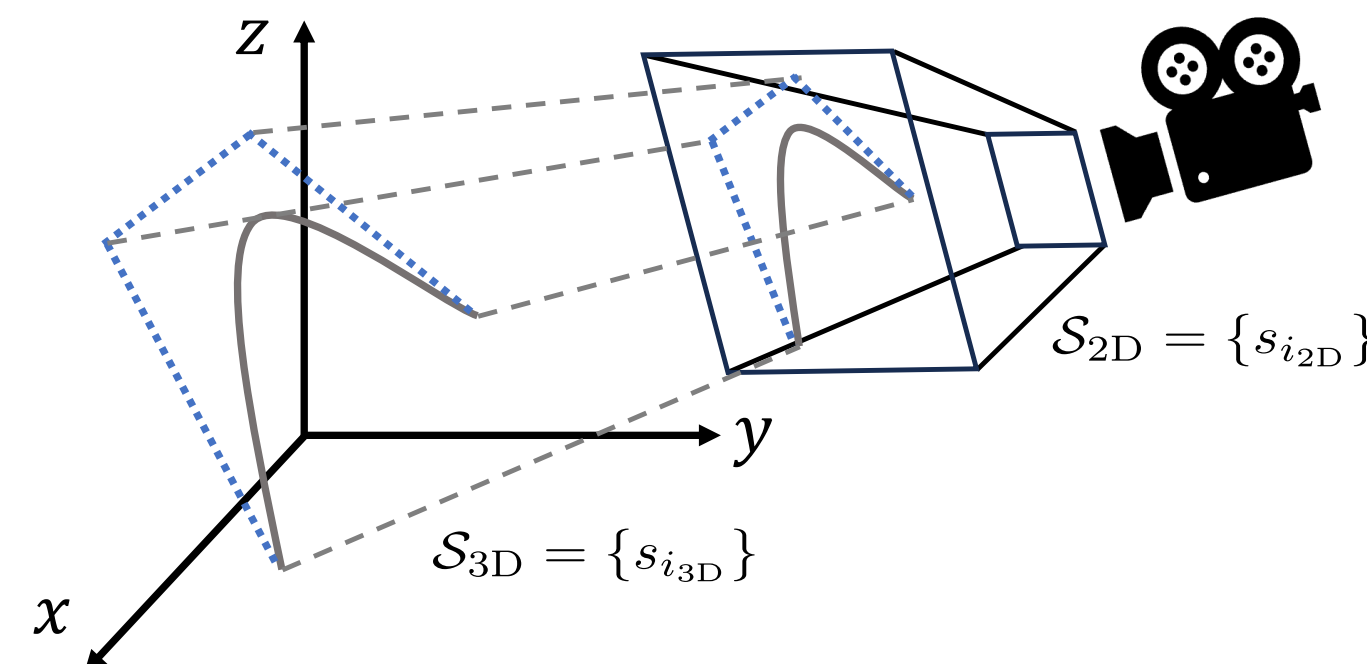


## Problem Definition

- ✓ Tracking 3D motion in videos is **fundamentally ambiguous** due to complex object types and projection into 2D frames.
- ✓ Recent methods often aim for **dense reconstruction**, making them **sensitive** to appearance changes or imprecise alignments.
- ✓ We explore **sketch-based abstraction** to express 3D movements in a **compact** and **robust** way.

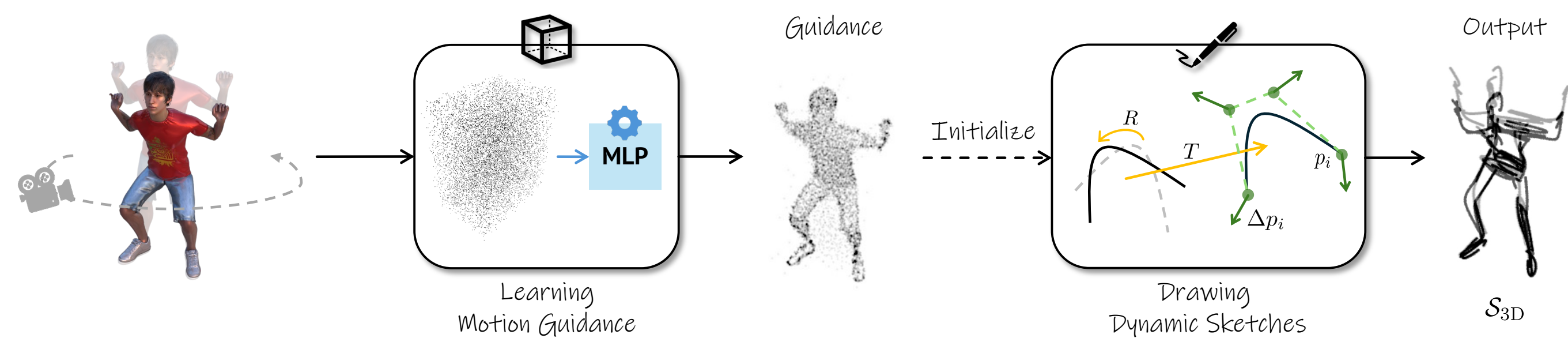
### Sketch representation

- Define a *sketch* as  $n$  black strokes on the white background.
- Each stroke is presented as a **3D cubic Bézier curve**, with four control points:  
 $s_i = \{p_i^j\}_{j=0}^3$

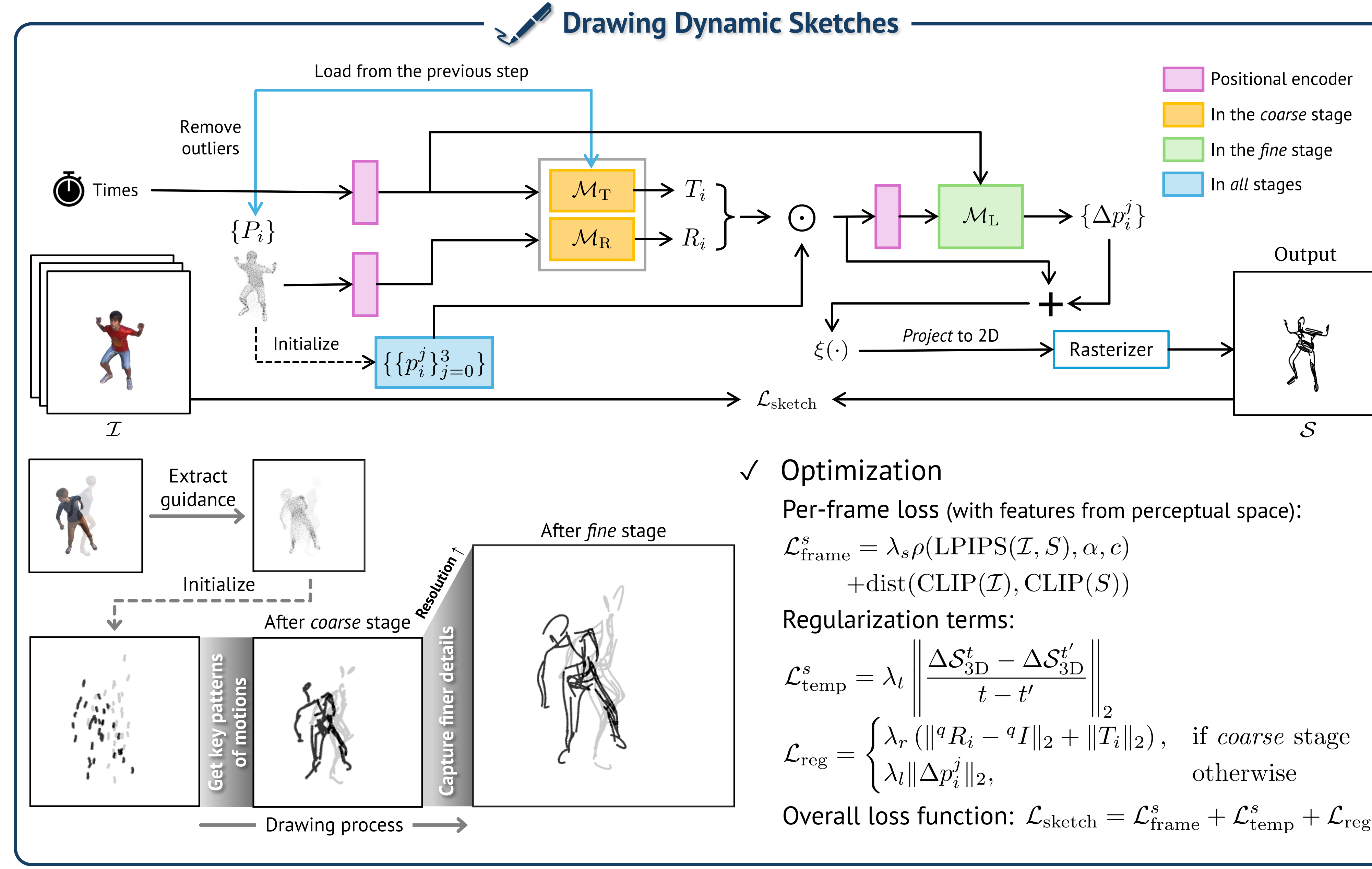
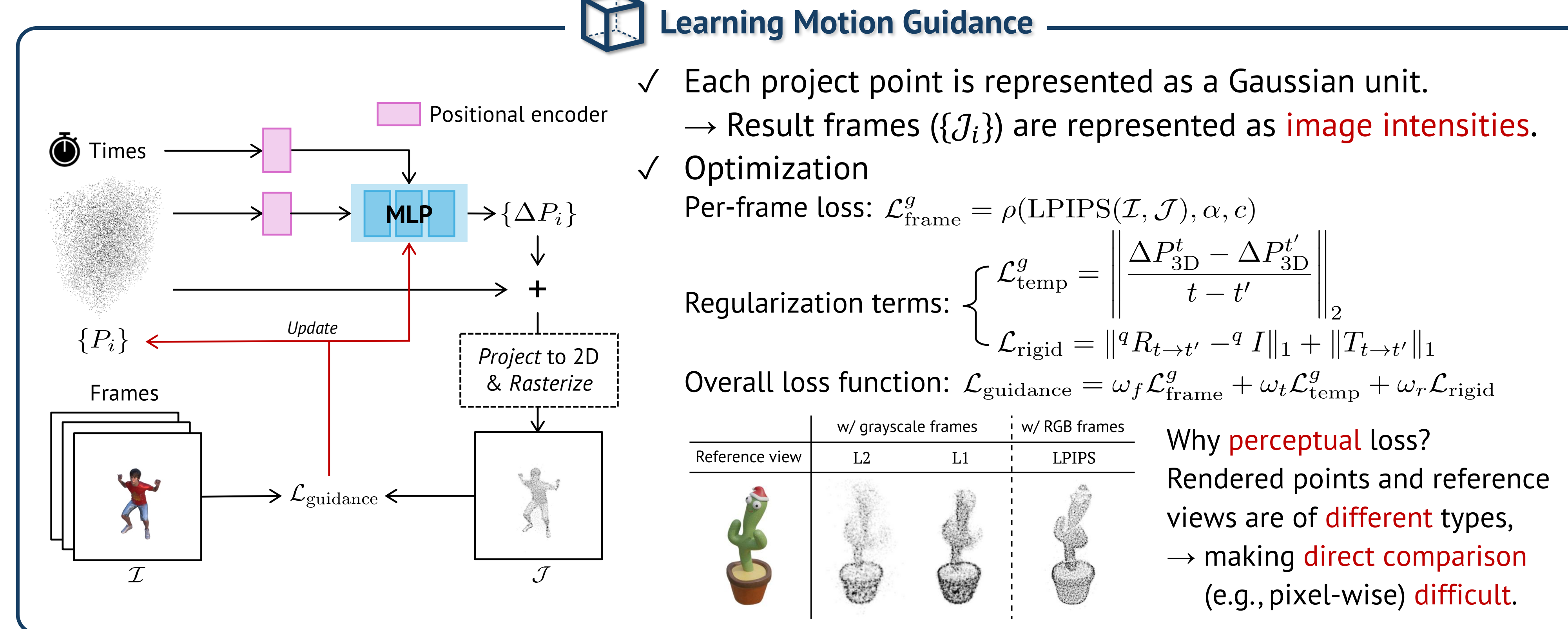


## Method Overview

- ✓ **Extract 3D motion guidance** from frames for **rough stroke movements**.
- ✓ **Transform strokes** and **adjust control points** for dynamic 3D sketches.



## Method



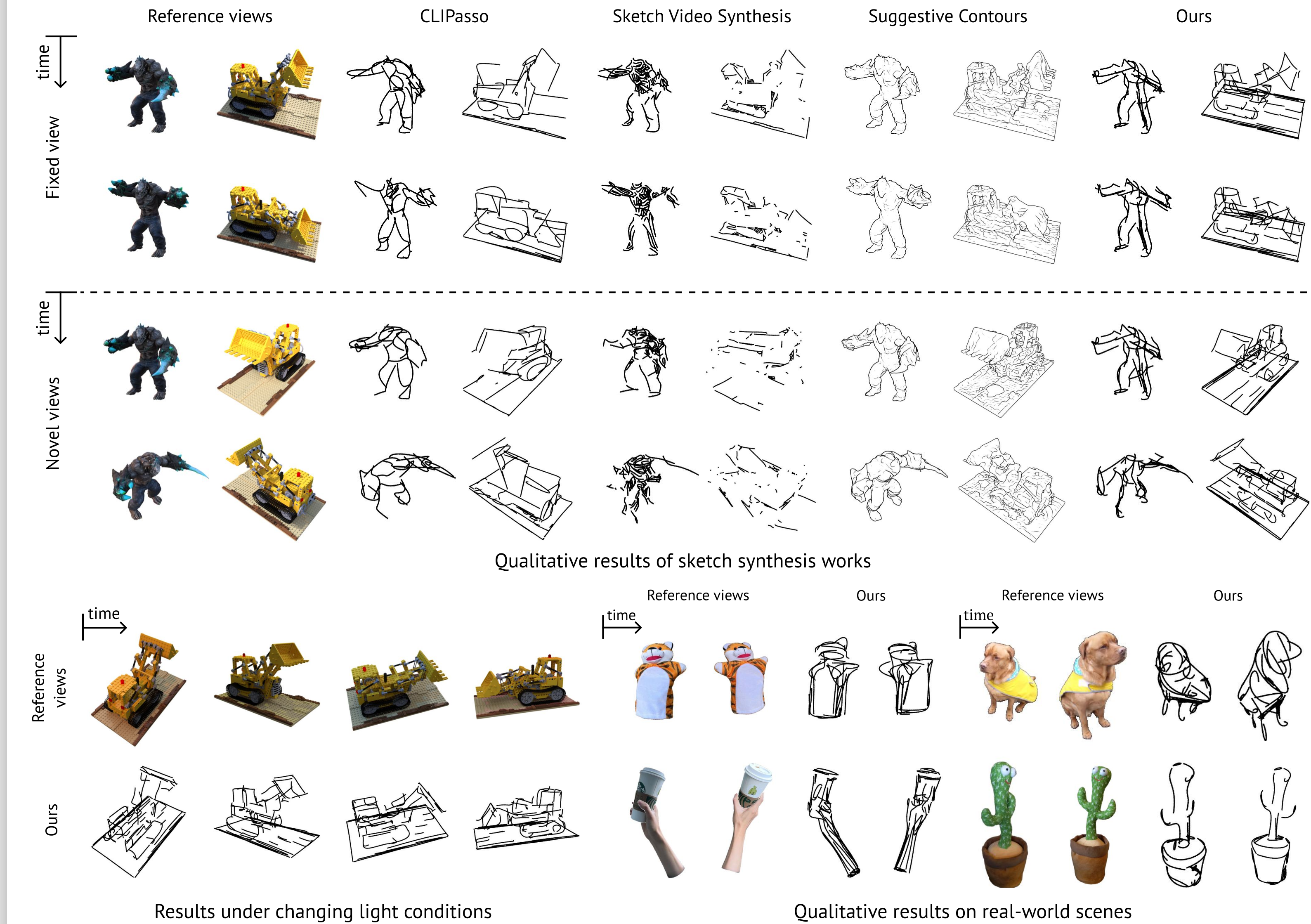
## Experimental Results

### Quantitative Results

Method	Structural alignment ( $\uparrow$ )		Motion prompt similarity ( $\uparrow$ )	
	Novel views	Fixed view	Novel views	Fixed view
CLIPasso	0.760 $\pm$ 0.107	0.740 $\pm$ 0.127	0.659 $\pm$ 0.007	0.664 $\pm$ 0.011
Sketch Video Syn.	0.663 $\pm$ 0.115	0.657 $\pm$ 0.135	0.654 $\pm$ 0.011	0.658 $\pm$ 0.011
Sugg. Contours	0.784 $\pm$ 0.102	0.750 $\pm$ 0.119	0.661 $\pm$ 0.013	0.656 $\pm$ 0.016
Liv3Stroke (Ours)	0.693 $\pm$ 0.096	0.683 $\pm$ 0.108	0.656 $\pm$ 0.006	0.656 $\pm$ 0.008

Quantitative results of dynamic 3D sketches.

### Qualitative Results



### Additional Results

