



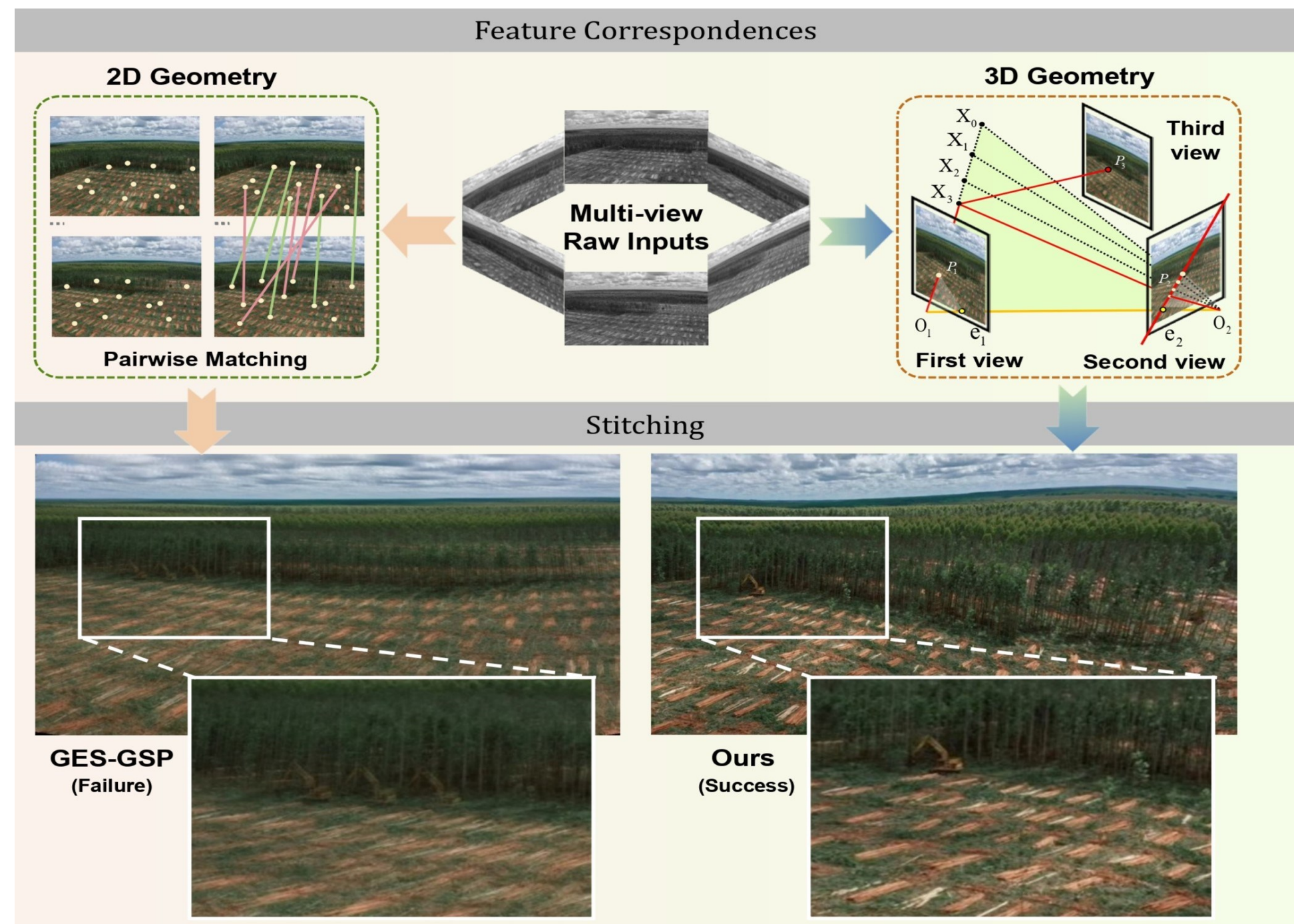
Pano360: Perspective to Panoramic Vision with Geometric Consistency

Zhengdong Zhu Weiyi Xue Zuyuan Yang Wenlve Zhou Zhiheng Zhou[†]



Motivation

Image stitching with 3D Geometry

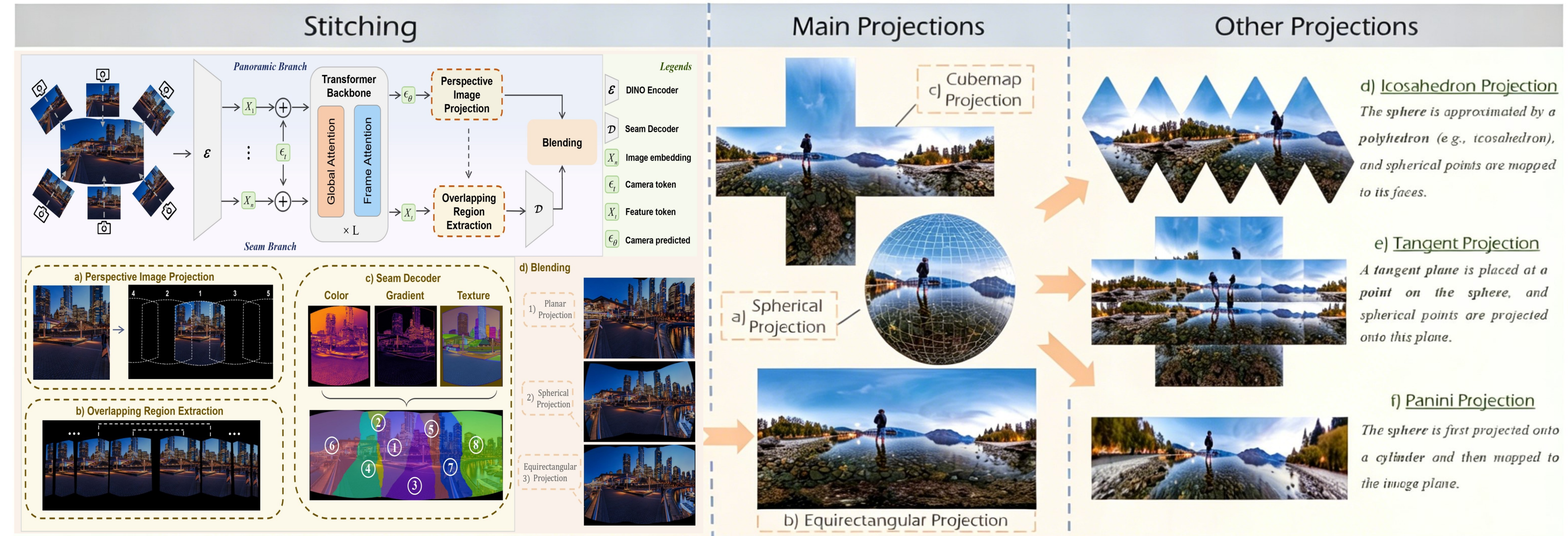


How can we generate panorama with geometric consistency?

Challenges

- **Large-scale stitching**
 - Accumulative Error
 - Pairwise Correspondence
- **Parallax Scenes**
 - Geometric Distortion
 - Misaligned and Ghost
- **Repetitive/Weak Texture**
 - Unreliable Matches
 - Incorrect Features

Overview



Quantitative & Qualitative Results

Method	Scene (a)				Scene (b)				Scene (c)			
	QA _q ↑	QA _a ↑	BRIS↓	NIQE↓	QA _q ↑	QA _a ↑	BRIS↓	NIQE↓	QA _q ↑	QA _a ↑	BRIS↓	NIQE↓
AutoStitch [3]	3.82	3.20	40.98	4.55	3.24	2.74	43.50	5.94	3.28	2.81	49.84	5.01
APAP [40]	3.62	3.05	54.49	3.72	3.22	3.03	52.62	3.78	3.53	3.66	45.66	3.77
ELA [14]	3.88	3.17	46.15	3.71	3.35	2.60	40.69	5.02	3.75	3.20	41.54	3.88
GSP [4]	3.87	3.25	37.55	3.53	3.20	3.45	40.66	3.96	3.65	3.57	42.19	3.71
GES-GSP [6]	3.95	3.20	36.45	3.36	3.45	3.35	32.25	3.95	3.74	3.72	44.22	3.95
LPC [8] [‡]	3.01	2.88	57.55	5.86	2.57	2.68	55.37	6.81	2.98	2.21	59.88	4.96
UDIS2 [27] [‡]	3.02	2.97	60.55	5.23	2.84	2.64	51.63	6.53	2.87	2.34	58.62	4.91
Pano360 (Ours)	4.08	3.40	34.65	3.26	3.57	3.52	28.79	3.71	4.09	3.94	37.96	3.37

Geometry	Method	Success (%)		Runtime
		Success (%)	Runtime	
✓	LoFTR+RANSAC [36]	63.4	~ 13s	
✓	LightGlue+RANSAC [20]	66.7	~ 11s	
✓	AutoStitch [3]	46.7	~ 60s	
✓	APAP [40]	30.0	> 300s	
✓	ELA [14]	80.1	~ 90s	
✓	GSP [4]	77.6	~ 30s	
✓	GES-GSP [6]	83.3	~ 20s	
✗	Ours	97.8	~ 5s	

Pano360

UDIS-D

Real-World



Applications

- **Camera Photography**
 - UAV Navigation
 - 360 Camera
- **3D Gaussian Splatting**
 - 3D Reconstruction
 - Virtual Reality
- **Autonomous Driving**
 - Surround View System
 - Novel View Synthesis

