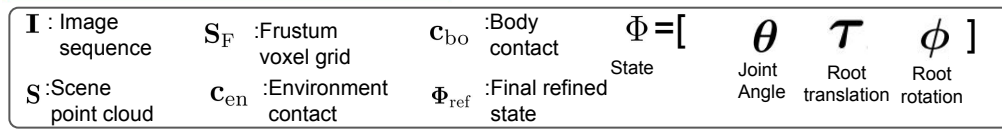
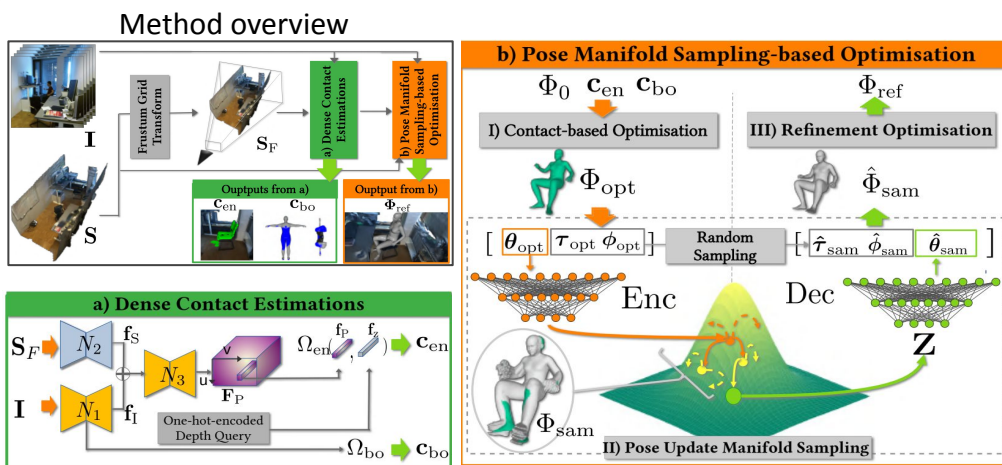
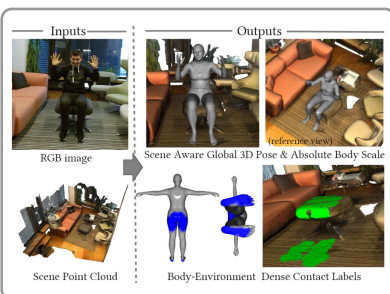




## Method

## Results

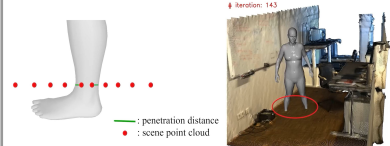


### Overview

We propose a new approach for 3D human MoCap which is aware of the scene geometry.

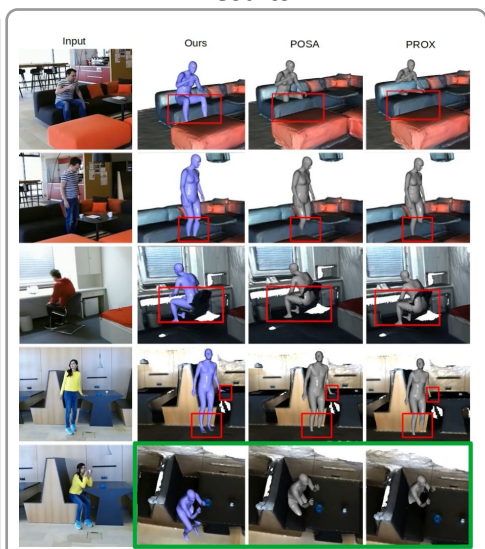
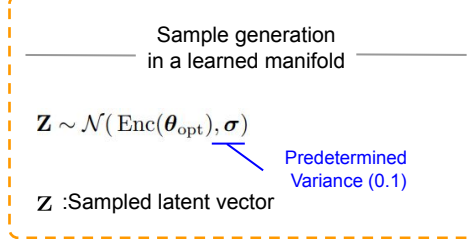
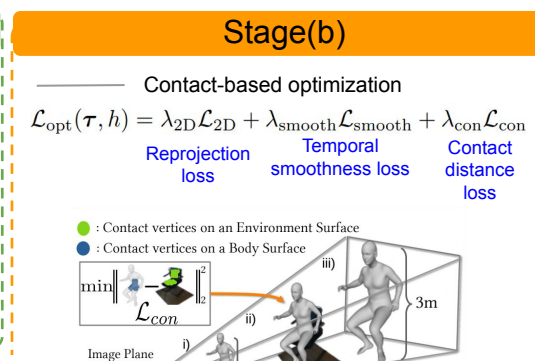
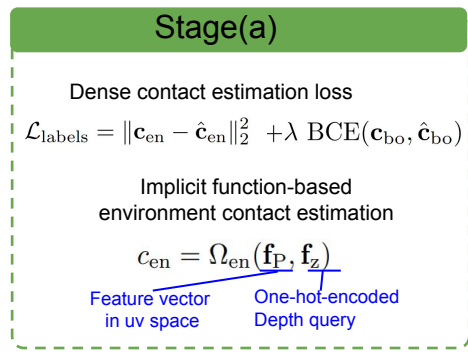
- simultaneously estimate global 3D human pose and body scale guided by estimated contacts
- The first method that regresses the dense body and environment contact labels
- A novel pose manifold sampling yielding better results by imposing hard constraints on incorrect body-environment interactions
- Large-scale body contact annotations on the GTA-IM dataset

### Why sampling-based optimization?



• **Environment collisions** appear due to the convergence at a bad local minima even with collision penalty loss term in the gradient-based optimization

Our novel pose sampling optimization handles the collisions **in a hard manner**



### 3D error comparison on PROX dataset

	No Procrustes		Procrustes	
	MPIPE [mm]	PCK [%] PVE [mm]	MPIPE [mm]	PCK [%] PVE [mm]
Ours	217.9	35.3	214.7	81.5
Ours (w/o S)	221.3	34.5	217.2	82.6
Ours (w/o R)	240.8	31.9	237.3	85.1
Ours (w/o SR)	251.1	31.5	245.2	83.9
SMPLeX-X [38]	550.0	10.0	549.1	84.7
PROX [11]	549.7	10.1	548.7	84.6
POSA [12]	552.2	10.1	550.9	85.5
LEMO (RGB) [66]	570.1	8.75	570.5	83.0
LEMO (RGB) [66]	570.0	8.77	570.4	83.0

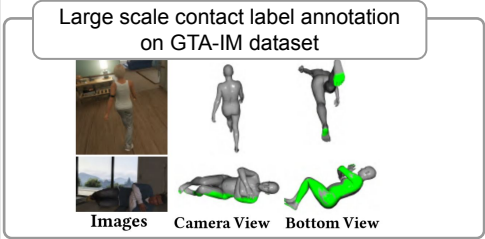
### Physical plausibility measurement

GPA Dataset	PROX Dataset	
	non penet. [%]	non penet. [%]
Ours	99.4	97.0
Ours (w/o S)	97.6	93.8
Ours (w/o R)	99.4	97.1
Ours (w/o SR)	97.6	93.8
SMPLeX-X [38]	97.7	88.6
PROX [11]	97.7	89.8
LEMO (RGB) [66]	97.8	-
POSA [12]	98.0	94.0
PROX-D [10]	-	94.2
LEMO [66]	-	96.4

### Global Translation Estimation On GPA dataset

	global translation bone length error [m]	absolute error [m]
Ours (+1m)	0.242	0.104
Ours (+3m)	0.244	0.097
Ours (+10m)	0.244	0.109
Baseline (+1m)	0.751	0.498
Baseline (+3m)	1.033	0.560
Baseline (+10m)	2.861	1.918
SMPLeX-X [38]	0.527	0.156
PROX [11]	0.528	0.160
POSA [12]	0.545	0.136

Related works: POSA [CVPR2021], PROX [ICCV2019], GTA-IM [ECCV 2020], LEMO [ICCV 2021]



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