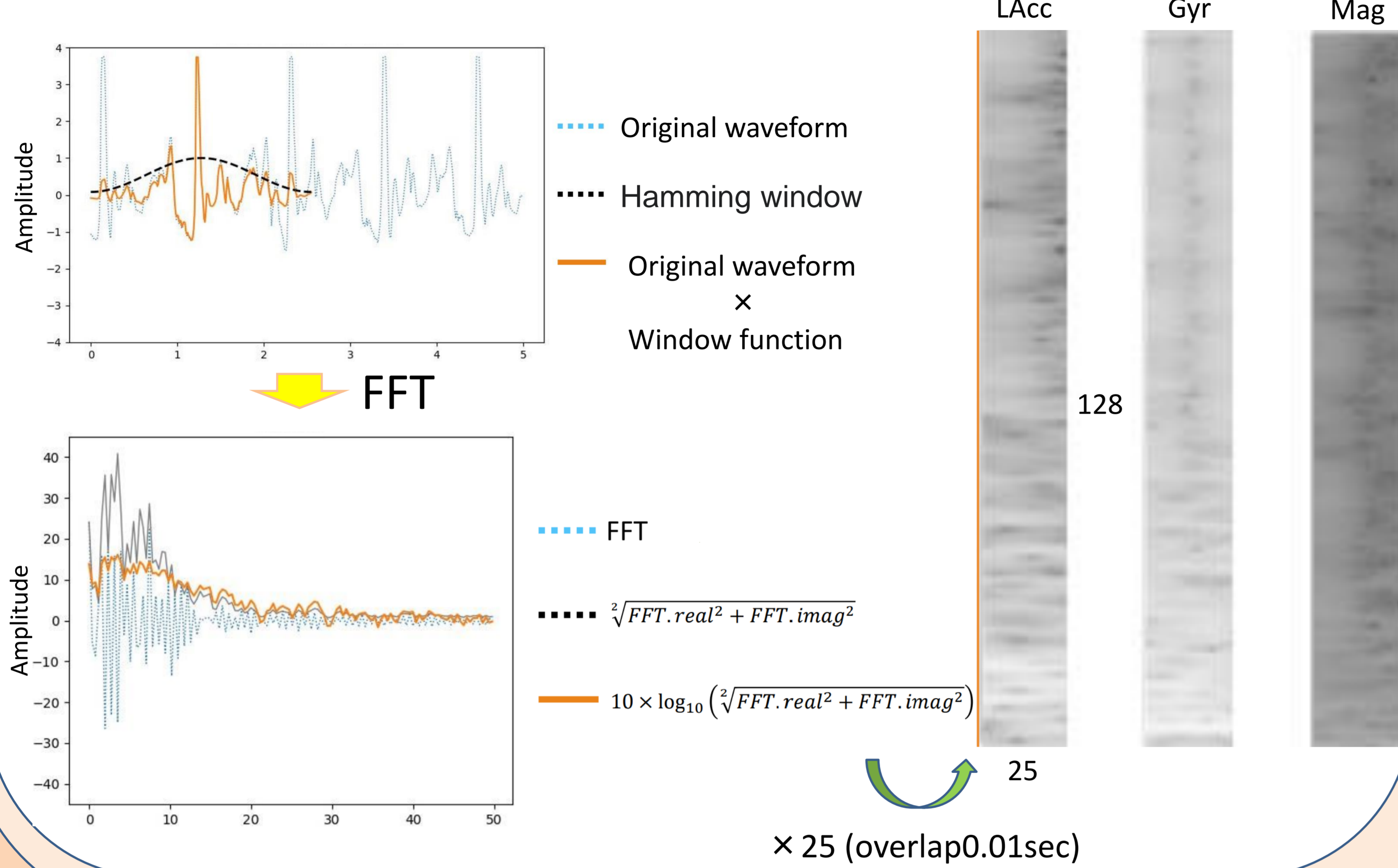


Human Activity Recognition Using Multi-input CNN Model with FFT Spectrograms

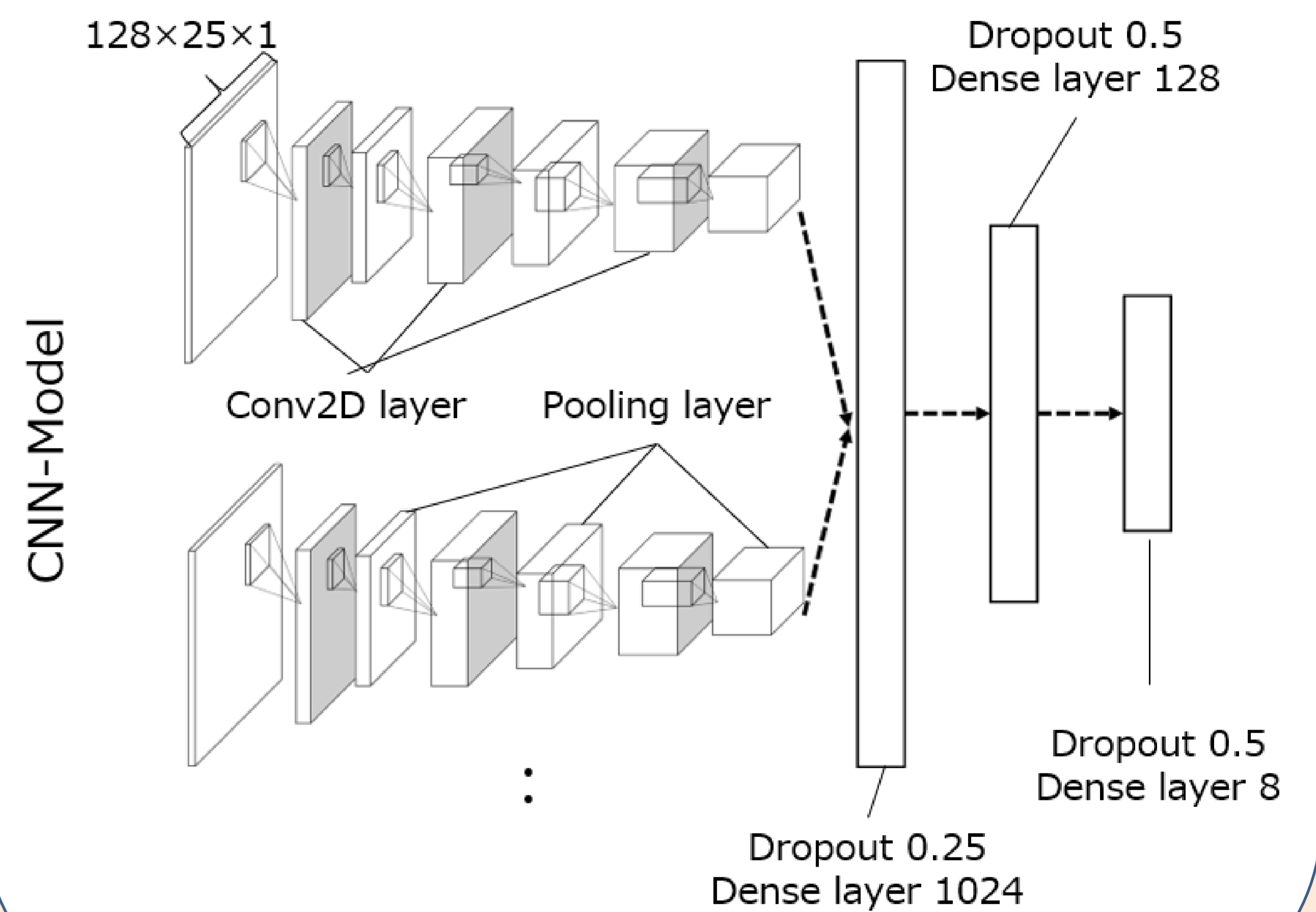
Kei Yaguchi, Kazukiyo Ikarigawa, Ryo Kawasaki, Wataru Miyazaki, Yuki Morikawa,
Chihito Ito, Masaki Shuzo, Eisaku Maeda
Tokyo Denki University

Method

Preprocessing



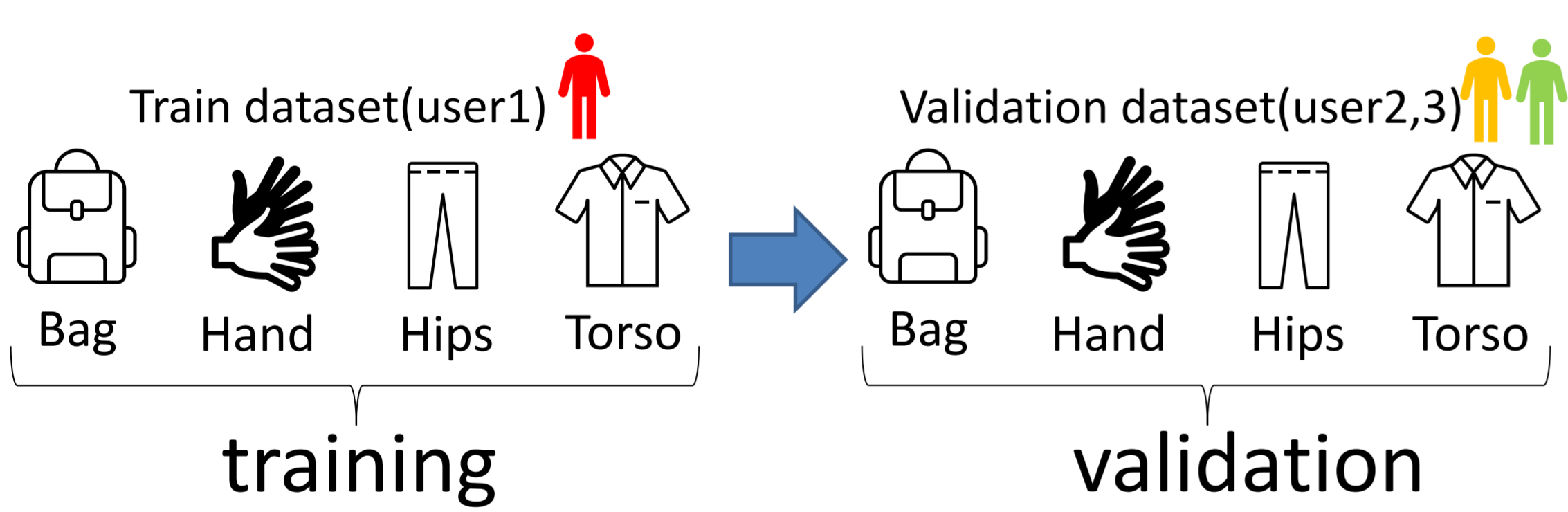
Model



Retention Position Estimation

Validation

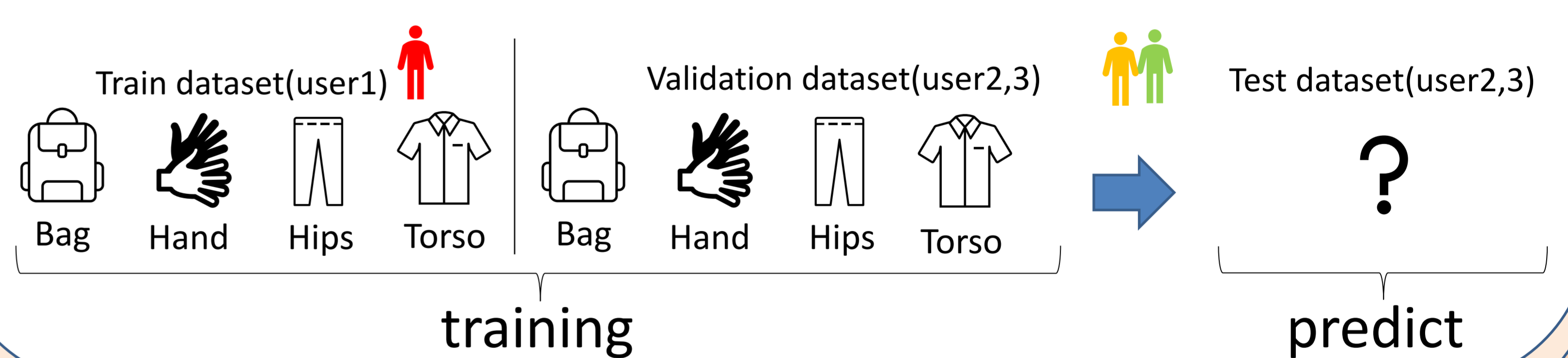
		Predicted				Location	F-measure	Precision	Recall
		Bag	Hand	Hips	Torso				
Ground Truth	Bag	20394	96	4	2455	Bag	0.8037	0.7336	0.8887
	Hand	274	22671	0	3	Hand	0.9917	0.9955	0.9879
	Hips	0	6	22942	0	Hips	0.9997	0.9998	0.9997
	Torso	7132	0	0	15816	Torso	0.7674	0.8655	0.6892



Results for test data

Location	#Predict
Bag	0
Hand	4
Hips	57569
Torso	0

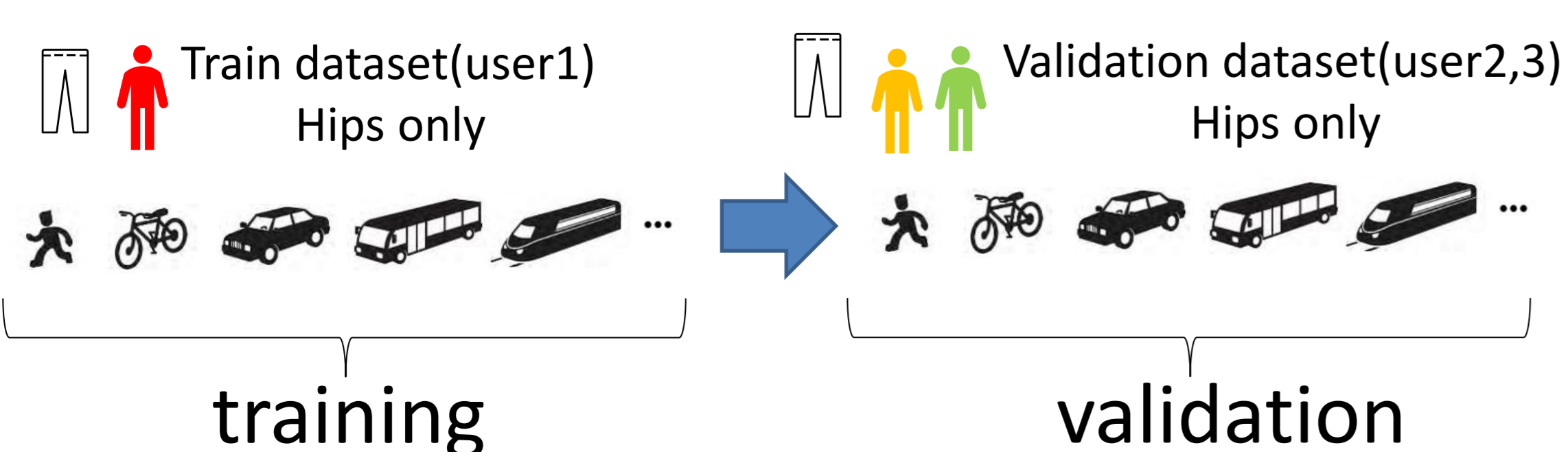
It was estimated that 99% of the data was measured from Hips



State Estimation

Pre-train

		Predicted								Activity	F-measure
		Still	Walk	Run	Bike	Car	Bus	Train	Subway		
Ground Truth	Still	5539	33	0	2	5	13	241	103	Still	0.8418±0.0043
	Walk	533	3864	1	304	0	2	350	136	Walk	0.8524±0.0167
	Run	4	28	340	178	0	0	1	0	Run	0.7220±0.0253
	Bike	229	81	0	926	14	25	844	281	Bike	0.6717±0.0979
	Car	545	4	0	11	844	765	1705	215	Car	0.4686±0.0772
	Bus	17	10	0	3	46	1335	362	57	Bus	0.6385±0.0302
	Train	144	24	0	2	42	149	3449	543	Train	0.5918±0.0415
	Subway	248	13	0	1	11	21	1782	2260	Subway	0.6419±0.0380
											macro avg



Fine-tuning

		Predicted								Activity	F-measure
		Still	Walk	Run	Bike	Car	Bus	Train	Subway		
Ground Truth	Still	5669	152	0	18	20	8	23	46	Still	0.9473±0.0031
	Walk	145	5014	1	19	2	1	7	2	Walk	0.9524±0.0063
	Run	0	11	540	0	0	0	0	0	Run	0.9899±0.0101
	Bike	43	89	0	2259	2	3	3	1	Bike	0.9556±0.0030
	Car	51	6	0	2	4024	3	0	3	Car	0.9872±0.0022
	Bus	5	22	0	10	9	1771	8	5	Bus	0.9769±0.0069
	Train	57	32	0	13	3	6	4164	78	Train	0.9644±0.0021
	Subway	64	14	0	7	4	4	78	4163	Subway	0.9646±0.0029
											macro avg

