

Wildkey Social: Insights from Privacy-Preserving Smartphone Measures in ND and IMID

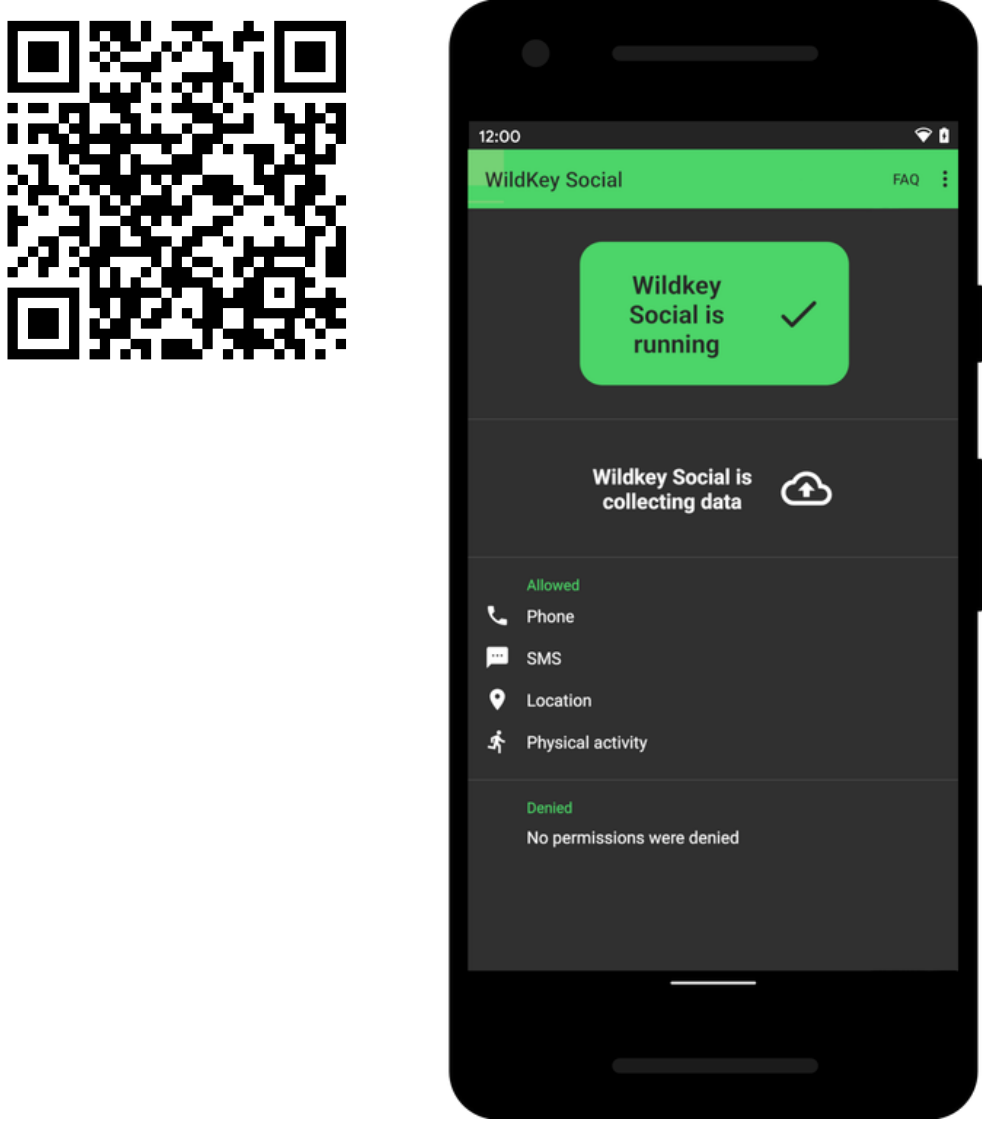
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WildKey Social

Privacy-aware toolkit for smartphone data collection in-the-wild



- Call and SMS Events
- Screen States
- App Categories Usage
- Physical Activity
- Visited Locations

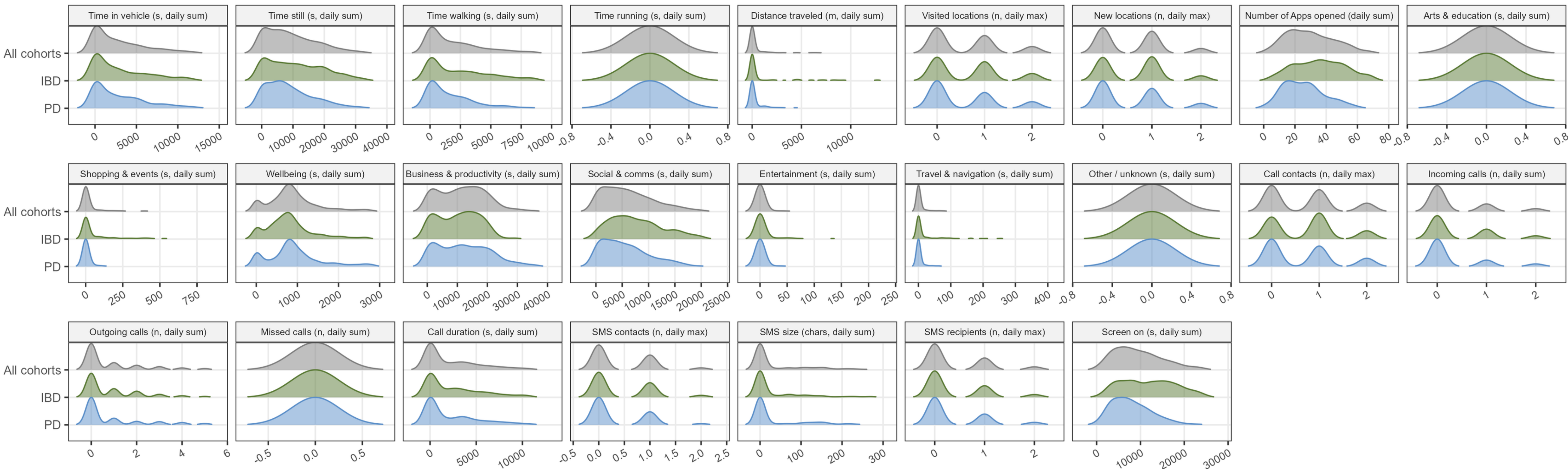
Total **25** features

Cohorts	Disease Group	N	Gender (%Female)	Age (mean, SD)	Age [min, max]	Mean Time Since Diagnosis (years, SD)
HV	-	3	333	62.33 (11.59)	[50, 73]	-
PD	NDD	35	457	65.09 (8.32)	[40, 78]	5.54 (6.74)
HD	NDD	1	100	63 (NA)	[63, 63]	22 (NA)
IBD	IMID	25	68	42.56 (10.9)	[26, 63]	13.44 (11.62)
PSS	IMID	3	100	66.33 (13.58)	[52, 79]	3.67 (4.62)
SLE	IMID	7	714	55.14 (15.91)	[29, 72]	20.71 (9.67)
RA	IMID	6	833	61.5 (13.31)	[39, 73]	9.33 (3.67)
Overall	-	80	60	56.83 (14.35)	[26, 79]	9.92 (9.94)

Total **1291** daily records

Outliers excluded per feature using the 1.5 × IQR rule

Distributions of daily smartphone behaviour



Exploratory associations between passive smartphone behaviours and fatigue and sleep

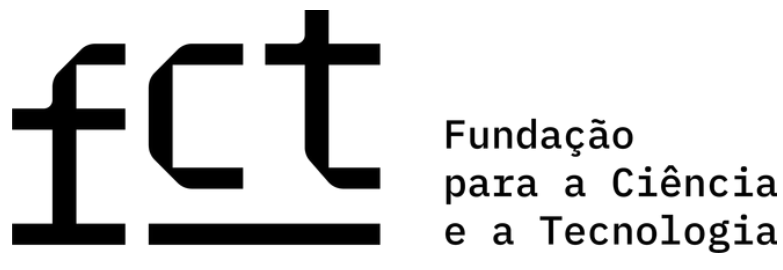
Repeated Measures Correlation		Overall fatigue (VAS)					Mobility	Overall fatigue (VAS)					Communication	
		Physical fatigue (VAS)						Physical fatigue (VAS)						
		Mental fatigue (VAS)					Mental fatigue (VAS)							
		Sleep quality (VAS)					Sleep quality (VAS)							
		Sleepiness (KSS)					Sleepiness (KSS)							
1.0														
0.5														
0.0														
-0.5														
-1.0														
	Time in vehicle (s, daily sum)	0.039	0.025	0.014	0.035	0.017	Mobility	Call contacts (n, daily max)	-0.002	0.047	-0.014	0.055	0.01	Communication
	Time still (s, daily sum)	-0.008	0.005	-0.004	-0.03	-0.043		Incoming calls (n, daily sum)	0.025	0.078†	0.045	0.013	0.068	
	Time walking (s, daily sum)	-0.004	0.03	-0.023	-0.007	-0.085†		Outgoing calls (n, daily sum)	-0.02	-0.003	-0.015	0.019	0.003	
	Time running (s, daily sum)	-0.04	-0.006	0.006	0.038	-0.033		Missed calls (n, daily sum)	0.044	0.074†	0.07	0.013	0.006	
	Distance traveled (m, daily sum)	0.045	0.021	-0.028	0.061	0.029		Call duration (s, daily sum)	0.017	0.051	0.044	-0.013	0	
	Visited locations (n, daily max)	-0.02	-0.018	0.007	-0.066†	-0.004		SMS contacts (n, daily max)	-0.029	-0.023	-0.062	-0.002	0.004	
	New locations (n, daily max)	-0.036	-0.021	-0.017	-0.063	-0.024		SMS size (chars, daily sum)	-0.067	-0.049	-0.061	-0.024	-0.007	
	Number of Apps opened (daily sum)	-0.07	-0.075†	-0.059	0.03	-0.014	SMS recipients (n, daily max)	-0.054	-0.042	-0.067	0.013	-0.003	Screen	
	Shopping & events (s, daily sum)	-0.021	-0.007	-0.051	-0.005	-0.03	Screen on (s, daily sum)	-0.021	-0.026	-0.016	0.047	0.032		
	Wellbeing (s, daily sum)	-0.114†	-0.146**	-0.176***	-0.036	-0.112†								
	Business & productivity (s, daily sum)	-0.069	-0.047	-0.031	0.001	-0.027								
	Social & comms (s, daily sum)	-0.003	-0.042	-0.011	0.041	0.007								
	Entertainment (s, daily sum)	0.025	0.038	0.057	-0.01	0.06								
	Travel & navigation (s, daily sum)	0.075†	0.08†	0.058	0.064	0.088†								

Well-being app use is negatively associated with fatigue

FDR Adjusted * p < 0.05 ** p < 0.01 *** p < 0.001; † Non-adjusted p < 0.05

Well-being app use is negatively associated with fatigue

Mobility and communication features show generally weak associations with fatigue and sleep



Reach us here

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