Supplementary Material

Are all campuses equally (digitally) visible? Crowdsourced vs. proprietary street-view coverage across Indonesian university campuses

S1 Campus Sample

Table S1 lists the 40 university campuses used in this study, with their abbreviation, official name, city and province, and centroid coordinate (WGS84).

Tab. S1: List of campuses in the study sample.

Abbreviation	Official name	City (Province)	Centroid (lat, lon)
IPB	IPB University (Dramaga)	Bogor (West Java)	−6.5553, 106.7235
ITB Ganesha	Institut Teknologi Bandung — Ganesha	Bandung (West Java)	−6.8897, 107.6100
ITB Jatinangor	Institut Teknologi Bandung — Jatinangor	Sumedang (West Java)	−6.9290, 107.7686
ITERA	Institut Teknologi Sumatera	South Lampung (Lampung)	−5.3644, 105.3152
ITS	Institut Teknologi Sepuluh Nopember	Surabaya (East Java)	−7.2825, 112.7948
Telkom University	Telkom University	Bandung Regency (West Java)	−6.9733, 107.6303
UGM	Universitas Gadjah Mada	Sleman (DI Yogyakarta)	−7.7698, 110.3777
UI	Universitas Indonesia — Depok	Depok (West Java)	−6.3620, 106.8272
UII	Universitas Islam Indonesia — Kaliurang	Sleman (DI Yogyakarta)	−7.6878, 110.4133
UM	Universitas Negeri Malang	Malang (East Java)	−7.9613, 112.6179
UMY	Universitas Muhammadiyah Yogyakarta	Bantul (DI Yogyakarta)	−7.8106, 110.3216
UNAIR Campus B	Universitas Airlangga — Campus B	Surabaya (East Java)	−7.2723, 112.7584

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Table S1 – continued

Abbreviation	Official name	City (Province)	Centroid (lat, lon)
UNAIR Campus C	Universitas Airlangga — Campus C	Surabaya (East Java)	−7.2680, 112.7853
UNAND	Universitas Andalas	Padang (West Sumatra)	−0.9149, 100.4601
UB	Universitas Brawijaya	Malang (East Java)	−7.9523, 112.6137
UNDIP	Universitas Diponegoro — Tembalang	Semarang (Central Java)	−7.0517, 110.4400
UNEJ	Universitas Jember	Jember (East Java)	−8.1642, 113.7169
UNESA Campus 1	Universitas Negeri Surabaya — Campus 1	Surabaya (East Java)	−7.3144, 112.7268
UNESA Campus 2	Universitas Negeri Surabaya — Campus 2	Surabaya (East Java)	−7.3010, 112.6697
UNHAS	Universitas Hasanuddin	Makassar (South Sulawesi)	−5.1320, 119.4875
UNILA	Universitas Lampung	Bandar Lampung (Lampung)	−5.3644, 105.2430
UNIMED	Universitas Negeri Medan	Deli Serdang (North Sumatra)	3.6082, 98.7170
UNJ	Universitas Negeri Jakarta	East Jakarta (DKI Jakarta)	−6.1946, 106.8784
UNJA	Universitas Jambi	Muaro Jambi (Jambi)	−1.6148, 103.5194
ULM	Universitas Lambung Mangkurat	Banjarbaru (South Kalimantan)	−3.2972, 114.5859
UNMUL	Universitas Mulawarman	Samarinda (East Kalimantan)	−0.4687, 117.1551
UNNES	Universitas Negeri Semarang	Semarang (Central Java)	−7.0502, 110.3958
UNP	Universitas Negeri Padang	Padang (West Sumatra)	−0.8974, 100.3489
UNPAD	Universitas Padjadjaran — Jatinangor	Sumedang (West Java)	−6.9264, 107.7736
UNRI	Universitas Riau	Pekanbaru (Riau)	0.4779, 101.3824
UNS	Universitas Sebelas Maret	Surakarta (Central Java)	−7.5589, 110.8566
UNSOED	Universitas Jenderal Soedirman	Banyumas (Central Java)	−7.4030, 109.2468

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Table S1 – continued

Abbreviation	Official name	City (Province)	Centroid (lat, lon)
UNSRAT	Universitas Sam Ratulangi	Manado (North Sulawesi)	1.4580, 124.8281
UNSRI Indralaya	Universitas Sriwijaya — Indralaya	Ogan Ilir (South Sumatra)	−3.2170, 104.6503
UNTAD	Universitas Tadulako	Palu (Central Sulawesi)	−0.8364, 119.8948
UNTAN	Universitas Tanjungpura	Pontianak (West Kalimantan)	−0.0599, 109.3456
UDAYANA Jimbaran	Universitas Udayana — Jimbaran	Badung (Bali)	−8.7957, 115.1735
UNY	Universitas Negeri Yogyakarta	Yogyakarta (DI Yogyakarta)	−7.7743, 110.3860
UPI	Universitas Pendidikan Indonesia	Bandung (West Java)	−6.8609, 107.5917
USU	Universitas Sumatera Utara	Medan (North Sumatra)	3.5617, 98.6569

S2 Full Coverage and Openness Rankings

Table S2 gives the full 40-campus coverage summary underlying the results reported in the main text, sorted by either-source coverage.

Table S3 gives the full 40-campus openness index results underlying the results reported in the main text, sorted by regression slope from most negative to most positive.

Tab. S2: Coverage ratios for all 40 campuses, sorted by either-source coverage in descending order. Mapillary and GSV coverage are the proportion of grid cells containing at least one image from that source; either-source coverage is the union of the two. The final row reports the unweighted sample mean.

Campus	Mapillary coverage	GSV coverage	Either-source coverage
ULM	0.000	0.385	0.385
UII	0.089	0.328	0.376
UGM	0.050	0.357	0.366
UNSRAT	0.001	0.362	0.362
UNS	0.012	0.338	0.345
UNAIR Campus B	0.037	0.307	0.319
UNAIR Campus C	0.000	0.307	0.307
ITB Ganesha	0.043	0.296	0.307
UNP	0.066	0.283	0.302
UNILA	0.007	0.295	0.295
UNDIP	0.115	0.253	0.282
UNNES	0.087	0.248	0.273
UNMUL	0.200	0.156	0.260
UNSOED	0.004	0.259	0.259
UNPAD	0.030	0.241	0.248
UPI	0.002	0.247	0.248
UNTAD	0.000	0.247	0.247
ITB Jatinangor	0.072	0.216	0.246
UNJ	0.004	0.234	0.237
UNAND	0.000	0.237	0.237
UDAYANA Jimbaran	0.012	0.229	0.236
UI	0.073	0.223	0.236
ITS	0.023	0.229	0.233
UNEJ	0.000	0.233	0.233

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Table S2 – continued from previous page

Campus	Mapillary coverage	GSV coverage	Either-source coverage
UNESA Campus 1	0.000	0.232	0.232
UB	0.084	0.203	0.222
USU	0.087	0.201	0.220
UM	0.014	0.206	0.220
UNY	0.029	0.197	0.215
UNIMED	0.007	0.204	0.208
UNHAS	0.003	0.206	0.206
UNSRI Indralaya	0.007	0.193	0.194
IPB	0.090	0.157	0.190
UNJA	0.000	0.165	0.165
Telkom University	0.016	0.149	0.163
UNESA Campus 2	0.044	0.153	0.162
UNTAN	0.000	0.153	0.154
UNRI	0.000	0.137	0.137
ITERA	0.002	0.053	0.055
UMY	0.000	0.033	0.033
Mean ($n = 40$)	0.033	0.229	0.240

Tab. S3: Openness index for all 40 campuses: the regression slope $\hat{\beta}_1$ of cell-level either-source coverage on normalised distance from the campus boundary (0 = edge, 1 = deepest interior point), sorted from most negative (coverage decays toward the interior, consistent with enclosure) to most positive (coverage rises toward the interior). Edge and core coverage are the fitted coverage values at normalised distance 0 and 1 respectively; R^2 is the proportion of cell-level variance explained by distance alone.

Campus	Slope $\hat{\beta}_1$	Edge coverage	Core coverage	R^2
UNJ	−0.382	0.370	0.133	0.061
UNDIP	−0.348	0.369	0.159	0.038
UNESA Campus 2	−0.296	0.246	0.048	0.048
ITB Ganesha	−0.286	0.428	0.329	0.026
UNAIR Campus B	−0.277	0.373	0.175	0.024
UDAYANA Jimbaran	−0.271	0.281	0.174	0.024
UNAND	−0.264	0.310	0.199	0.024
UB	−0.241	0.290	0.273	0.021

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Table S3 – continued from previous page

Campus	Slope $\hat{\beta}_1$	Edge coverage	Core coverage	R^2
USU	−0.230	0.324	0.220	0.022
UNAIR Campus C	−0.223	0.381	0.389	0.013
UGM	−0.174	0.391	0.216	0.008
UNPAD	−0.169	0.278	0.246	0.009
UMY	−0.137	0.071	0.000	0.039
UNSRI Indralaya	−0.129	0.231	0.264	0.006
UII	−0.119	0.391	0.175	0.003
UI	−0.098	0.288	0.287	0.003
ITB Jatinangor	−0.083	0.283	0.238	0.003
ITS	−0.047	0.244	0.209	0.001
UM	+0.005	0.230	0.345	0.000
UNHAS	+0.009	0.179	0.121	0.000
ITERA	+0.034	0.041	0.032	0.001
UNP	+0.035	0.290	0.400	0.000
UNTAN	+0.054	0.164	0.217	0.001
UNY	+0.065	0.202	0.303	0.002
IPB	+0.078	0.176	0.234	0.002
UNSOED	+0.083	0.207	0.150	0.002
UNTAD	+0.087	0.216	0.288	0.003
Telkom University	+0.087	0.157	0.264	0.004
UNIMED	+0.090	0.204	0.326	0.004
UNJA	+0.115	0.146	0.223	0.006
UNSRAT	+0.118	0.328	0.380	0.004
UNESA Campus 1	+0.125	0.229	0.464	0.006
UNS	+0.130	0.319	0.412	0.005
ULM	+0.137	0.360	0.425	0.006
UNNES	+0.147	0.256	0.333	0.006
UNRI	+0.194	0.102	0.240	0.018
UNILA	+0.264	0.214	0.373	0.024
UPI	+0.303	0.172	0.380	0.034
UNMUL	+0.372	0.177	0.518	0.042
UNEJ	+0.385	0.141	0.359	0.053
Median slope = +0.021; median $R^2 = 0.006$; $n = 40$.				

S3 Cell-Level Agreement Composition per Campus

This section presents additional detail on the cell-level agreement between Mapillary and GSV coverage.

Figure S1 reorders the cell-level agreement classification by the size of each campus's *both-source* class rather than by campus name.

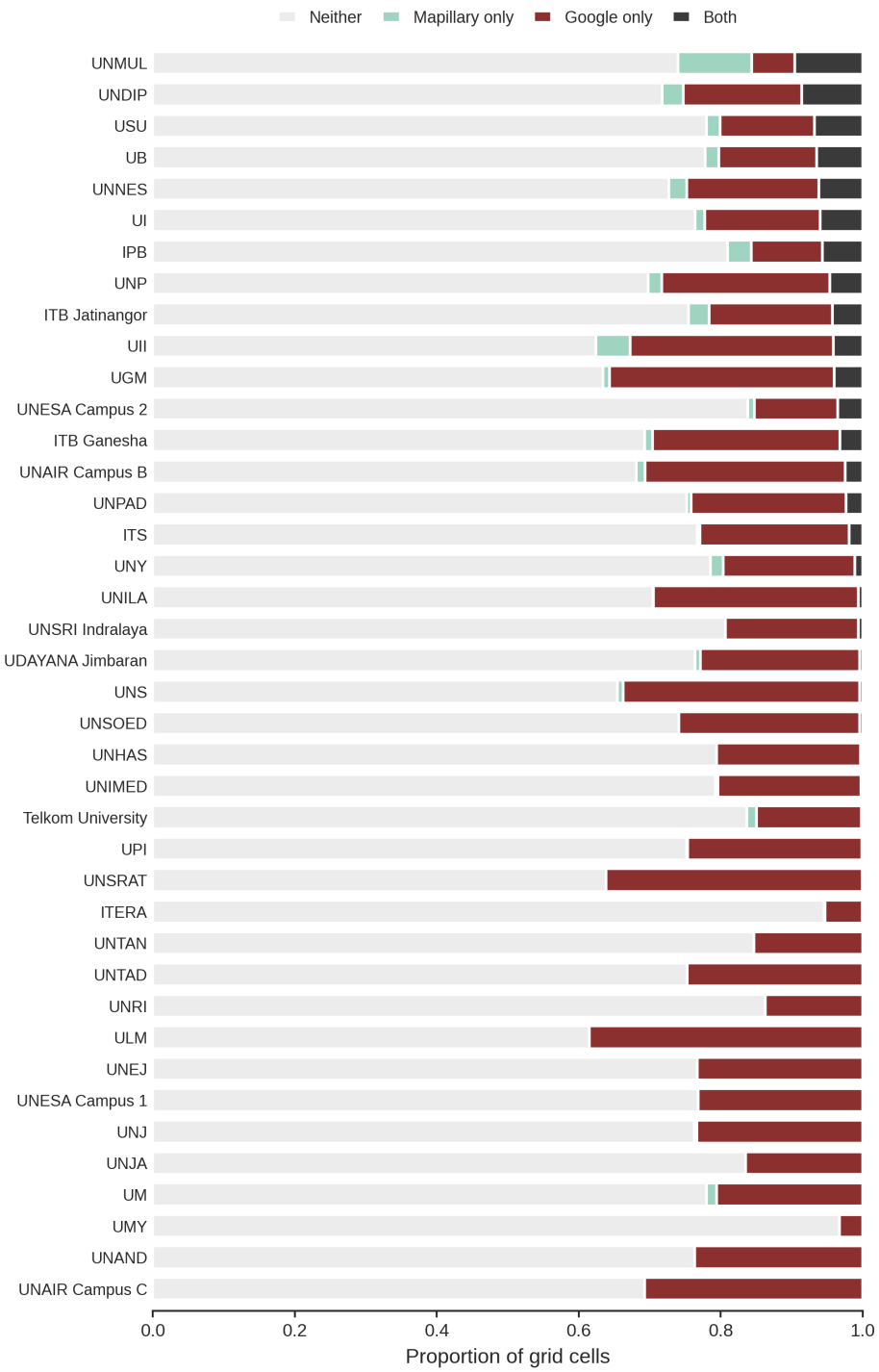


Fig. S1: Cell-level agreement composition per campus (neither, Mapillary only, Google only, both), sorted by the size of the *both* class rather than by total coverage.

S4 Detailed Temporal Maps

This section presents per-campus maps of temporal depth, measured as the number of distinct capture years per grid cell, for GSV and Mapillary.



Fig. S2: Distinct GSV capture years per cell.

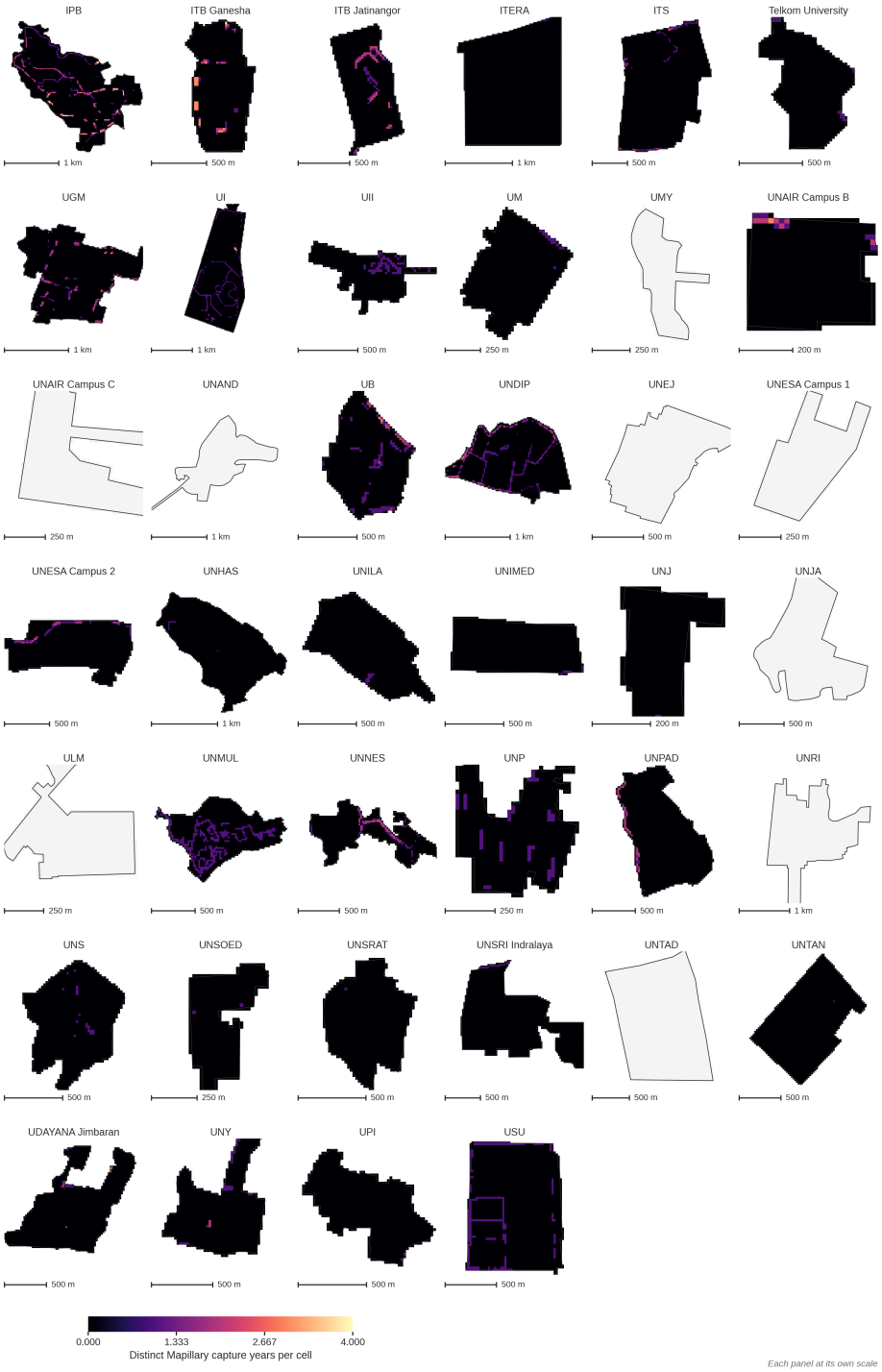


Fig. S3: Distinct Mapillary capture years per cell.