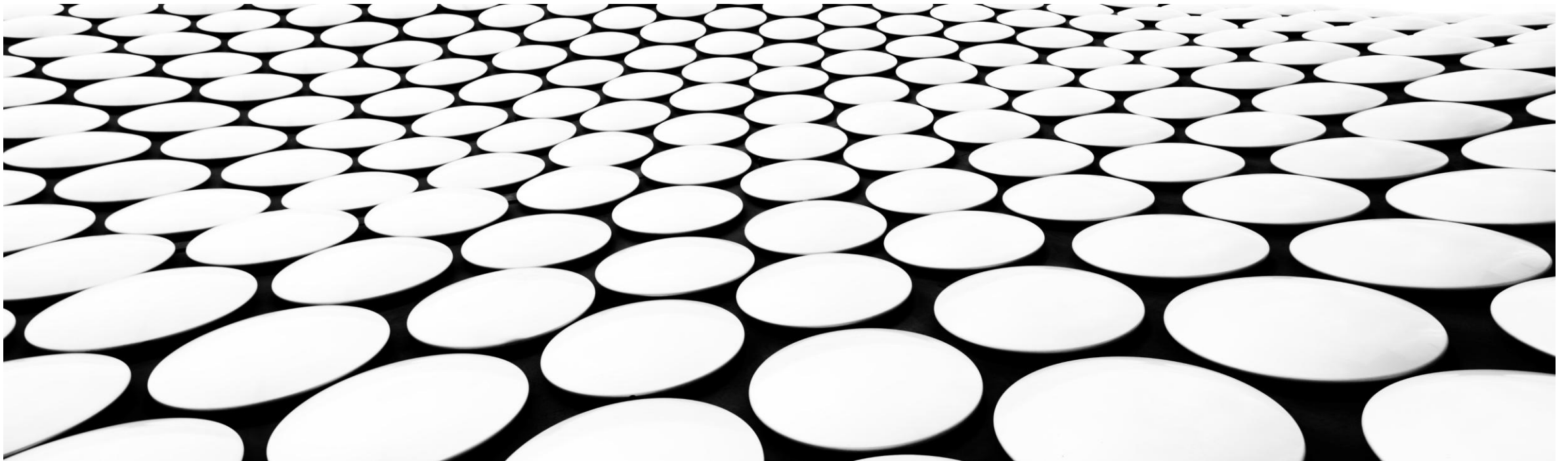

MODUL 5 GEOGRAPHICALLY WEIGHTED REGRESSION (GWR)

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PENGANTAR

- **Geographically Weighted Regression (GWR)** is a spatial statistical technique that extends traditional regression analysis by allowing local parameters to be estimated rather than assuming that one set of global parameters can explain the relationship between variables across the entire study area.
- GWR recognizes that spatial relationships may vary across a geographic space, addressing the issue of **spatial non-stationarity**.

KONSEP GWR

- **Local regression:** Parameters are estimated for each location in the study area
- **Spatial weights:** Observations closer to the regression point have more influence
- **Bandwidth selection:** Determines the extent of spatial influence in the model
- **Kernel function:** Defines how weights decrease with distance

PERSAMAAN GWR

$$y_i = \beta_0(u_i, v_i) + \sum_{k=1}^n \beta_k(u_i, v_i)x_{ik} + e_i$$

- y_i : variabel respon (dependen)
- (u_i, v_i) : koordinat titik i ($i = 1, 2, \dots, n$), umumnya longitude dan latitude
- $\beta_0(u_i, v_i)$: parameter intercept di titik i .
- $\beta_k(u_i, v_i)$: parameter lokal untuk variable k di titik i .
- x_{ik} : variable ke- k di titik i , disebut juga predictor
- e_i : galat/error. e_i

CONTOH

respon

prediktor

	covid19_r	crowded_hou	elderly	lt_illness	ethnic	imd19_ext	hlthsoc_sec	educ_sec	trnsp_sec	accfood_sec	admsupport_sec	pblic_sec
1	81.49693572	0.009398031	0.169491894	0.231614291	0.023134263	0.4973	0.154341091	0.096406916	0.041703074	0.05131464	0.042444462	0.067572219
2	218.1891743	0.017166932	0.149488484	0.208637979	0.11817617	0.571	0.167121932	0.098300548	0.055035107	0.067923076	0.048178635	0.058610006
3	136.1178307	0.007767805	0.194204635	0.227235402	0.014603076	0.363	0.155925045	0.098395855	0.047041914	0.053714022	0.04331547	0.064307769
4	109.0757267	0.009348274	0.156312301	0.19001096	0.053812432	0.3024	0.148389615	0.100101008	0.046165148	0.05026285	0.044764813	0.06838686
5	143.0411883	0.008527962	0.174671289	0.196307453	0.037598045	0.2891	0.148100543	0.085914229	0.051515893	0.055045497	0.042559269	0.077692088
6	170.9795938	0.009810174	0.146970878	0.213644967	0.021511619	0.4678	0.119509526	0.076645188	0.069211664	0.046372684	0.053233062	0.064661236
7	179.5003659	0.008538877	0.159295449	0.173057143	0.040726309	0.1837	0.125198303	0.085894741	0.061106925	0.04703736	0.051905687	0.056426985
8	117.2968832	0.026206127	0.129236757	0.202326953	0.30836198	0.5519	0.147646349	0.102357781	0.044478958	0.04892355	0.045503362	0.055929151
9	122.4791469	0.009368154	0.191736177	0.255735051	0.033266463	0.5766	0.149318615	0.06657549	0.047688826	0.12110259	0.045523372	0.093619238

- Variabel respon: banyaknya kasus covid19
- Terdapat 150 lokasi ($i = 1, 2, \dots, 150$) di wilayah: Pakistan, Bangladesh, Cina, dll.
- x_{ik} : variabel prediktor ke- $k \rightarrow$ dapat dipilih dari salah satu variable data di atas (36 prediktor)
- Terdapat variabel-variabel yang memengaruhi banyaknya kasus.
- *objct, cty19c, ctyu19nm, long, lat, st_rs, st_In, X2020.04.14, I.PL1, IMD20, IMD2., Rsdnt, Hshld, Dwlln, Hsh_S, E_16_, A_65_, Ag_85, Mixed, Indin, Pkstn, Bngld, Chins, Oth_A, Black, Othr_t, CB_U_, Crwd_, Lng_, Trn_, Adm_, Ac___, Pb___, Edctn, H___, geometry.*

GWR DI R (PACKAGE)

- spgwr
- Sp
- spdep
- sf
- tidyverse
- ggplot2
- stats
- car

PETA SEBARAN

Banyaknya kasus covid19

