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LAMPIRAN

Lampiran 1. Data Jumlah Kecelakaan Lalu Lintas Sulawesi Selatan tahun 2021, Jumlah penduduk Badan Pusat Statistik Sulawesi, Rasio Jenis Kelamin Badan Pusat Statistik Sulawesi dan Jumlah Penduduk Usia 15 Tahun ke atas (SMA) Badan Pusat Statistik Sulawesi Selatan.

No	wilayah	Y	X_1	X_2	X_3	U	V
1	Bantaeng	177	197886	97.88	23659	-5.52	120.02
2	Barru	165	185525	95.79	22821	-4.44	119.65
3	Bone	435	806750	95.53	68191	-4.54	120.33
4	Bulukumba	426	440090	95.24	48861	-5.43	120.21
5	Enrekang	101	227520	103.72	31683	-3.46	119.88
6	Gowa	407	773315	98.45	123792	-5.31	119.74
7	Jeneponto	325	405508	97.78	42577	-5.55	119.67
8	Kepulauan Selayar	49	137974	96.37	16109	-6.10	120.5
9	Kota Makassar	1086	1427619	99.22	292187	-5.16	119.44
10	Kota Palopo	192	187331	100.25	31035	-3.00	120.2
11	Kota Parepare	118	152922	98.34	29965	-4.01	119.63
12	Luwu	271	367454	101.52	53608	-3.36	120.26
13	Luwu Timur	311	325052	105.99	52799	-2.58	121.16
14	Luwu Utara	108	300511	102.16	37165	-2.27	119.97
15	Maros	206	396924	100.65	28574	-5.06	119.7
16	Pangkajene Dan Kepulauan	106	348230	96.13	48276	-4.81	119.56
17	Pinrang	252	407317	97.55	50366	-3.65	119.56
18	Sindenreng Rappang	189	323194	98.05	32341	-3.77	120.02
19	Sinjai	111	261366	97.96	28574	-5.22	120.11
20	Soppeng	126	235574	92.90	24522	-4.35	119.93
21	Takalar	265	302695	95.53	43221	-5.42	119.49
22	Tana Toraja	67	285179	107.29	41885	-2.86	119.84
23	Toraja Utara	84	264145	104.4	37165	-2.86	119.83
24	wajo	146	379396	94.39	37006	-4.02	120.07

Sumber direktorat lalulintas kepolisian daerah Sulawesi selatan 2021

Keterangan:

Y : Jumlah kecelakaan

X_1 : Jumlah penduduk

X_2 : Rasio jenis kelamin

X_3 : Jumlah penduduk usia 15 tahun ke atas (SMA)

U : Latitude / Lintang

V : Longitude/ Bujur

Lampiran 2. Statistik Deskriptif Variabel Respon dan Prediktor

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
jumlahkecelakaan	24	49	1086	238.46	213.116	45418.433
Jumlah penduduk	24	43	7161	603.58	1431.836	2050154.254
rasiojeniskelamin	24	92.90	107.29	98.8788	3.72446	13.872
Jumlah pendudukusia 15th keatas(SMA)	24	16109	292187	51932.58	55399.108	3069061195
Valid N (listwise)	24					

Lampiran 3. Hasil Pengujian Morans I dengan Software R

```
        Moran I test under randomisation

data:  datakecelakaan21$rasio.jenis.kelamin
weights: ww

Moran I statistic standard deviate = 4.078, p-value = 2.271e-05
alternative hypothesis: greater
sample estimates:
Moran I statistic       Expectation          Variance
       0.53352638       -0.04347826        0.02001979
```

Lampiran 4. Hasil Pengujian *Breusch – pagan* dengan *Software* R

```
        studentized Breusch-Pagan test

data:  reg.klasik
BP = 0.07564, df = 3, p-value = 0.9946
```

Lampiran 5. Outpot nilai Bandwidth untuk setiap lokasi pengamatan

```
> #mencari bandwitch
> bw.fg<-bw.gwr(y~x1+x2+x3, data = datakecelakaan21.sp, ke
Fixed bandwidth: 2.389922 CV score: 217351.5
Fixed bandwidth: 1.477348 CV score: 244072.6
Fixed bandwidth: 2.953924 CV score: 209460.7
Fixed bandwidth: 3.302496 CV score: 206246.3
Fixed bandwidth: 3.517925 CV score: 204677
Fixed bandwidth: 3.651068 CV score: 203832.1
Fixed bandwidth: 3.733354 CV score: 203351.2
Fixed bandwidth: 3.78421 CV score: 203068.4
Fixed bandwidth: 3.815641 CV score: 202898.9
Fixed bandwidth: 3.835066 CV score: 202796.1
Fixed bandwidth: 3.847072 CV score: 202733.2
Fixed bandwidth: 3.854492 CV score: 202694.7
Fixed bandwidth: 3.859077 CV score: 202671
Fixed bandwidth: 3.861911 CV score: 202656.3
Fixed bandwidth: 3.863663 CV score: 202647.3
Fixed bandwidth: 3.864746 CV score: 202641.7
Fixed bandwidth: 3.865415 CV score: 202638.3
Fixed bandwidth: 3.865828 CV score: 202636.2
Fixed bandwidth: 3.866084 CV score: 202634.9
Fixed bandwidth: 3.866242 CV score: 202634.1
Fixed bandwidth: 3.866339 CV score: 202633.6
Fixed bandwidth: 3.8664 CV score: 202633.2
Fixed bandwidth: 3.866437 CV score: 202633.1
```

Lampiran 6. Jarak *Euclidean* antar Kabupaten/Kota

	Bantaeng	Barru	Bone	Bulukumba	Enrekang	Gowa	Jeneponto
Bantaeng	0	1.141622	1.0278619	0.210238	2.0647518	0.35000	0.3512834
Barru	1.14162	0	0.6873136	1.1374093	1.006628	0.8746428	1.1101802
Bone	1.02786	0.687314	0	0.8980535	1.17000	0.9700515	1.2065239
Bulukumba	0.21024	1.137409	0.8980535	0	1.9974484	0.4850773	0.5531727
Enrekang	2.06475	1.006628	1.17000	1.9974484	0	1.8552897	2.1005237
Gowa	0.35000	0.874643	0.9700515	0.4850773	1.8552897	0	0.25000
Jeneponto	0.35128	1.11018	1.2065239	0.5531727	2.1005237	0.25000	0
Kepulauan Selayar	0.75286	1.864967	1.5692355	0.7300685	2.711826	1.0962208	0.9956907
Kota Makassar	0.68264	0.75000	1.0846658	0.8159657	1.7560182	0.3354102	0.4527693
Palopo	2.52642	1.54146	1.5454773	2.4300206	0.560357	2.3553556	2.60450
parepare	1.55955	0.430465	0.8780091	1.533884	0.6041523	1.3046455	1.5405194
luwu	2.17329	1.240363	1.1820744	2.07060	0.3929377	2.0181427	2.2680829
Luwu Timur	3.15328	2.395767	2.12850	3.0041638	1.553319	3.0772228	3.32280
Luwu Utara	3.25038	2.193468	2.298369	3.16910	1.19340	3.0486882	3.2936909
Maros	0.56036	0.622013	0.8168843	0.6300794	1.6100932	0.2531798	0.4909175
Pangkajene Dan Kepulauan	0.84599	0.380789	0.8159657	0.8982761	1.3874077	0.5314132	0.748131
Pinrang	1.92575	0.79511	1.1768602	1.894967	0.3721559	1.6697305	1.9031815
Sindenreng Rappang	1.75000	0.765376	0.8300602	1.6708381	0.340147	1.5652476	1.8140838
Sinjai	0.31321	0.905539	0.71470	0.2325941	1.7749648	0.3807887	0.55000
Soppeng	1.17346	0.294109	0.4428318	1.1157061	0.89140	0.9786215	1.2278436
Takalar	0.53935	0.992975	1.2165525	0.7200694	1.9984244	0.27313	0.222036
Tana Toraja	2.66608	1.591383	1.75000	2.59650	0.6013319	2.45204	2.6953664
Toraja Utara	2.66678	1.59022	1.7528263	2.5979415	0.6020797	2.4516525	2.6947542
Wajo	1.50083	0.59397	0.5813777	1.4169333	0.5913544	1.3315405	1.5814234

Lampiran 6. Jarak *Euclidean* antar Kabupaten/Kota (lanjutan)

	Kepulauan Selayar	Kota Makass	Palopo	Parepare	Luwu	Luwu Timur	Luwu Utara
Bantaeng	0.7528612	0.6826419	2.5264204	1.5595512	2.1732924	3.153284	3.2503846
Barru	1.8649665	0.75000	1.5414603	0.4304649	1.2403629	2.395767	2.1934676
Bone	1.5692355	1.0846658	1.5454773	0.8780091	1.1820744	2.12850	2.298369
Bulukumba	0.7300685	0.8159657	2.4300206	1.533884	2.07060	3.004164	3.16910
Enrekang	2.711826	1.7560182	0.560357	0.6041523	0.3929377	1.553319	1.19340
Gowa	1.0962208	0.3354102	2.3553556	1.3046455	2.0181427	3.077223	3.0486882
Jeneponto	0.9956907	0.4527693	2.60450	1.5405194	2.2680829	3.32280	3.2936909
Kepulauan Selayar	0	1.4167569	3.1144823	2.2638463	2.7504909	3.581341	3.86650
Kota Makassar	1.4167569	0	2.28980	1.16559	1.9779788	3.100774	2.93820
Palopo	3.1144823	2.28980	0	1.1597414	0.3649658	1.047855	0.7653757
parepare	2.2638463	1.16559	1.1597414	0	0.9052072	2.09423	1.7729072
luwu	2.7504909	1.9779788	0.3649658	0.9052072	0	1.190966	1.1279184
Luwu Timur	3.5813405	3.1007741	1.047855	2.0942302	1.190966	0	1.2297154
Luwu Utara	3.86650	2.9381967	0.7653757	1.7729072	1.1279184	1.229715	0
Maros	1.31210	0.2785678	2.1198113	1.0523307	1.7898603	2.877846	2.8030341
Pangkajene Dan Kepulauan	1.5961516	0.37	1.9198177	0.8030567	1.6101242	2.744613	2.5728778
Pinrang	2.624138	1.5147607	0.91220	0.3667424	0.7576939	1.924812	1.439618
Sindenreng Rappang	2.3789283	1.506154	0.7907591	0.4579301	0.4750789	1.647938	1.5008331
Sinjai	0.9625487	0.6726812	2.2218236	1.3017296	1.8660386	2.841144	2.9533202
Soppeng	1.8404891	0.9466784	1.3767353	0.4534314	1.0435516	2.155412	2.0803846
Takalar	1.2175796	0.264764	2.52200	1.4169333	2.19920	3.294617	3.1863616
Tana Toraja	3.306539	2.3345235	0.3862642	1.1690167	0.6529931	1.34937	0.6041523
Toraja Utara	3.3085495	2.3328309	0.39560	1.1672618	0.6594695	1.359154	0.6063827
Wajo	2.1239821	1.3024976	1.0282509	0.4401136	0.68680	1.806018	1.7528548

Lampiran 6. Jarak *Euclidean* antar Kabupaten/Kota (lanjutan)

	Maros	Pangkajene D	Pinrang	Sindenren	Sinjai	Soppeng	Takalar	Tana Toraj	Toraja Uta	Wajo
Bantaeng	0.560357	0.8459905	1.9257466	1.75000	0.3132092	1.1734564	0.5393515	2.6660833	2.666777	1.5008331
Barru	0.6220129	0.3807887	0.7951101	0.765376	0.9055385	0.2941088	0.9929753	1.591383	1.59022	0.5939697
Bone	0.8168843	0.8159657	1.1768602	0.83006	0.71470	0.4428318	1.2165525	1.75000	1.752826	0.5813777
Bulukumba	0.6300794	0.8982761	1.894967	1.670838	0.2325941	1.1157061	0.7200694	2.59650	2.597942	1.4169333
Enrekang	1.6100932	1.3874077	0.3721559	0.340147	1.7749648	0.89140	1.9984244	0.6013319	0.60208	0.5913544
Gowa	0.2531798	0.5314132	1.6697305	1.565248	0.3807887	0.9786215	0.27313	2.45204	2.451653	1.3315405
Jeneponto	0.4909175	0.748131	1.9031815	1.814084	0.55000	1.2278436	0.222036	2.6953664	2.694754	1.5814234
Kepulauan Selayar	1.31210	1.5961516	2.624138	2.378928	0.9625487	1.8404891	1.2175796	3.306539	3.30855	2.1239821
Kota Makassar	0.2785678	0.37000	1.5147607	1.506154	0.6726812	0.9466784	0.264764	2.3345235	2.332831	1.30250
Palopo	2.1198113	1.9198177	0.91220	0.790759	2.2218236	1.3767353	2.52200	0.3862642	0.39560	1.0282509
parepare	1.0523307	0.8030567	0.3667424	0.45793	1.3017296	0.4534314	1.4169333	1.1690167	1.167262	0.4401136
luwu	1.7898603	1.6101242	0.7576939	0.475079	1.8660386	1.0435516	2.19920	0.6529931	0.65947	0.68680
Luwu Timur	2.8778464	2.7446129	1.9248117	1.647938	2.8411441	2.1554118	3.2946168	1.3493702	1.359154	1.8060177
Luwu Utara	2.8030341	2.5728778	1.439618	1.500833	2.9533202	2.0803846	3.1863616	0.6041523	0.606383	1.7528548
Maros	0	0.286531	1.4169333	1.32910	0.4401136	0.7463243	0.4167733	2.20445	2.203838	1.1038569
Pangkajene Dan Kepulauan	0.286531	0	1.16000	1.13719	0.68600	0.5903389	0.61400	1.97000	1.96860	0.9403191
Pinrang	1.4169333	1.16000	0	0.475395	1.6635504	0.7917702	1.7713836	0.8381527	0.834865	0.6300794
Sindenreng Rappang	1.32910	1.1371895	0.4753946	0	1.4527904	0.5869412	1.733032	0.9276314	0.929624	0.254951
Sinjai	0.4401136	0.68600	1.6635504	1.45279	0	0.8884256	0.6514599	2.3753947	2.376552	1.2006665
Soppeng	0.7463243	0.5903389	0.7917702	0.586941	0.8884256	0	1.1569356	1.4927156	1.493352	0.358469
Takalar	0.4167733	0.61400	1.7713836	1.733032	0.6514599	1.1569356	0	2.583815	2.582479	1.5153877
Tana Toraja	2.20445	1.97000	0.8381527	0.927631	2.3753947	1.4927156	2.583815	0	0.01000	1.1825819
Toraja Utara	2.2038376	1.96860	0.8348653	0.929624	2.3765521	1.4933519	2.5824794	0.01000	0	1.1845674
Wajo	1.1038569	0.9403191	0.6300794	0.254951	1.2006665	0.358469	1.5153877	1.1825819	1.184567	0

Lampiran 7. Model GWR dengan *Software* R

```
************************************************************************
*          Results of Geographically Weighted Regression               *
************************************************************************

*********************Model calibration information*********************
Kernel function: gaussian
Fixed bandwidth: 3.866437
Regression points: the same locations as observations are used.
Distance metric: A distance matrix is specified for this model calibration.

****************Summary of GWR coefficient estimates:******************
                Min.     1st Qu.      Median     3rd Qu.      Max.
Intercept  4.5170e+02  4.8190e+02  4.8565e+02  4.9311e+02 499.3432
x1         3.3189e-04  3.4174e-04  3.4928e-04  3.5606e-04   0.0004
x2        -5.0010e+00 -4.9341e+00 -4.8526e+00 -4.8155e+00  -4.5022
x3         1.8455e-03  1.8827e-03  1.9192e-03  1.9603e-03   0.0020
************************Diagnostic information*************************
Number of data points: 24
Effective number of parameters (2trace(S) - trace(S'S)): 4.255998
Effective degrees of freedom (n-2trace(S) + trace(S'S)): 19.744
AICc (GWR book, Fotheringham, et al. 2002, p. 61, eq 2.33): 285.3284
AIC (GWR book, Fotheringham, et al. 2002,GWR p. 96, eq. 4.22): 275.6755
BIC (GWR book, Fotheringham, et al. 2002,GWR p. 61, eq. 2.34): 260.6739
Residual sum of squares: 115210.1
R-square value:  0.8897114
Adjusted R-square value:  0.8646693

************************************************************************
Program stops at: 2023-06-12 06:03:44
```

Lampiran 7. Model GWR dengan *Software* R (lanjutan)

Filter

	Intercept	x1	x2	x3	y	yhat	residual	CV_Score	Stud_residual
1	487.4951	0.0003581688	-4.879968	0.001871438	177	124.99682	52.0031827	0	0.711235433
2	492.6271	0.0003495090	-4.929686	0.001917987	165	129.02556	35.9744415	0	0.502173241
3	476.9337	0.0003509162	-4.768342	0.001910379	435	434.78630	0.2137023	0	0.004553584
4	482.8004	0.0003576709	-4.831367	0.001874047	426	271.63626	154.3637382	0	2.134699616
5	485.2800	0.0003418630	-4.850883	0.001959622	101	122.01381	-21.0138143	0	-0.294764595
6	493.0819	0.0003563064	-4.936912	0.001881458	407	515.48938	-108.4893779	0	-1.527321065
7	495.4938	0.0003580584	-4.962430	0.001872139	325	235.17299	89.8270076	0	1.222571311
8	479.0710	0.0003630162	-4.794879	0.001845518	49	96.80479	-47.8047868	0	-0.683370616
9	499.3432	0.0003548838	-5.000985	0.001889145	1086	1061.76782	24.2321758	0	0.965083498
10	476.8048	0.0003383250	-4.762025	0.001979255	192	124.21675	67.7832503	0	0.941127995
11	492.1677	0.0003460913	-4.923624	0.001936498	118	118.93071	-0.9307093	0	-0.013185345
12	475.8602	0.0003413716	-4.753535	0.001962482	271	223.92435	47.0756471	0	0.638130472
13	451.7035	0.0003355952	-4.502171	0.001995293	311	188.95377	122.0462309	0	1.828514043
14	481.9378	0.0003318917	-4.812191	0.002014786	108	164.94105	-56.9410462	0	-0.782889952
15	493.1777	0.0003543597	-4.937185	0.001891882	206	190.96256	15.0374439	0	0.218027832
16	495.6353	0.0003523070	-4.961777	0.001902924	106	233.20909	-127.2090877	0	-1.730719956
17	493.2006	0.0003431368	-4.933104	0.001952569	252	250.10334	1.8966563	0	0.025585787
18	482.4488	0.0003445068	-4.822742	0.001945198	189	183.83113	5.1688699	0	0.069746191
19	484.3232	0.0003559724	-4.846446	0.001883157	111	156.41376	-45.4137631	0	-0.612745304
20	485.8785	0.0003490538	-4.859892	0.001920448	126	163.71575	-37.7157476	0	-0.549126673
21	499.0523	0.0003569055	-4.998721	0.001878341	265	210.74179	54.2582050	0	0.752385188
22	485.5307	0.0003368429	-4.851382	0.001987221	67	144.32121	-77.3212103	0	-1.191313510
23	485.7757	0.0003368346	-4.853905	0.001987261	84	141.85774	-57.8577431	0	-0.819167567
24	481.7754	0.0003465607	-4.816605	0.001934005	146	230.18964	-84.1896425	0	-1.174920785

Lampiran 7. Model GWR dengan *Software* R (lanjutan)

Intercept_SE	x1_SE	x2_SE	x3_SE	Intercept_TV	x1_TV	x2_TV	x3_TV	Local_R2	Longitude	Latitude
454.4904	0.0001733039	4.517090	0.0008630806	1.0726191	2.066709	-1.0803344	2.168324	0.8951779	120.02	-5.52
453.5044	0.0001732277	4.506738	0.0008627084	1.0862677	2.017627	-1.0938480	2.223215	0.8929953	119.65	-4.44
453.2622	0.0001732213	4.504291	0.0008627139	1.0522249	2.025826	-1.0586222	2.214383	0.8911856	120.33	-4.54
454.2404	0.0001732881	4.514500	0.0008630110	1.0628743	2.064024	-1.0701886	2.171522	0.8943522	120.21	-5.43
453.4598	0.0001733792	4.505491	0.0008632078	1.0701721	1.971765	-1.0766603	2.270163	0.8887607	119.88	-3.46
454.3184	0.0001732702	4.515353	0.0008629468	1.0853224	2.056363	-1.0933613	2.180271	0.8954057	119.74	-5.31
454.7644	0.0001733141	4.519949	0.0008631343	1.0895615	2.065951	-1.0978951	2.169000	0.8962897	119.67	-5.55
455.4401	0.0001734662	4.526626	0.0008636865	1.0518858	2.092720	-1.0592611	2.136791	0.8953604	120.50	-6.10
454.3053	0.0001732593	4.515224	0.0008628983	1.0991356	2.048281	-1.1075829	2.189302	0.8958576	119.44	-5.16
453.7826	0.0001735287	4.508249	0.0008637748	1.0507340	1.949678	-1.0562915	2.291401	0.8858132	120.20	-3.00
453.4035	0.0001732696	4.505419	0.0008628242	1.0854962	1.997415	-1.0928227	2.244372	0.8915993	119.63	-4.01
453.4367	0.0001734079	4.505168	0.0008633447	1.0494523	1.968605	-1.0551295	2.273115	0.8870770	120.26	-3.36
454.4906	0.0001737472	4.514967	0.0008647169	0.9938676	1.931515	-0.9971659	2.307452	0.8804282	121.16	-2.58
454.8715	0.0001738689	4.518166	0.0008649979	1.0595032	1.908861	-1.0650762	2.329238	0.8834457	119.97	-2.27
454.0031	0.0001732407	4.512083	0.0008628151	1.0862870	2.045476	-1.0942140	2.192685	0.8947895	119.70	-5.06
453.8219	0.0001732284	4.510161	0.0008627454	1.0921361	2.033772	-1.1001330	2.205661	0.8944507	119.56	-4.81
453.4966	0.0001733387	4.506048	0.0008630460	1.0875510	1.979574	-1.0947739	2.262415	0.8905336	119.56	-3.65
453.2775	0.0001733051	4.503941	0.0008629627	1.0643562	1.987863	-1.0707826	2.254093	0.8894663	120.02	-3.77
453.9806	0.0001732549	4.511840	0.0008628764	1.0668367	2.054617	-1.0741616	2.182417	0.8940331	120.11	-5.22
453.3285	0.0001732280	4.504884	0.0008627114	1.0718021	2.014996	-1.0788051	2.226061	0.8918158	119.93	-4.35
454.6652	0.0001732950	4.518948	0.0008630575	1.0976259	2.059526	-1.1061691	2.176380	0.8964519	119.49	-5.42
454.0111	0.0001735847	4.510353	0.0008639372	1.0694249	1.940510	-1.0756104	2.300192	0.8864895	119.84	-2.86
454.0135	0.0001735848	4.510377	0.0008639365	1.0699586	1.940461	-1.0761639	2.300240	0.8865243	119.83	-2.86
453.2212	0.0001732622	4.503571	0.0008628224	1.0630028	2.000210	-1.0695080	2.241487	0.8902147	120.07	-4.02

Lampiran 8. Perhitungan Model GWR disetiap kabupaten/kota

Kabupaten/Kota	Model GWR
Bantaeng	$\hat{y}_1 = 487.4951 + 0.0003581688x_1 - 4.879968x_2 + 0.001871438x_3$
Barru	$\hat{y}_2 = 492.6271 + 0.0003495090x_1 - 4.929686x_2 + 0.001917987x_3$
Bone	$\hat{y}_3 = 476.9337 + 0.0003509162x_1 - 4.768342x_2 + 0.001910379x_3$
Bulukumba	$\hat{y}_4 = 482.8004 + 0.0003576709x_1 - 4.831367x_2 + 0.001874047x_3$
Enrekang	$\hat{y}_5 = 485.2800 + 0.0003418630x_1 - 4.850883x_2 + 0.001959622x_3$
Gowa	$\hat{y}_6 = 493.0819 + 0.0003563064x_1 - 4.936912x_2 + 0.001881458x_3$
Jeneponto	$\hat{y}_7 = 495.4938 + 0.0003580584x_1 - 4.962430x_2 + 0.001872139x_3$
Kepulauan Selayar	$\hat{y}_8 = 479.0710 + 0.0003630162x_1 - 4.794879x_2 + 0.001845518x_3$
Kota Makassar	$\hat{y}_9 = 499.3432 + 0.0003548838x_1 - 5.000985x_2 + 0.001889145x_3$
Palopo	$\hat{y}_{10} = 476.8048 + 0.0003383250x_1 - 4.762025x_2 + 0.001979255x_3$
Parepare	$\hat{y}_{11} = 492.1677 + 0.0003460913x_1 - 4.923624x_2 + 0.001936498x_3$
Luwu	$\hat{y}_{12} = 475.8602 + 0.0003413716x_1 - 4.753535x_2 + 0.001962482x_3$
Luwu Timur	$\hat{y}_{13} = 451.7035 + 0.0003355952x_1 - 4.502171x_2 + 0.001995293x_3$
Luwu Utara	$\hat{y}_{14} = 481.9378 + 0.0003318917x_1 - 4.812191x_2 + 0.002014786x_3$
Maros	$\hat{y}_{15} = 493.1777 + 0.0003543597x_1 - 4.937185x_2 + 0.001891882x_3$

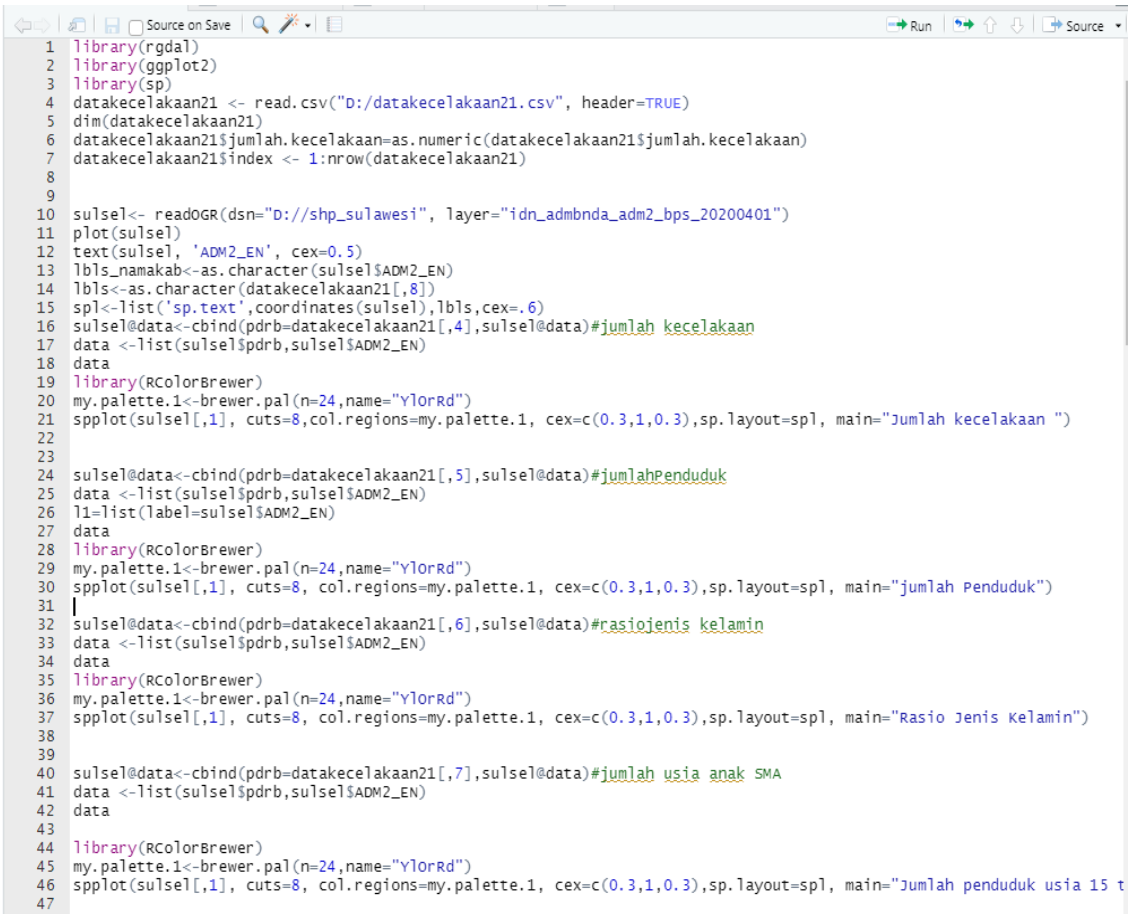
Lampiran 8. Perhitungan Model GWR disetiap kabupaten/kota (Lanjuta)

Pangkejene dan Kepulauan	$\hat{y}_{16} = 495.6353 + 0.0003523070x_1 - 4.961777x_2 + 0.001902924x_3$
Pinrang	$\hat{y}_{17} = 493.2006 + 0.0003431368x_1 - 4.933104x_2 + 0.001952569x_3$
Sindenreng Rappang	$\hat{y}_{18} = 482.4488 + 0.0003445068x_1 - 4.822742x_2 + 0.001945198x_3$
Sinjai	$\hat{y}_{19} = 484.3232 + 0.0003559724x_1 - 4.846446x_2 + 0.001883157x_3$
Soppeng	$\hat{y}_{20} = 485.8785 + 0.0003490538x_1 - 4.859892x_2 + 0.001920448x_3$
Takalar	$\hat{y}_{21} = 499.0523 + 0.0003569055x_1 - 4.998721x_2 + 0.001878341x_3$
Tana Toraja	$\hat{y}_{22} = 485.5307 + 0.0003368429x_1 - 4.851382x_2 + 0.001987221x_3$
Toraja Utara	$\hat{y}_{23} = 485.7757 + 0.0003368346x_1 - 4.853905x_2 + 0.001987261x_3$
Wajo	$\hat{y}_{24} = 481.7754 + 0.0003465607x_1 - 4.816605x_2 + 0.001934005x_3$

Lampiran 9. Estimasi Parameter Model GWR

Kabupaten/Kota	**b0**	**b1**	**b2**	**b3**
Bantaeng	487.4951	0.0003581688	-4.879968	0.001871438
Bone	492.6271	0.0003495090	-4.929686	0.001917987
Barru	476.9337	0.0003509162	-4.768342	0.001910379
Bulukumba	482.8004	0.0003576709	-4.831367	0.001874047
Enrekang	485.2800	0.0003418630	-4.850883	0.001959622
Gowa	493.0819	0.0003563064	-4.936912	0.001881458
Jeneponto	495.4938	0.0003580584	-4.962430	0.001872139
Kepulauan Selayar	479.0710	0.0003630162	-4.794879	0.001845518
Kota Makassar	499.3432	0.0003548838	-5.000985	0.001889145
Palopo	476.8048	0.0003383250	-4.762025	0.001979255
Parepare	492.1677	0.0003460913	-4.923624	0.001936498
Luwu	475.8602	0.0003413716	-4.753535	0.001962482
Luwu Timur	451.7035	0.0003355952	-4.502171	0.001995293
Luwu Utara	481.9378	0.0003318917	-4.812191	0.002014786
Maros	493.1777	0.0003543597	-4.937185	0.001891882
Pangkejene dan Kepulauan	495.6353	0.0003523070	-4.961777	0.001902924
Pinrang	493.2006	0.0003431368	-4.933104	0.001952569
Sindenreng Rappang	482.4488	0.0003445068	-4.822742	0.001945198
Sinjai	484.3232	0.0003559724	-4.846446	0.001883157
Soppeng	485.8785	0.0003490538	-4.859892	0.001920448
Takalar	499.0523	0.0003569055	-4.998721	0.001878341
Tana Toraja	485.5307	0.0003368429	-4.851382	0.001987221
Toraja Utara	485.7757	0.0003368346	-4.853905	0.001987261
Wajo	481.7754	0.0003465607	-4.816605	0.001934005

Lampiran 9. Syntax Menggunkan *Software* R



```
library(rgdal)
library(ggplot2)
library(sp)
datakecelakaan21 <- read.csv("D:/datakecelakaan21.csv", header=TRUE)
dim(datakecelakaan21)
datakecelakaan21$jumlah.kecelakaan=as.numeric(datakecelakaan21$jumlah.kecelakaan)
datakecelakaan21$index <- 1:nrow(datakecelakaan21)


sulsel<- readOGR(dsn="D://shp_sulawesi", layer="idn_admbnda_adm2_bps_20200401")
plot(sulsel)
text(sulsel, 'ADM2_EN', cex=0.5)
lbls_namakab<-as.character(sulsel$ADM2_EN)
lbls<-as.character(datakecelakaan21[,8])
spl<-list('sp.text',coordinates(sulsel),lbls,cex=.6)
sulsel@data<-cbind(pdrb=datakecelakaan21[,4],sulsel@data)#jumlah kecelakaan
data <-list(sulsel$pdrb,sulsel$ADM2_EN)
data
library(RColorBrewer)
my.palette.1<-brewer.pal(n=24,name="YlOrRd")
spplot(sulsel[,1], cuts=8,col.regions=my.palette.1, cex=c(0.3,1,0.3),sp.layout=spl, main="Jumlah kecelakaan ")


sulsel@data<-cbind(pdrb=datakecelakaan21[,5],sulsel@data)#jumlahPenduduk
data <-list(sulsel$pdrb,sulsel$ADM2_EN)
l1=list(label=sulsel$ADM2_EN)
data
library(RColorBrewer)
my.palette.1<-brewer.pal(n=24,name="YlOrRd")
spplot(sulsel[,1], cuts=8, col.regions=my.palette.1, cex=c(0.3,1,0.3),sp.layout=spl, main="jumlah Penduduk")

sulsel@data<-cbind(pdrb=datakecelakaan21[,6],sulsel@data)#rasiojenis kelamin
data <-list(sulsel$pdrb,sulsel$ADM2_EN)
data
library(RColorBrewer)
my.palette.1<-brewer.pal(n=24,name="YlOrRd")
spplot(sulsel[,1], cuts=8, col.regions=my.palette.1, cex=c(0.3,1,0.3),sp.layout=spl, main="Rasio Jenis Kelamin")


sulsel@data<-cbind(pdrb=datakecelakaan21[,7],sulsel@data)#jumlah usia anak SMA
data <-list(sulsel$pdrb,sulsel$ADM2_EN)
data

library(RColorBrewer)
my.palette.1<-brewer.pal(n=24,name="YlOrRd")
spplot(sulsel[,1], cuts=8, col.regions=my.palette.1, cex=c(0.3,1,0.3),sp.layout=spl, main="Jumlah penduduk usia 15 t
```

Lampiran 9. Syntax Menggunkan *Software* R (lanjutan)

```
#Regresi Klasik
library(sp)
library(rgdal) # membaca shapefile
library(spData)
library(readxl) # membaca file excel
library(raster) # text pada peta
library(spdep) # pembobot data spasial
library(lmtest) # regresi klasik
library(DescTools) # Uji dependensi
library(nortest) # uji normalitas
library(spatialreg) # running model SAR
library(car)
library(nortest)
library(GWmodel) # Model GWR
library(lmtest)
library(car)
y <-datakecelakaan21$jumlah.kecelakaan
x1 <-datakecelakaan21$jumlah.penduduk
x2 <-datakecelakaan21$rasio.jenis.kelamin
x3 <-datakecelakaan21$usia.anak


w <- poly2nb(sulsel,row.names = sulsel$ADM2_EN, queen = TRUE)
# ww <- nb2listw(w,style="W")

# Blok try-catch untuk menangani error
tryCatch({
  ww <- nb2listw(w,style="W")
}, error = function(e) {
  # Menampilkan pesan error
  cat(paste("Error: ", e$message, "\n"))
})



add_nb <- function(x) {
  queen_nb <- poly2nb(x, queen = TRUE)
  count <- card(queen_nb)
if (!any(count == 0)) {
    return(queen_nb)
  }
  ## get nearest neighbour index, use centroids:
  nnbs <- knearneigh(coordinates(x))$nn
  no_edges_from <- which(count == 0)
  for (i in no_edges_from) {
    queen_nb[[i]] <- nnbs[i]
  }
  return(queen_nb)
}

```

Lampiran 9. Syntax Menggunkan Software R (lanjutan)

```
sulsel_new <- add_nb(sulsel)
ww <- nb2listw(sulsel_new,style="W")
ww

moran(datakecelakaan21$usia.anak, ww, n = length(ww$neighbours), S0 = Szero(ww))
moran.test(datakecelakaan21$usia.anak, ww, alternative = "greater")

moran(datakecelakaan21$rasio.jenis.kelamin, ww, n = length(ww$neighbours), S0 = Szero(ww))
moran.test(datakecelakaan21$rasio.jenis.kelamin, ww, alternative = "greater")

moran(datakecelakaan21$jumlah.penduduk, ww, n = length(ww$neighbours), S0 = Szero(ww))
moran.test(datakecelakaan21$jumlah.kecelakaan, ww, alternative = "greater")

reg.klasik<-lm(y~x1+x2+x3,data = datakecelakaan21)
summary(reg.klasik)

err.ols<-residuals(reg.klasik)


# Uji Asumsi
vif(reg.klasik)
ad.test(err.ols)

###UJI EFEK SPASIAL###
#Uji BP
bptest(reg.klasik)
#Uji dependensi
RunsTest(err.ols)
# normalitas
ad.test(err.ols)


library(spdep) # pembobot data spasial
library(rgdal)
#coordinat
#install.packages("tidyverse")
cord<-cbind(datakecelakaan21$Longitude,datakecelakaan21$Latitude)
DM <-gw.dist(dp.locat = cord)

#konvert data spasial
datakecelakaan21.sp<-datakecelakaan21
coordinates(datakecelakaan21.sp)<- ~Longitude+Latitude #set bahwa long lat sebagai koordinat
class(datakecelakaan21.sp)


#mencari bandwitch
bw.fg<-bw.gwr(y~x1+x2+x3, data = datakecelakaan21.sp, kernel = "gaussian", dMat = DM, adaptive

```

Lampiran 9. Syntax Menggunkan Software R (lanjutan)

```
148
149 ###MODEL GWR###
150 gwr1<-gwr.basic(y~x1+x2+x3, data = datakecelakaan21.sp,bw=bw.fg, kernel="gaussian",dMat=DM)
151 gwr1
152
153
154 hasil=as.data.frame(gwr1$SDF)
155 View(hasil) #melihat output model GWR
156 par(mfrow=c(1,3))
157 boxplot(hasil[,1],xlab="Intercept")
158 boxplot(hasil[,2],xlab="X1")
159 boxplot(hasil[,3],xlab="X2")
160 boxplot(hasil[,4],xlab="X3")
161
162
163 par(mfrow=c(1,1))
164
165 #hasil uji t
166 ujit <- gwr.t.adjust(gwr1)
167 a <- ujit$results$t
168 a
169
```