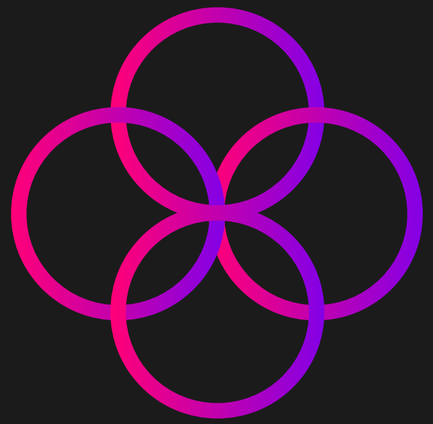
SZYMON MOLIŃSKI



Interpolacja zanieczyszczenia powietrza na podstawie danych z czujników udostępnionych przez Główny Inspektorat Ochrony Środowiska z wykorzystaniem metody Krigingu

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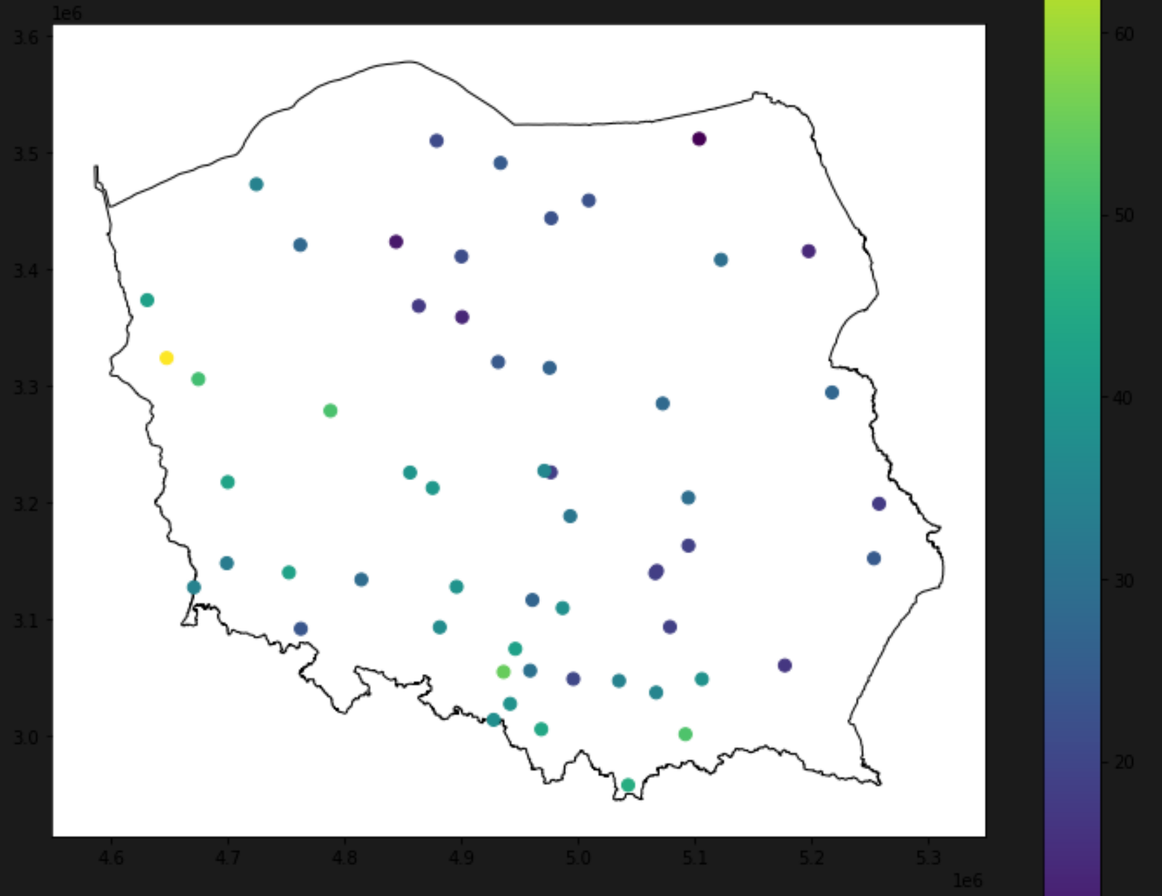
(Mniejszy) Problem

http://powietrze.gios.gov.pl/pjp/archives



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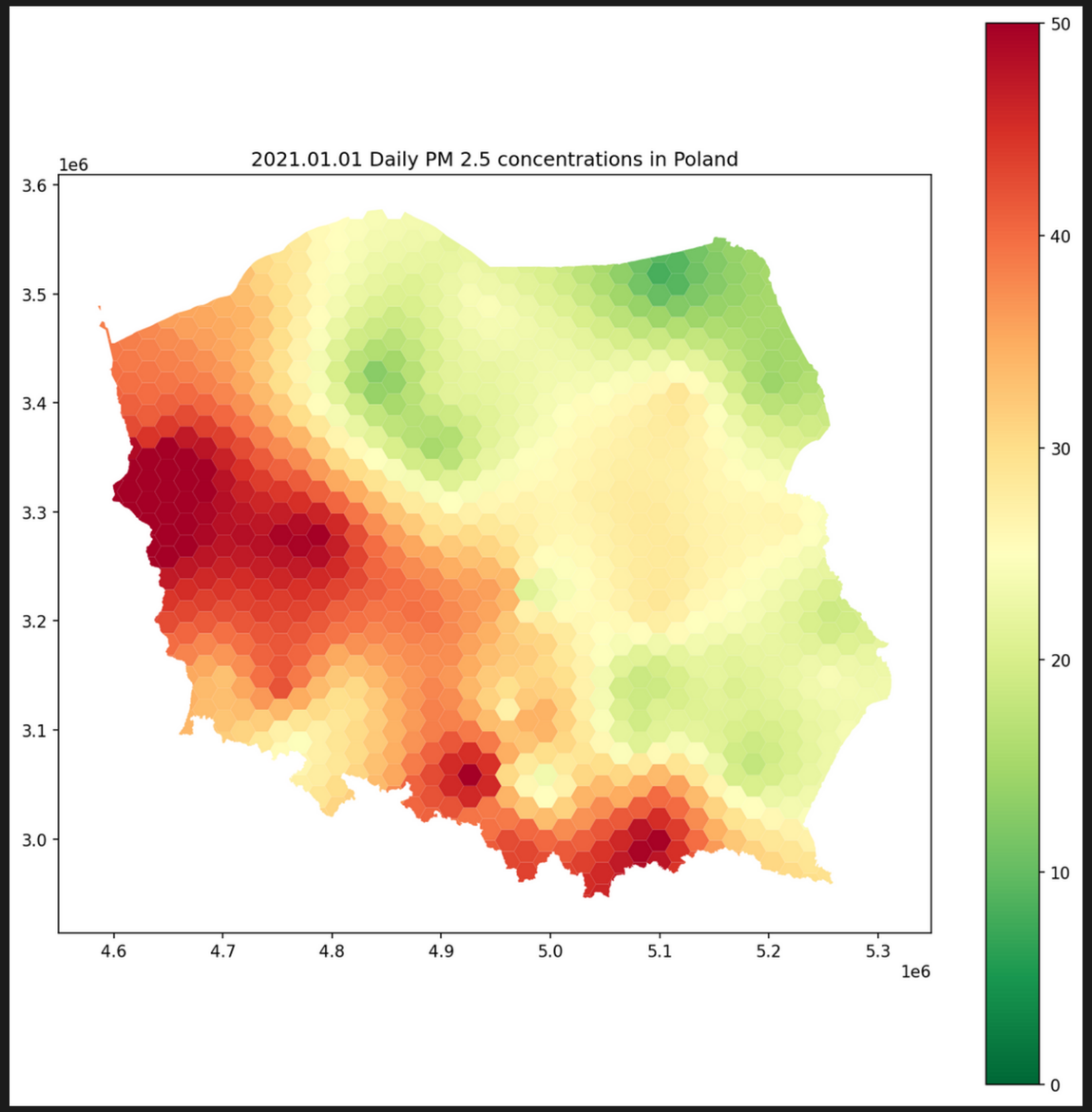
Cel: "pełne" pokrycie powierzchni Polski



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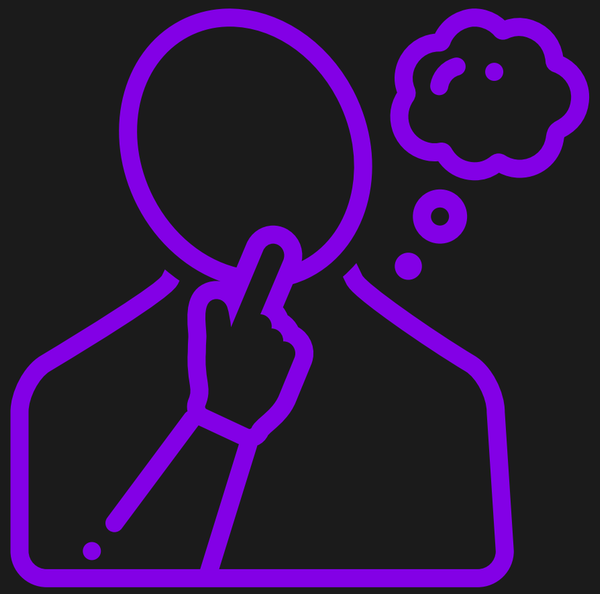
Inverse Distance Weighting



Jak?

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

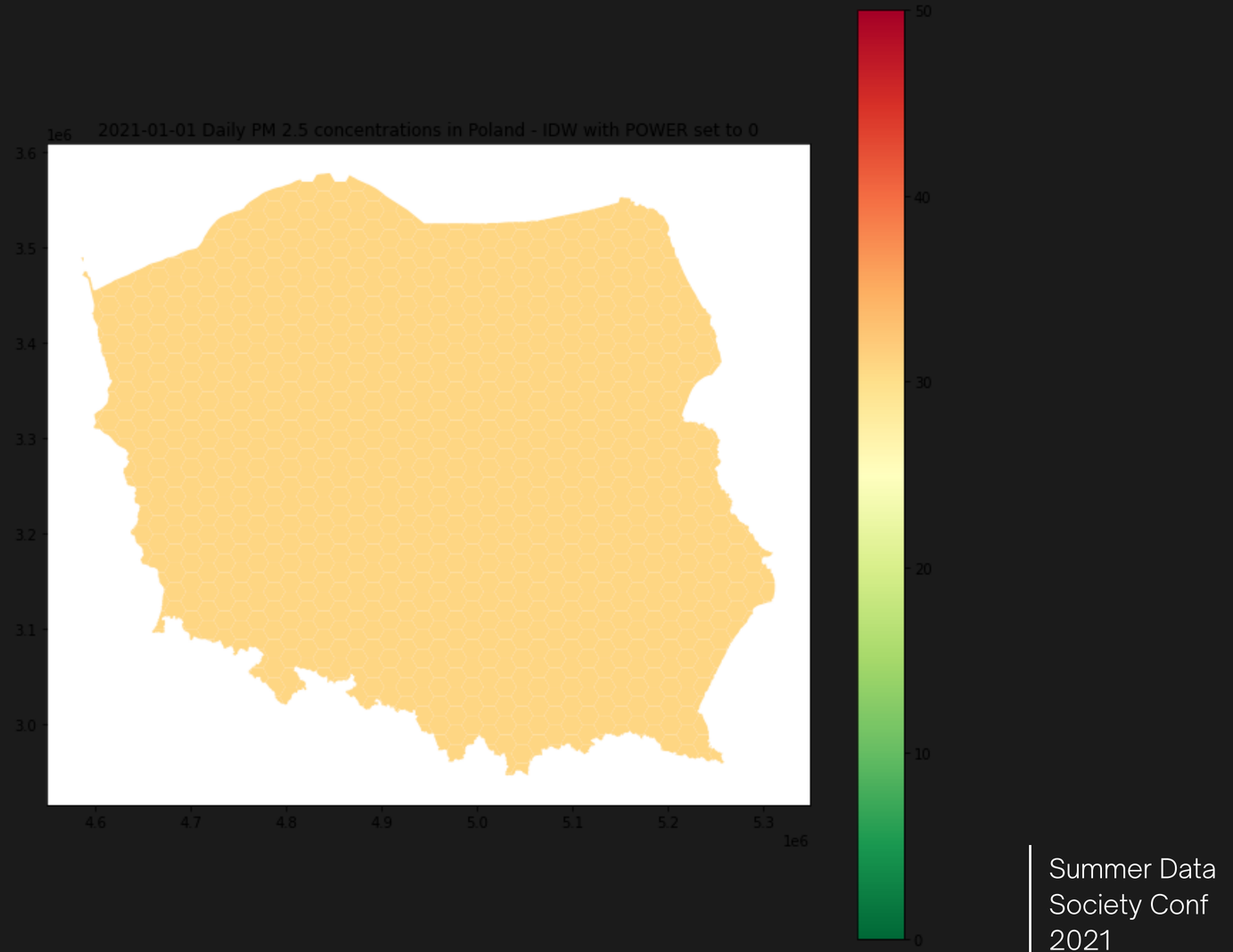
$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

p == 0

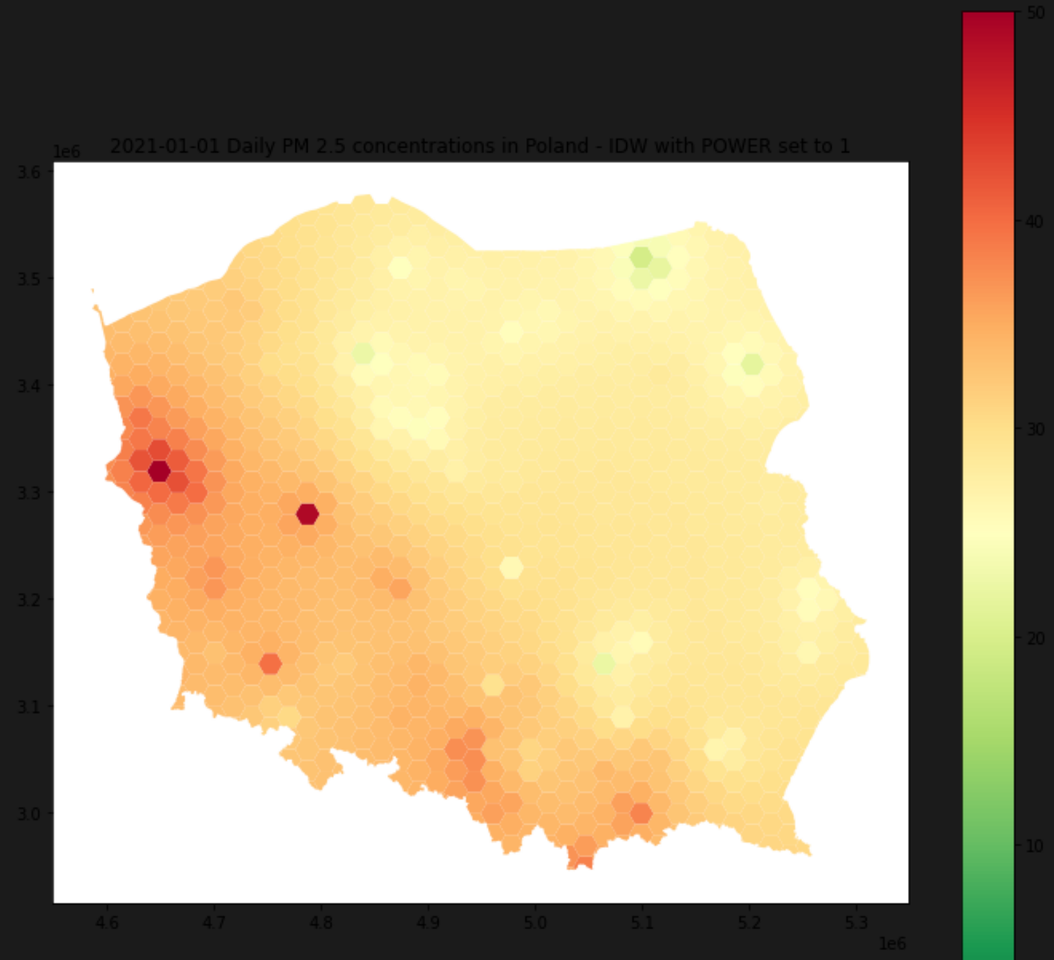


Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

p == 1



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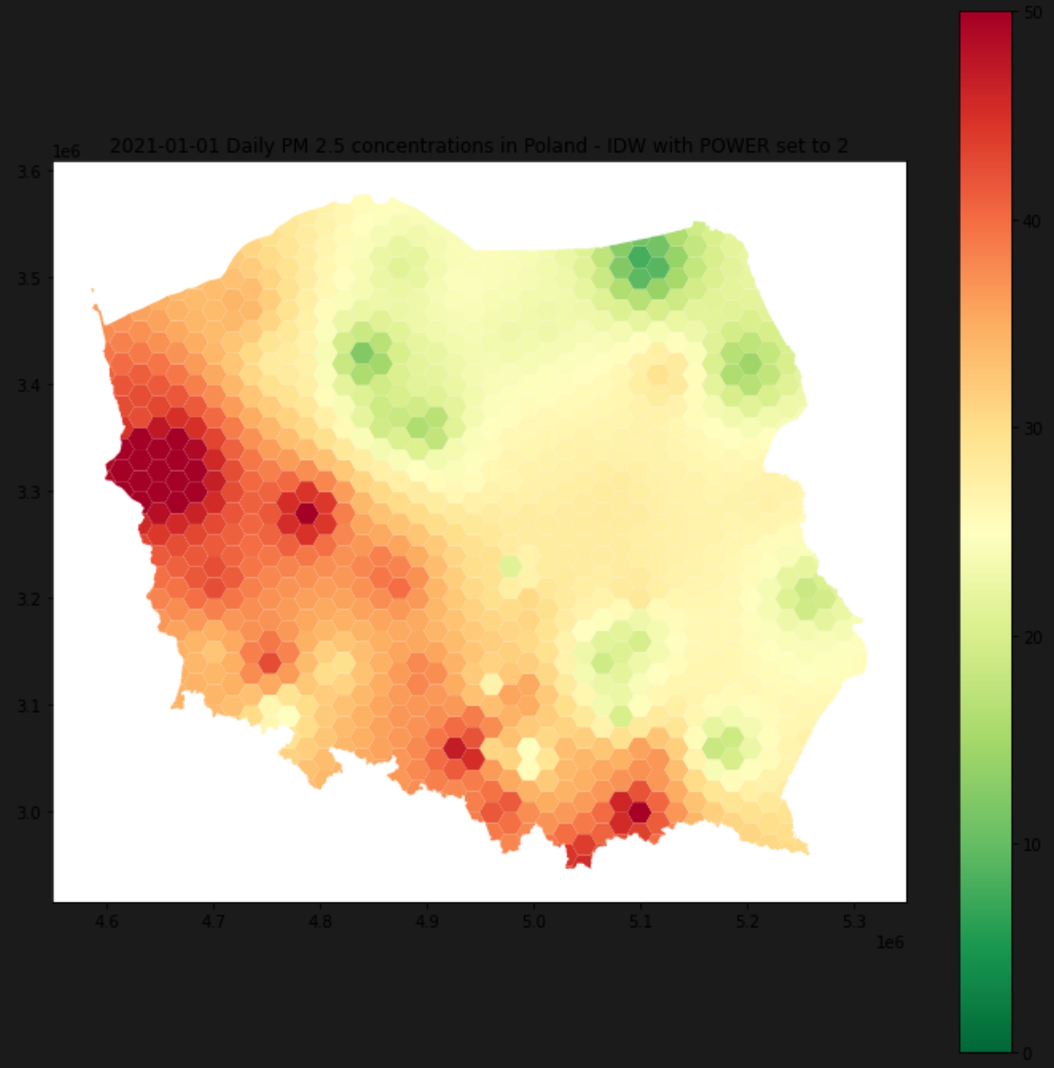
Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

p == 2



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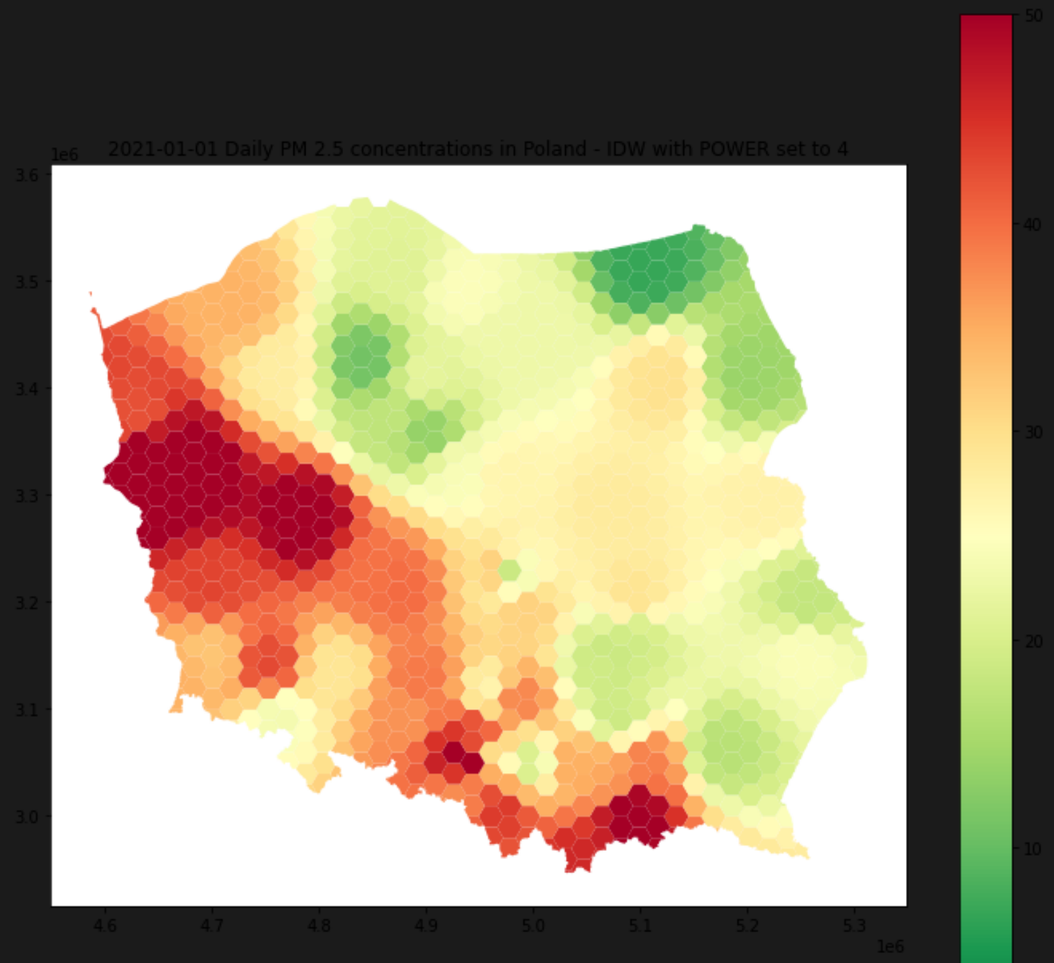
Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

p == 4

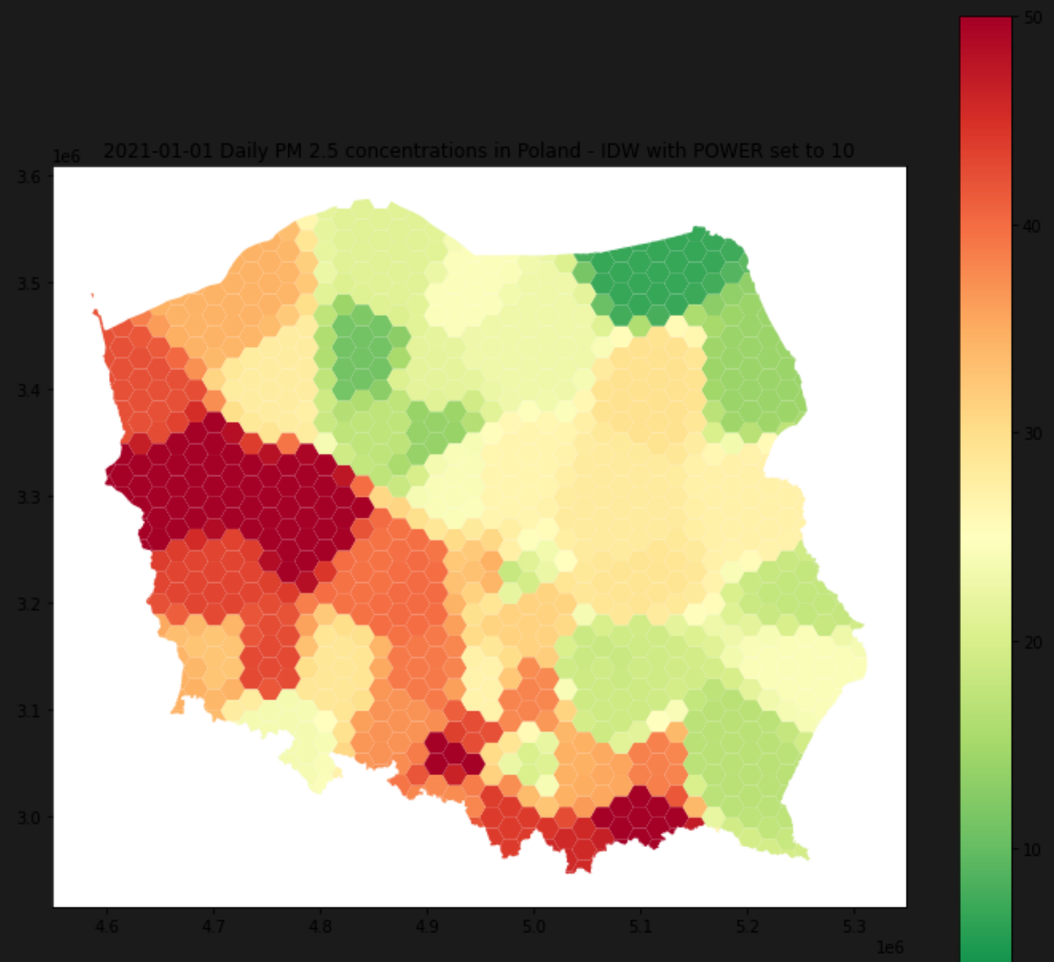


Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

p == 10



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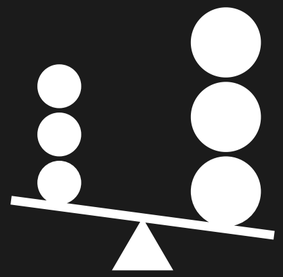
Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

Problemy



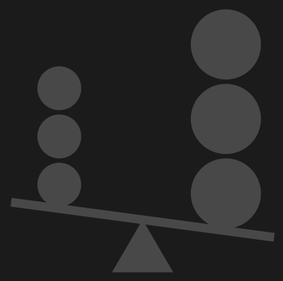
Jaka waga jest właściwa?

Jak estymować błąd predykcji?

Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$



Jaka waga jest właściwa?

Jak estymować błąd predykcji?

WALIDACJA KRZYŻOWA

Problemy

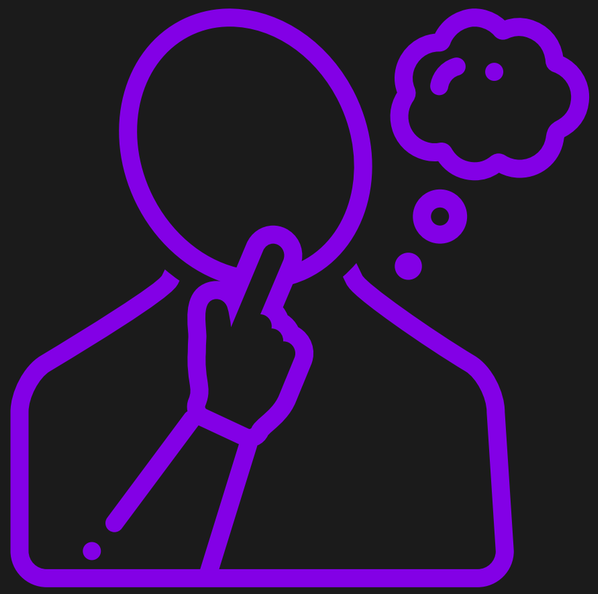
Inverse Distance Weighting

$$\widehat{y} = \frac{\sum_i \lambda_i y_i}{\sum_i \lambda_i}$$

$$\lambda_i = \frac{1}{\left(d_i\right)^p}$$

Problemy

Kriging



Czy można to poprawić?

$$\widehat{z} = \sum_{i=1}^{K} \lambda_i z_i$$

$$\sum_{j=1} \lambda_j C\left(x_i, x_j\right) - \mu = \overline{C}\left(x_i, V\right); i = 1, 2, \ldots, K$$

$$\sum_{j=1}^{K} \lambda_j = 1$$

Kriging

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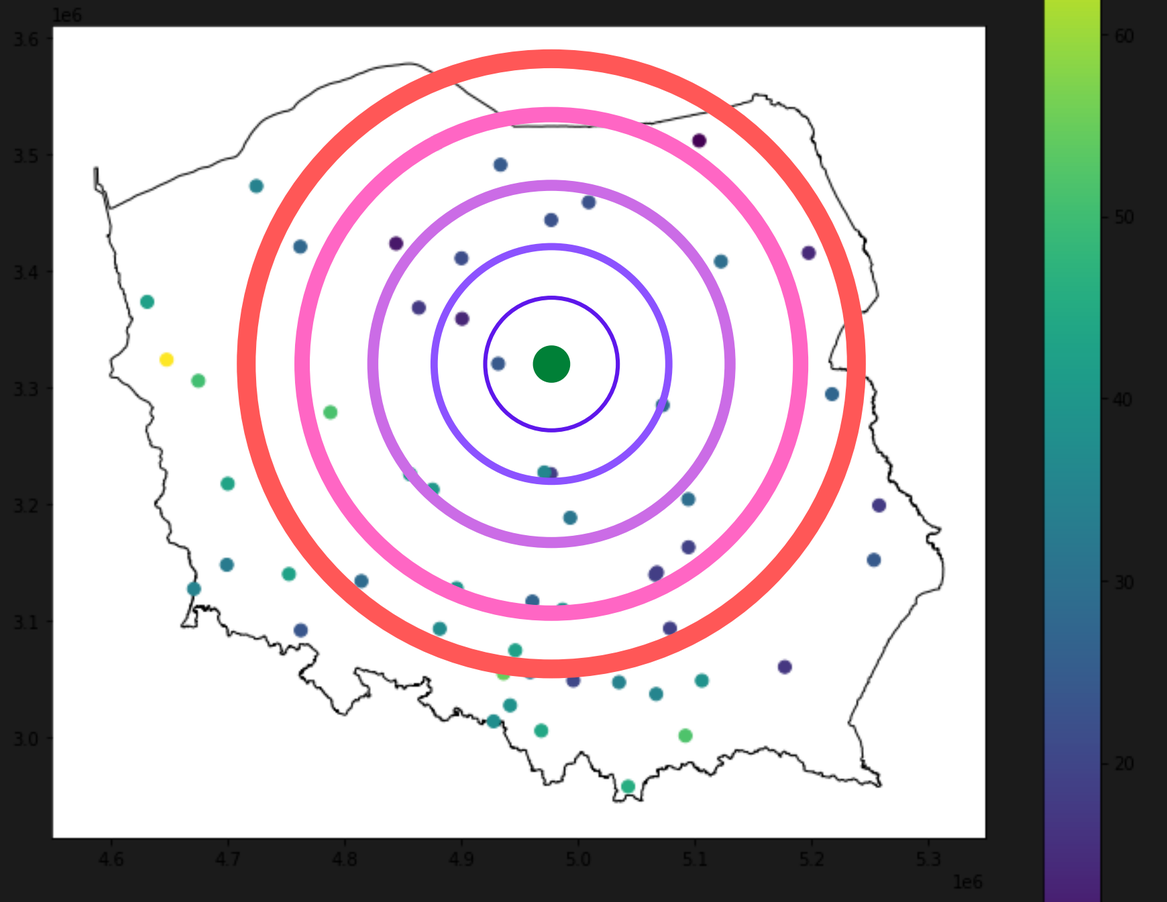
Zmienność w przestrzeni



Kriging

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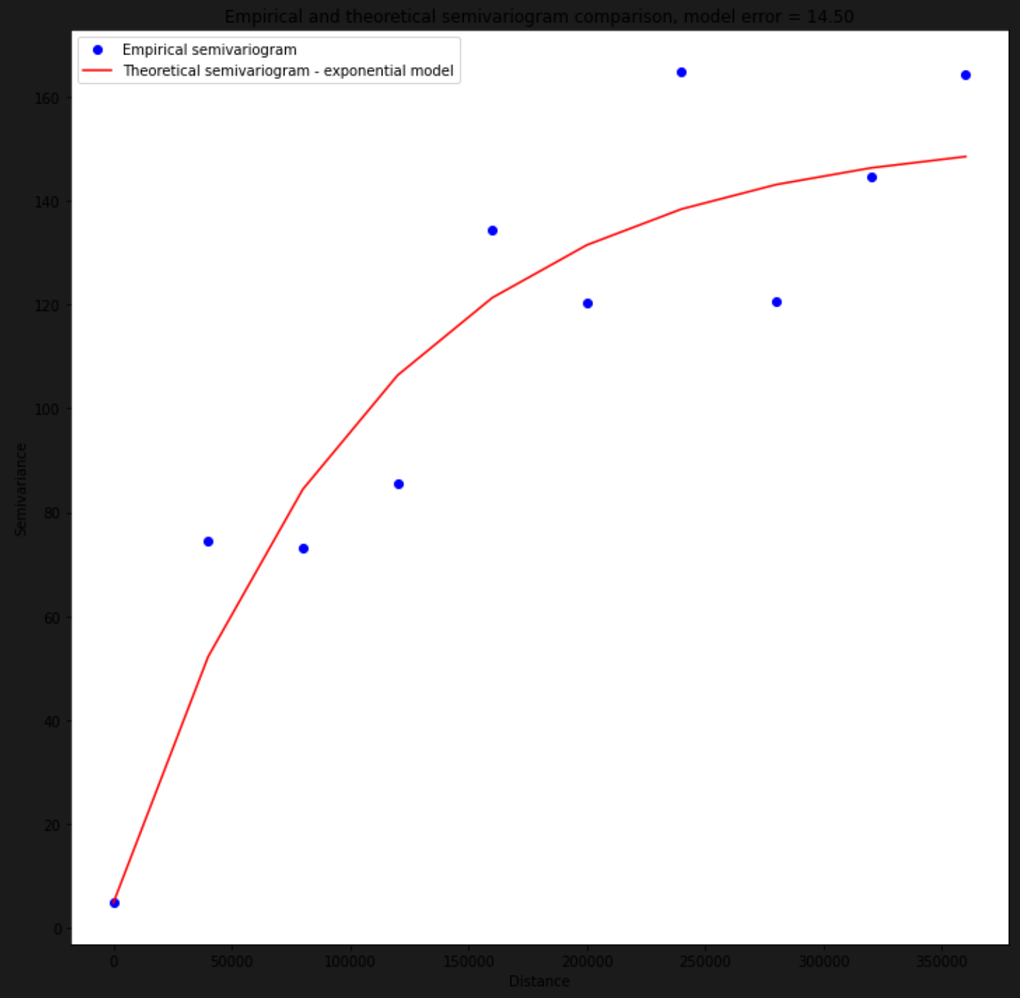
$$\sum_{j=1}^{K} \lambda_j = 1$$

Semiwariancja



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Kriging

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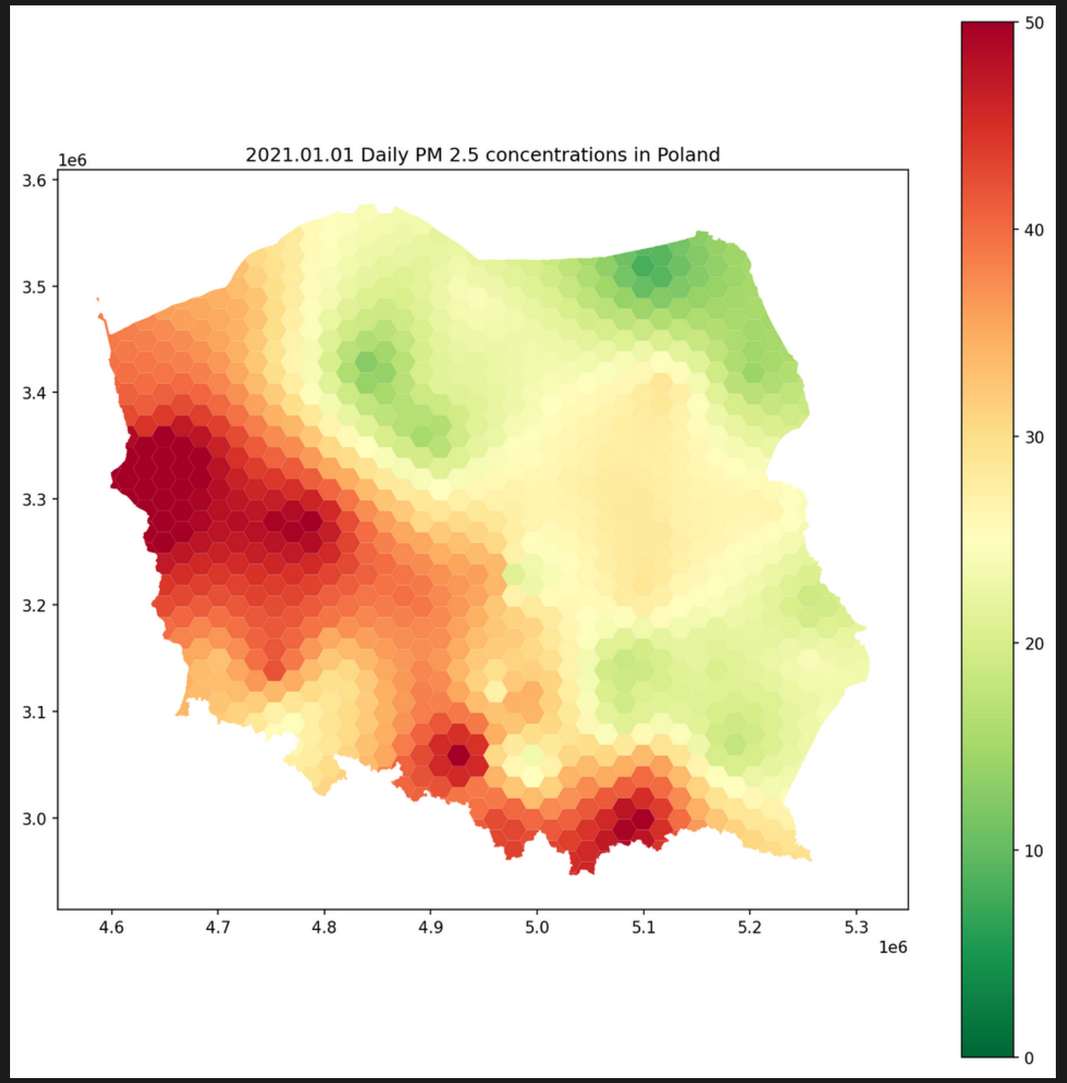
Kriging



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Kriging

$$\widehat{z} = \sum_{i=1}^{K} \lambda_i z_i$$

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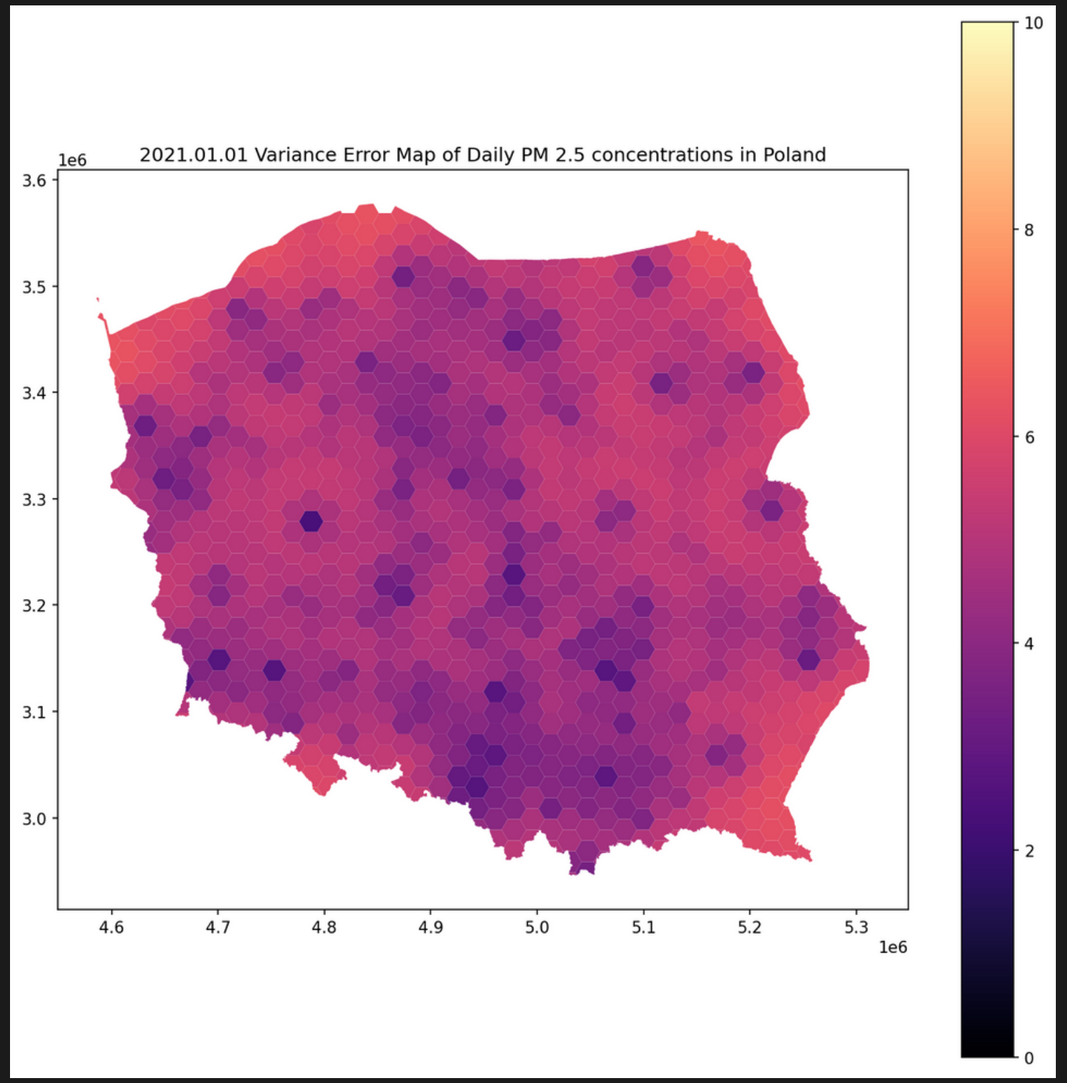
Przedział błędu



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$$\widehat{z} = \sum_{i=1}^{K} \lambda_i z_i$$

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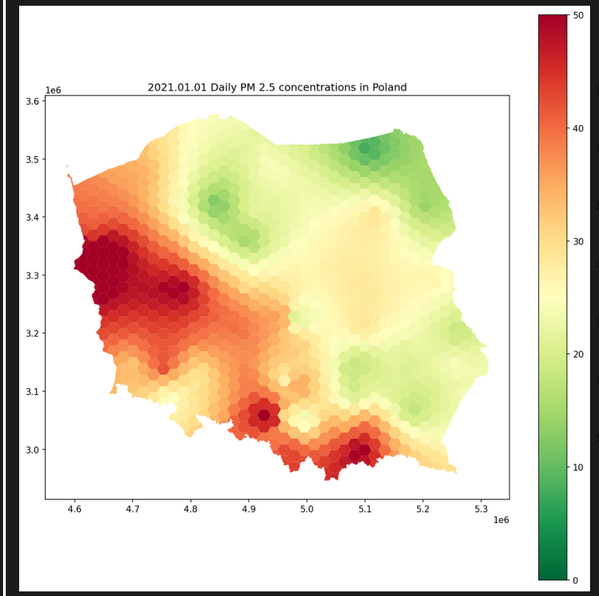
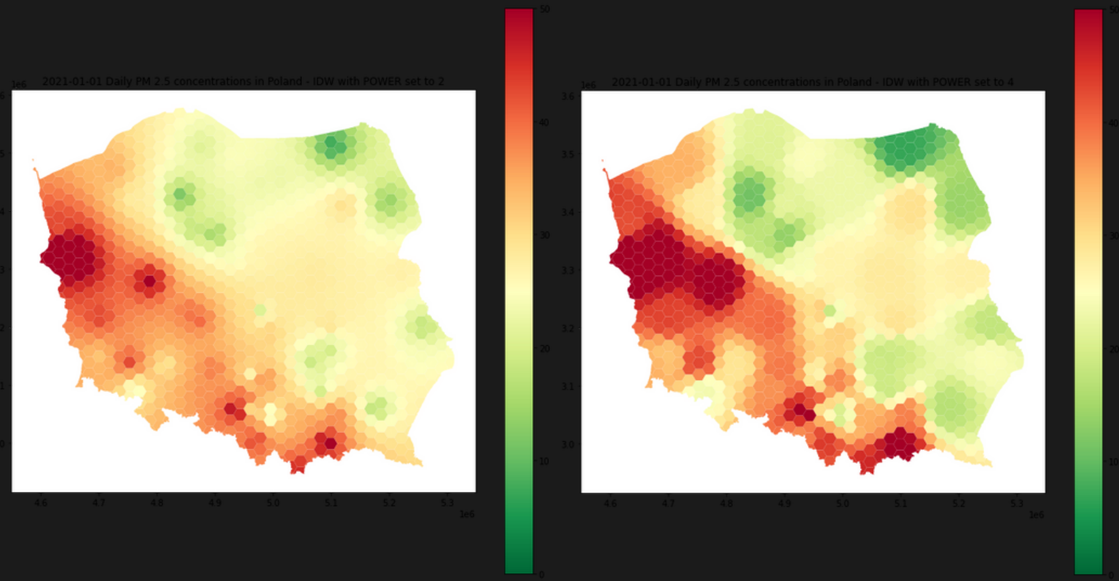
Kriging



IDW p=2



IDW p=4

Zestawienie z IDW

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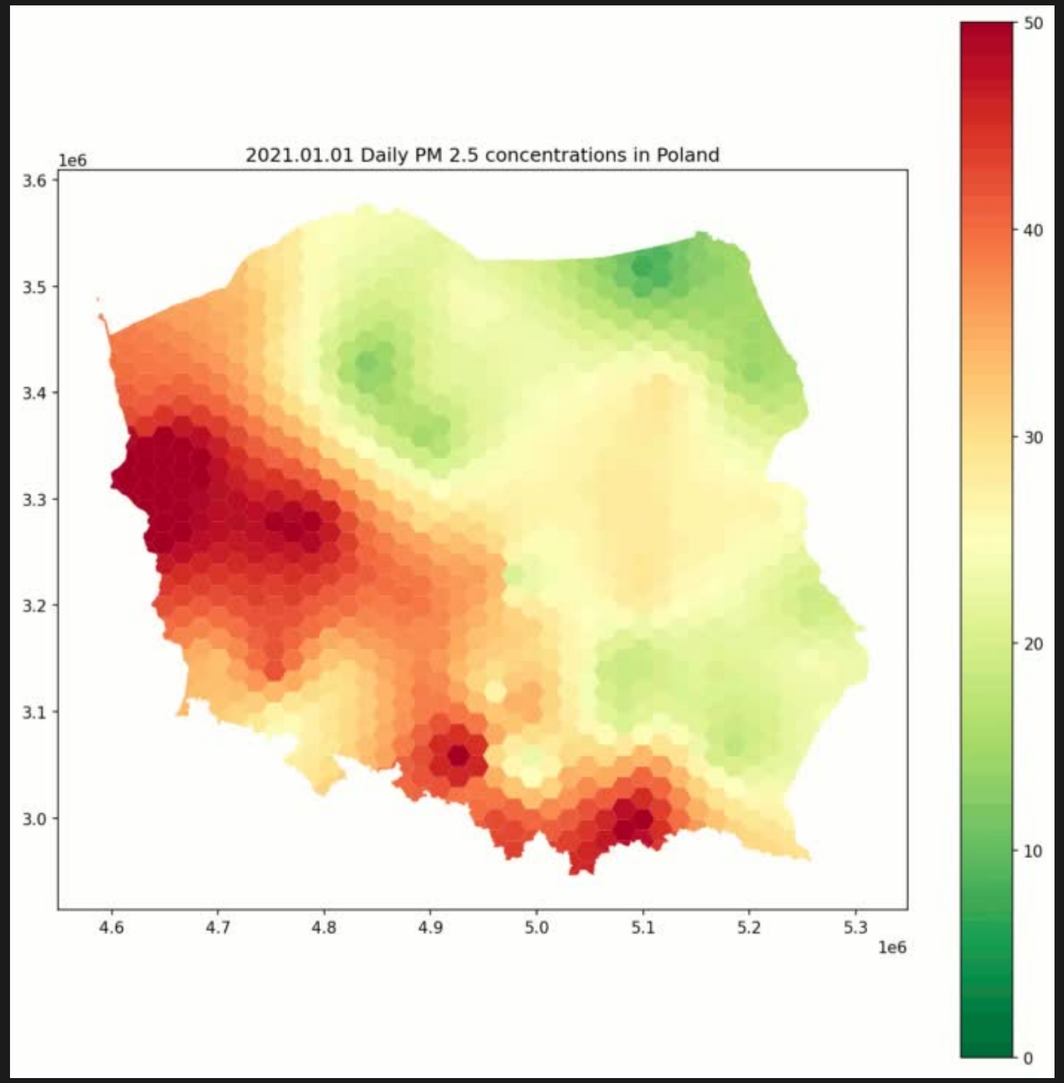
Kriging

$$\widehat{z} = \sum_{i=1}^{K} \lambda_i z_i$$

$$\sum_{j=1} \lambda_j C\left(x_i, x_j\right) - \mu = \overline{C}\left(x_i, V\right); i = 1, 2, \ldots, K$$

$$\sum_{j=1}^{K} \lambda_j = 1$$

Kriging - zestawienie w czasie



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Kriging

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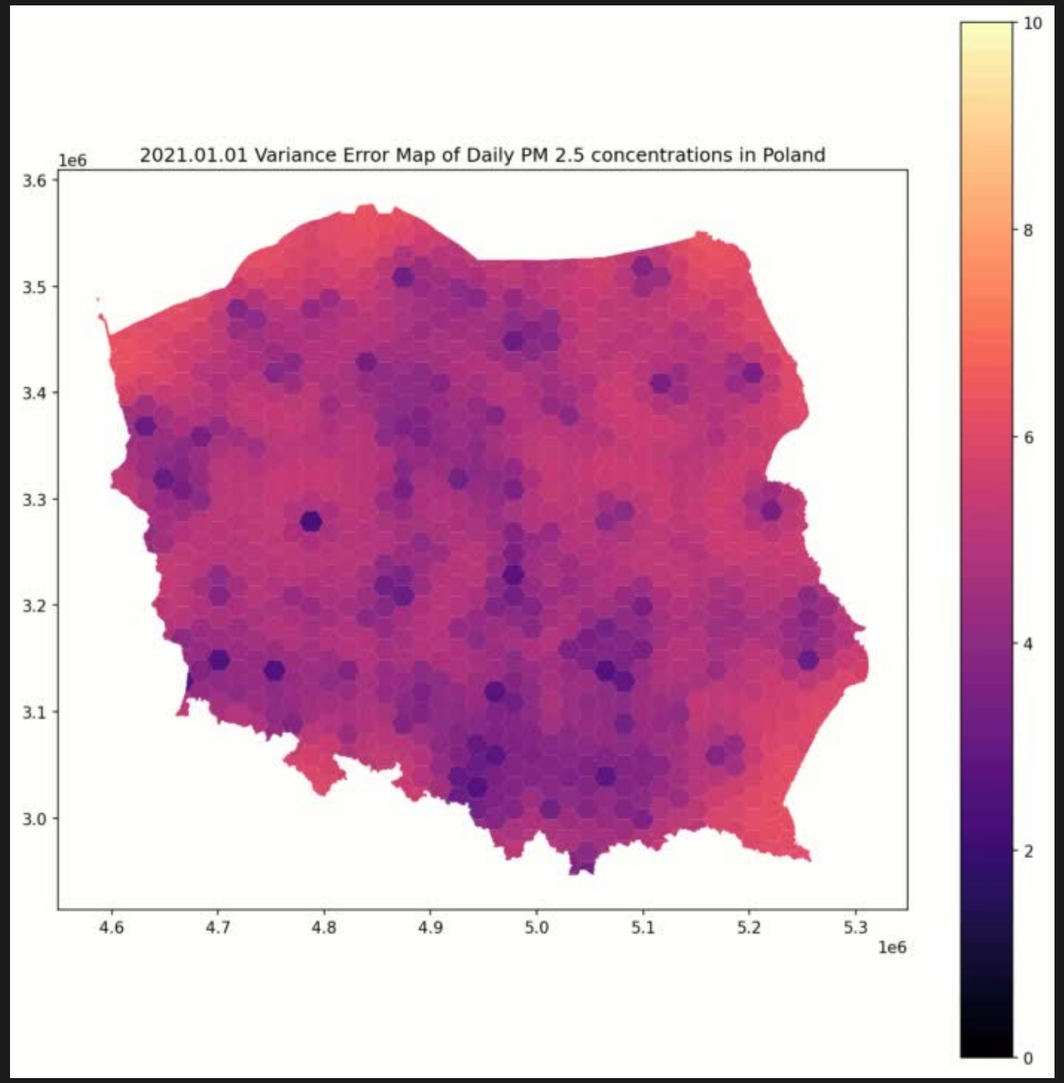
$$\sum_{j=1}^{K} \lambda_j = 1$$

Kriging - propagacja błędu w czasie



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Kriging

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$$\sum_{j=1} \lambda_j C\left(x_i, x_j\right) - \mu = \overline{C}\left(x_i, V\right); i = 1, 2, \ldots, K$$

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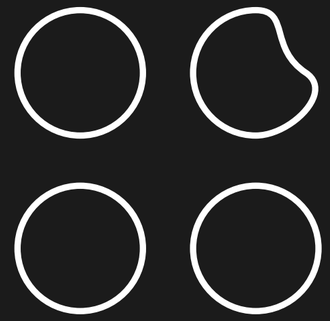
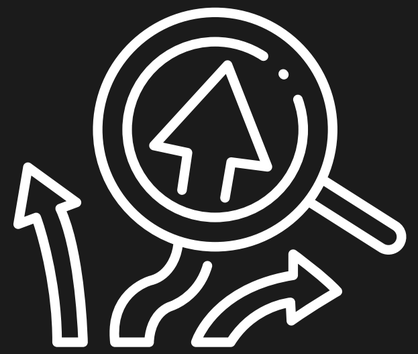
Problemy i ograniczenia



Czy proces jest stacjonarny?



Czy proces jest izotropowy?

Kriging

$$\widehat{z} = \sum_{i=1}^{K} \lambda_i z_i$$

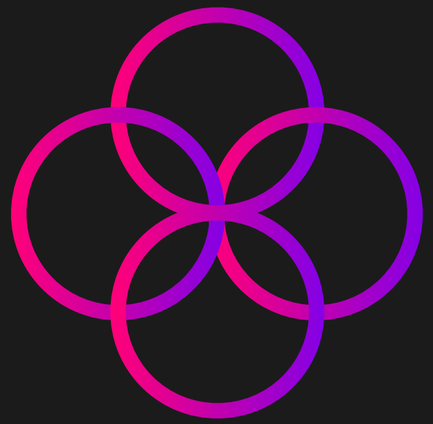
$$\sum_{j=1} \lambda_j C\left(x_i, x_j\right) - \mu = \overline{C}\left(x_i, V\right); i = 1, 2, \ldots, K$$

$$\sum_{j=1}^{K} \lambda_j = 1$$

Problemy i ograniczenia

RELAKSACJA DZIĘKI RÓŻNYM RODZAJOM KRIGINGU

SZYMON MOLINSKI



Linki

MATERIALS	https://github.com/szymon-datalions/conferences-and-workshops/tree/main/2021/06/SummerDataSocietyConf
PYTHON - KRIGING	https://github.com/szymon-datalions/pyinterpolate
PYPI	https://pypi.org/project/pyinterpolate/
AUTOR EMAIL	simon@ml-gis-service.com