Body Fat Prediction

Your Path to a Healthier You

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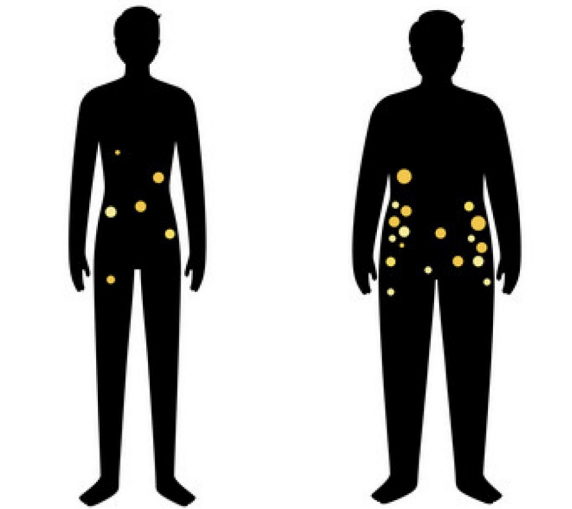
Introduction & Data Cleaning

- Energy storage, insulation, and protection of vital organs
- Weight Management
- Health and Disease Risk

$$BMI(ADIPOSITY) = \frac{weight_{lbs} \times 703}{height_{inch}}$$

$$100 \times Bodyfat = \frac{495}{density} - 450$$



- **Replacement:**

Individual	Original obs.	Fixed obs.	Method
‘HEIGHT’	29.5 inches	69.50 inches	BMI formula

- **Deletion:**

Individual	Original obs.	Value by Calculation	Method
‘BODYFAT’	0.0%	0.69%	Body fat formula
‘BODYFAT’	1.9%	-3.611%	Body fat formula
‘BODYFAT’	45.1%	47.48%	Body fat formula

- **Final cleaned data:** n = 249(from 252)

Final Models

Define the best models by:

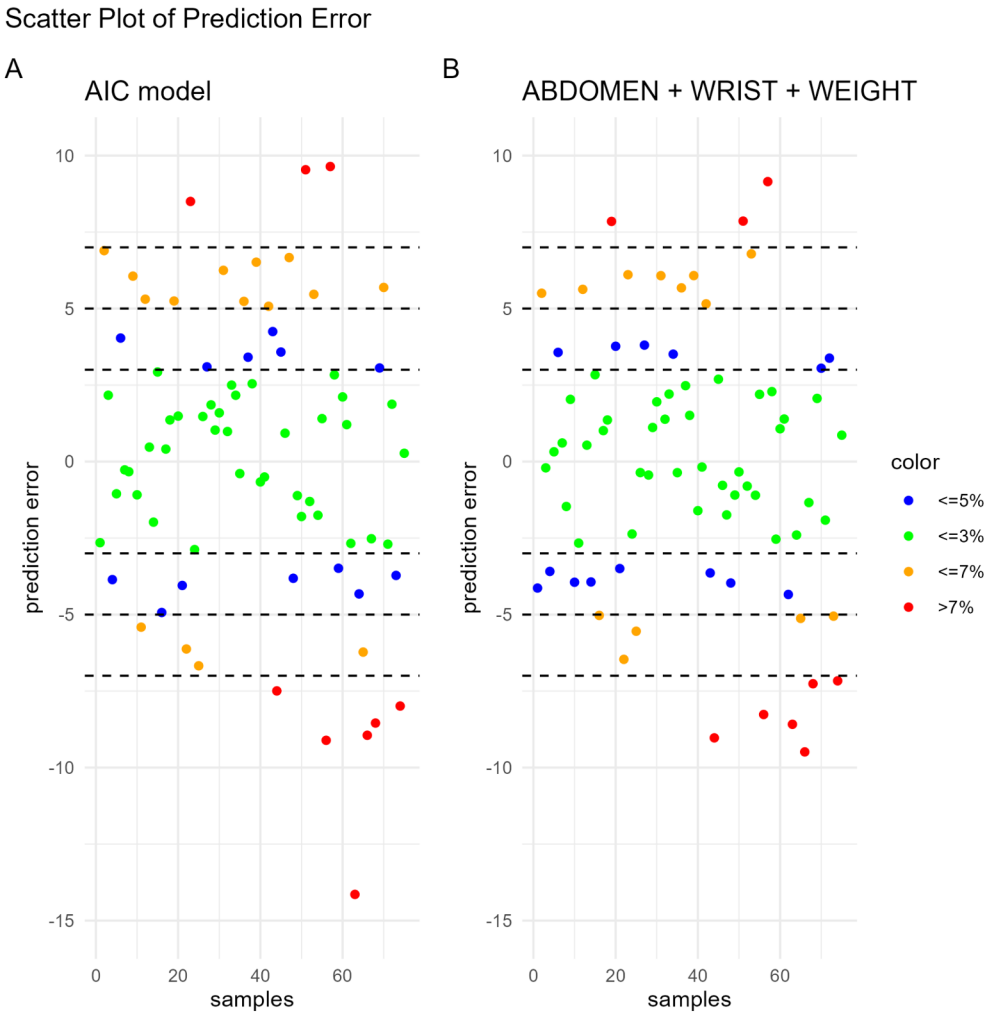
1. Number of inputs
2. Adjust R square and RMSE on the training set
3. Prediction error on the test set

Performance:

AIC Model(R2=0.751, RMSE=3.74), 11 inputs

3-features model(R2=0.729, RMSE=4.01), 3 inputs: Abdomen, Wrist, Weight

Prediction Error of Final Models



Model Construction

model	adjusted R^2	RMSE	±3%	±5%	±7%
All features	0.728	3.98	0.493	0.667	0.840
AIC	0.751	3.743	0.507	0.680	0.880
BIC	0.739	3.826	0.467	0.747	0.853
Abdomen+ Wrist+Weight	0.729	4.01	0.520	0.707	0.880
PCA	0.749	3.758	0.413	0.680	0.760
Regression Tree	0.633	4.708	0.400	0.693	0.787
Random Forest	0.684	4.236	0.507	0.693	0.840

Discussion and Improvement

1. Bias data (gender, age)
2. More features (diet)
3. Sample size

Get Started!

Our shinny

Q & A