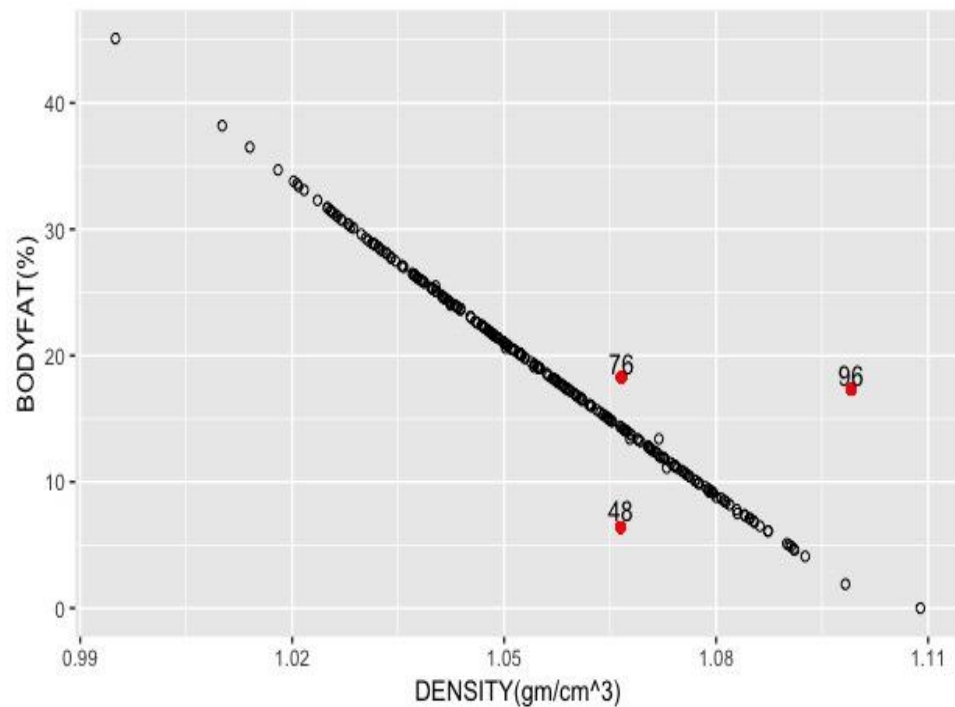


Body Fat Prediction

Xiaohan Wang, Lize Du

Data Processing

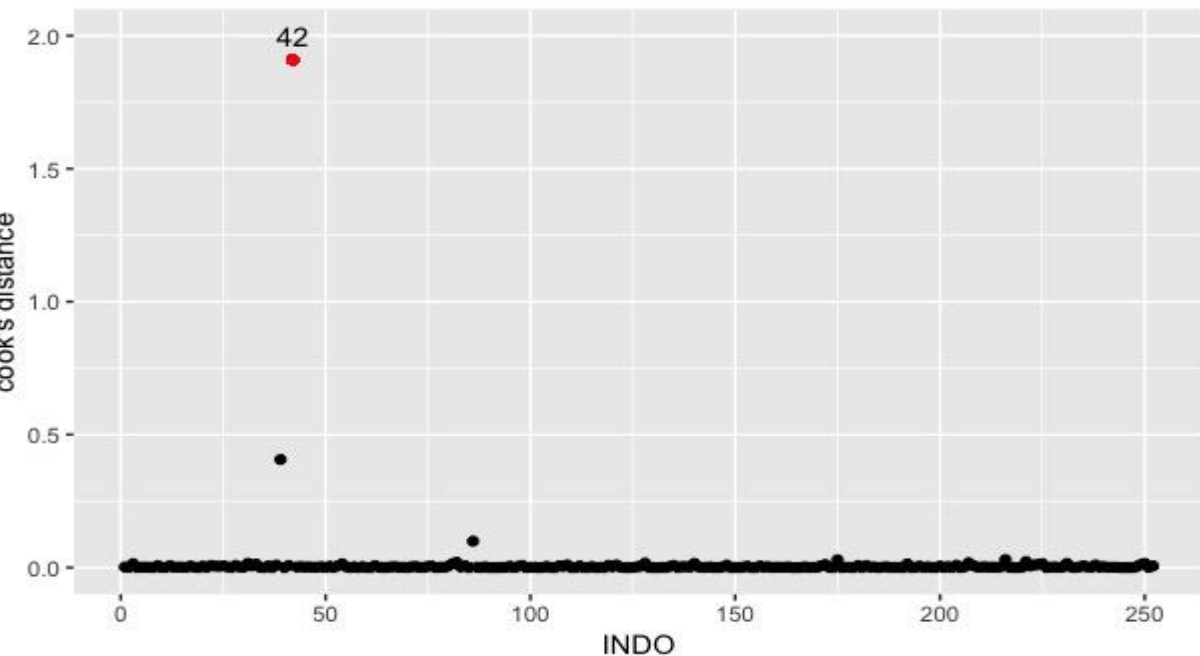
$$\text{BODYFAT} = 495/\text{DENSITY} - 450$$



IDNO	BODYFAT	CAL_BODYFAT
96	17.3	0.37
48	6.4	14.14
76	18.3	14.09

Data Processing

$$\text{BMI}(\text{kg}/\text{m}^2) = 0.45\text{WEIGHT}(\text{lbs}) / (0.025\text{HEIGHT}(\text{inches}))^2$$

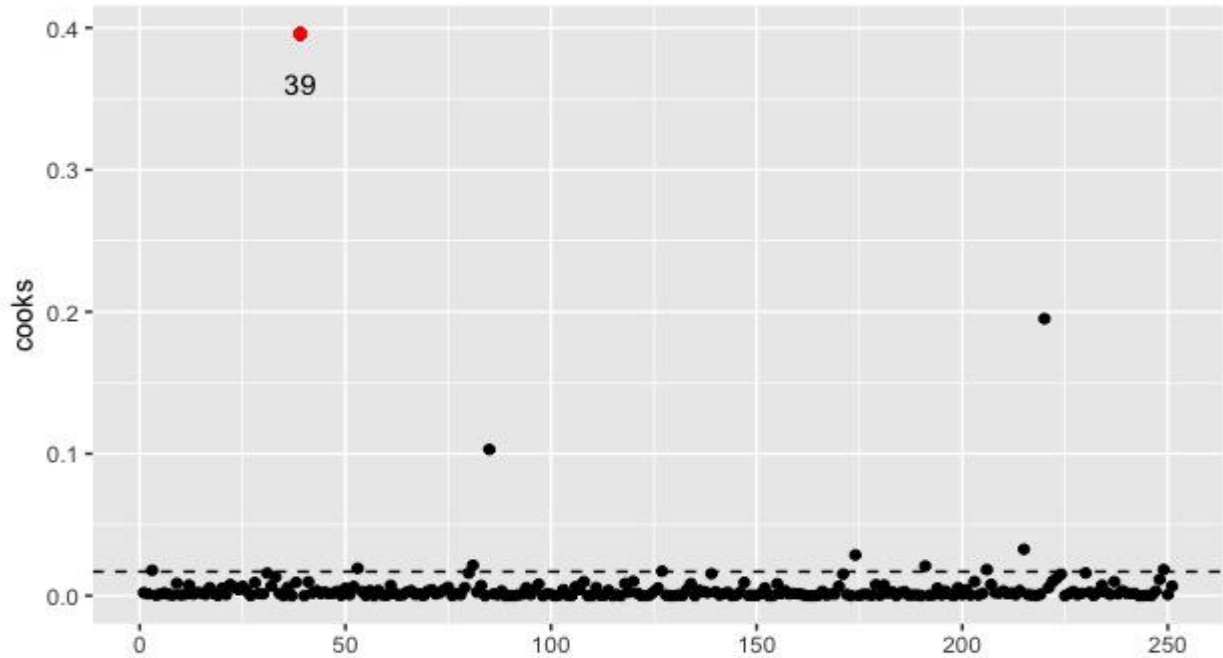


70.3inches tall!

BODYFAT AGE WEIGHT HEIGHT ADIPOSITITY

42 31.7 44 205 29.5 29.9

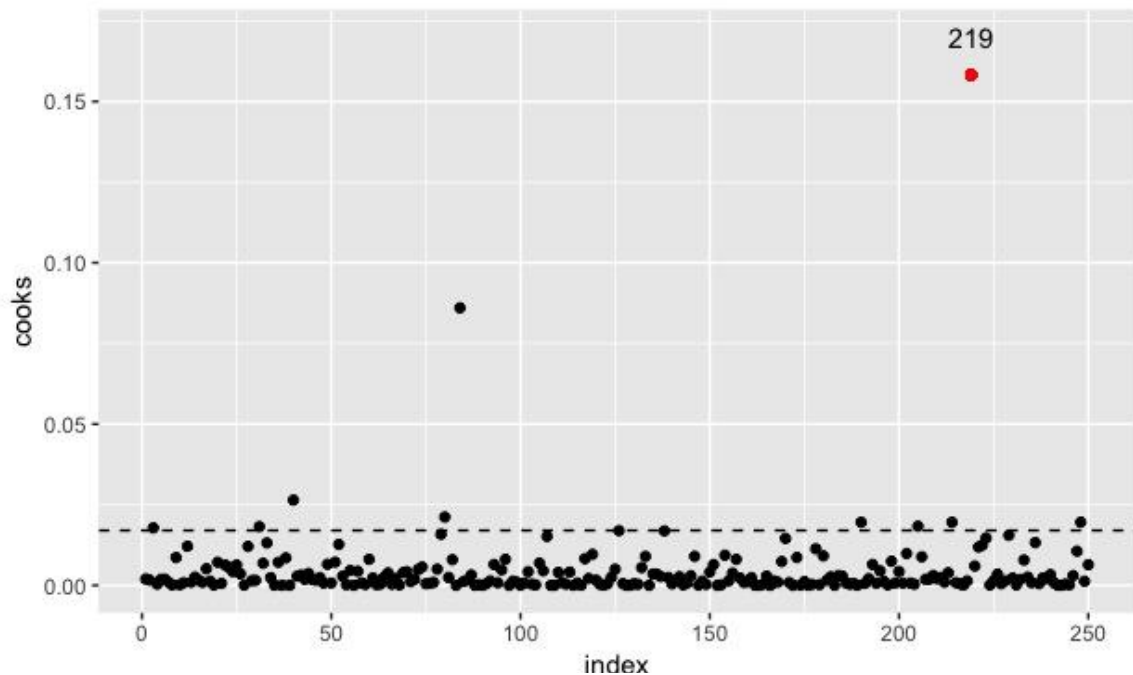
Data Processing



BODYFAT	AGE	WEIGHT	HEIGHT	ADIPOSITITY	NECK	CHEST	ABDOMEN	HIP	THIGH	KNEE	ANKLE	BICEPS	FOREARM	WRIST
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39	33.8	46	363.15	72.25	48.9	51.2	136.2	148.1	147.7	87.3	49.1	29.6	45	29	21.4
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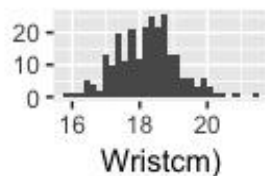
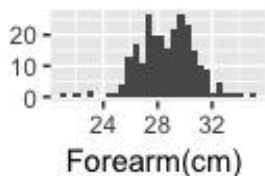
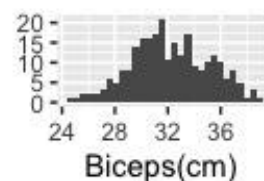
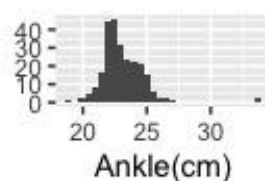
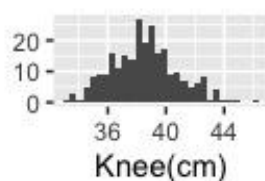
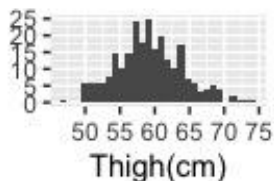
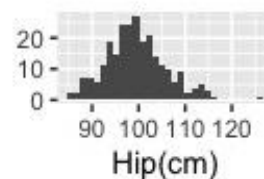
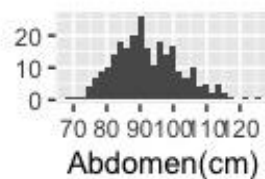
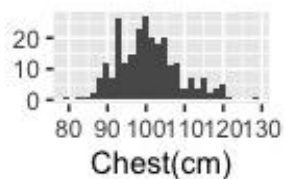
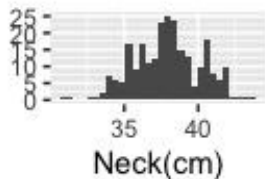
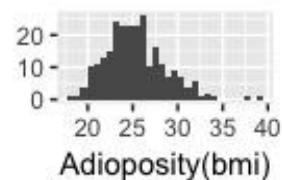
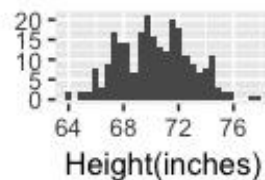
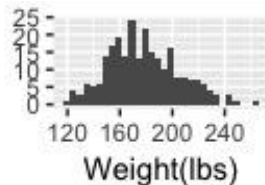
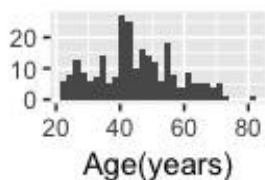
Data Processing



	BODYFAT	AGE	WEIGHT	HEIGHT	ADIPOSIITY	NECK	CHEST	ABDOMEN	HIP	THIGH	KNEE	ANKLE	BICEPS	FOREARM	WRIST
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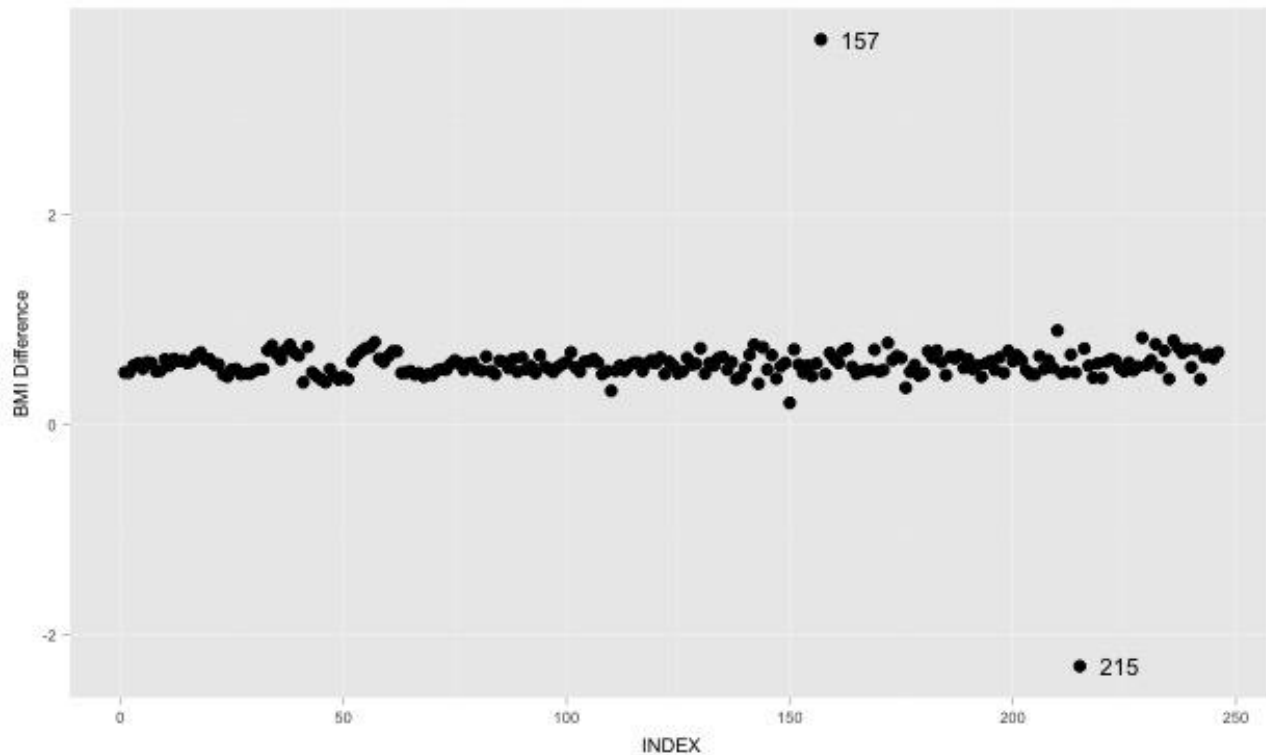
	221	12.7	54	153.25	70.5	24.5	38.5	99	91.8	96.2	57.7	38.1	23.9	31.4	29.9	18.9
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Data Processing



Data Processing

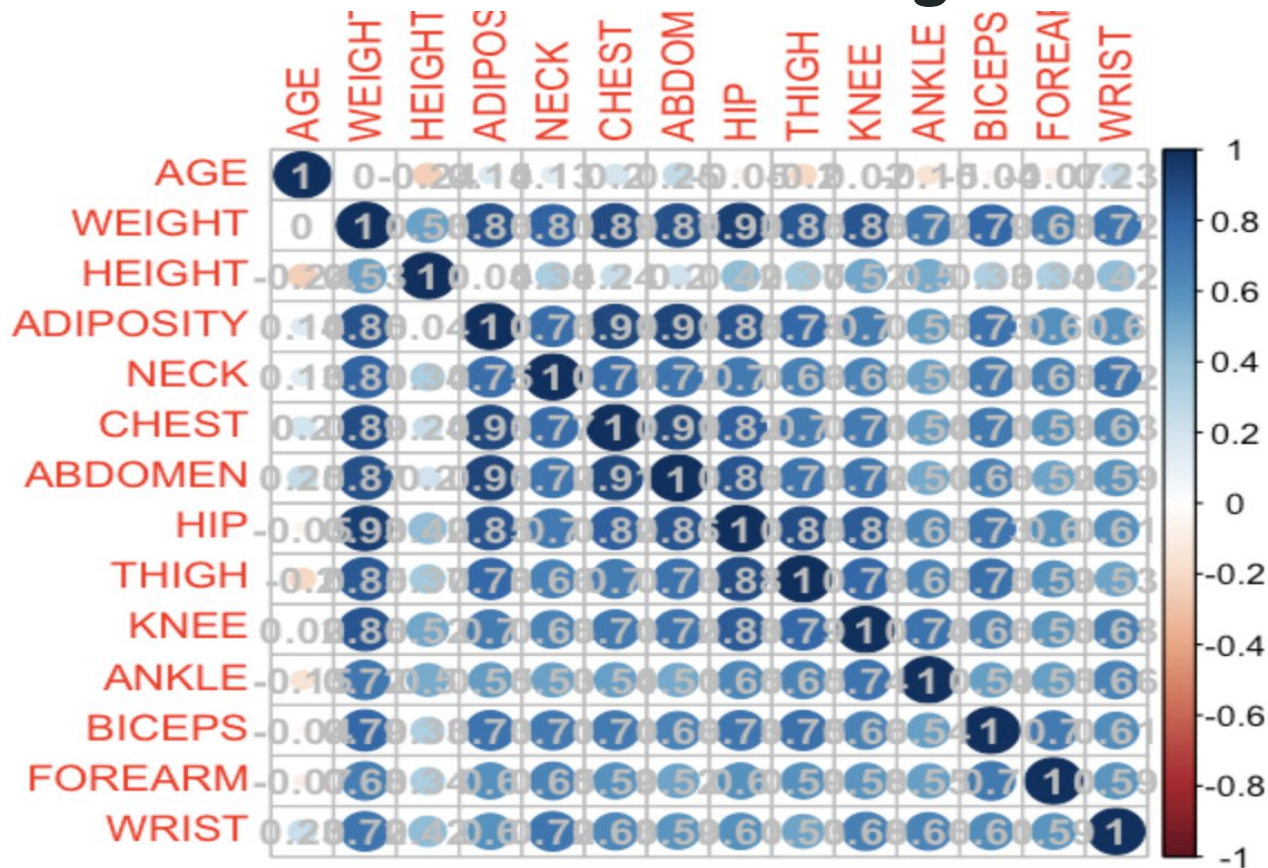
check the consistency between weight, height and BMI



Variable Selection and Model Building

		group	d1	d2	d3	d4	d5
		observations	49	49	49	49	48
method	nvariable	RMSE	R-Squared		RAE		
Backward	4	3.966	0.747		3.297		
Forward	2	4.018	0.738		3.290		
Stepwise	3	4.101	0.713		3.376		

Variable Selection and Model Building



Variable Selection and Model Building

Model	AGE	WEIGHT	HEIGHT	NECK	CHEST	ABDOMEN	HIP	THIGH	KNEE	ANKLE	BICEPS	FOREARM	WRIST
Backward	O	X	O	O	O	X	O	O	O	O	O	X	X
Forward	O	X	O	O	O	X	O	O	O	O	O	O	O
Stepwise	O	X	O	O	O	X	O	O	O	O	O	O	X

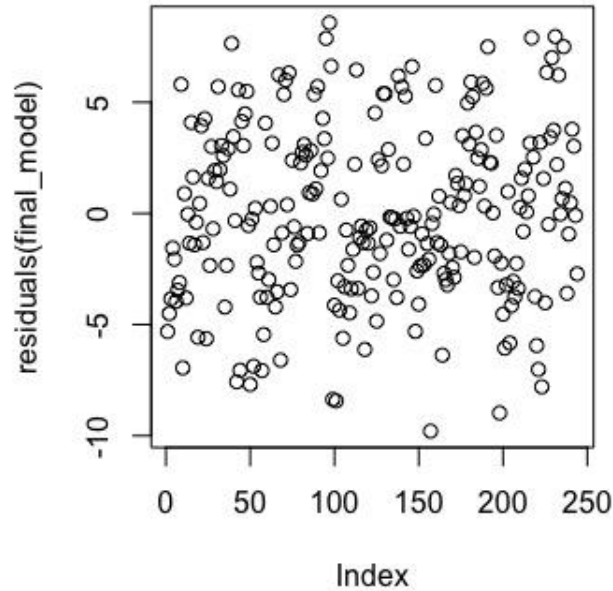
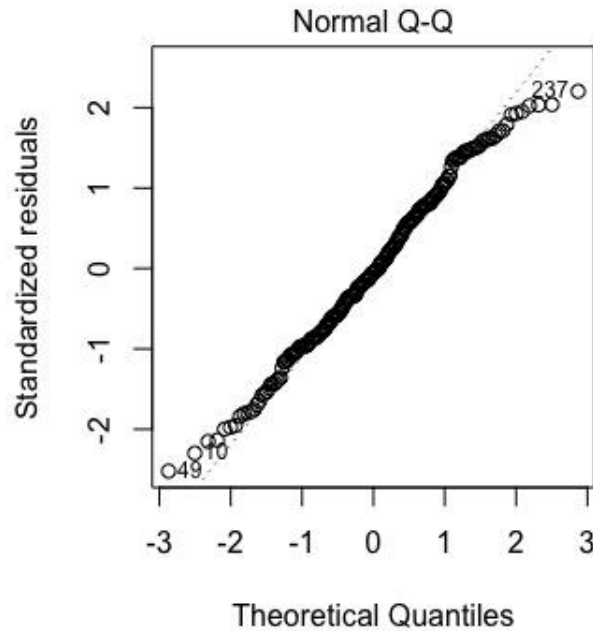
Method	MSE
Backward	15.805
Forward	16.413
Stepwise	15.980

Variable Selection and Model Building

Final Model:

$$\text{BODYFAT} = -33.43743 - 0.11405 * \text{WEIGHT} + 0.92060 * \text{ABDOMEN} - 1.20069 * \text{WRIST} + 0.33291 * \text{FOREARM}$$

Model Diagnostic



Variable	Vif
WEIGHT	7.008
ABDOMEN	4.376
WRIST	2.181
FOREARM	2.004