Calculating Variance of Discrete Frequency Distribution

Data Science and A.I. Lecture Series

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PostNetwork Academy

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x_i	f_i				
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14.5	5				
24.5	12				
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Assumed Mean=34.5 and h=10

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14.5	5	-2	4	-10	20
24.5	12	-1	1	-12	12
34.5	22	0	0	0	0
44.5	17	1	1	17	17
54.5	9	2	4	18	36
64.5	4	3	9	12	36
	N=70			$\sum_{i=1}^{n} f_i u_i = 22$	$\sum_{i=1}^{n} f_i u_i^2 = 130$

Assumed Mean=34.5 and h=10

Calculate variance using formula $Var(X) = h^2(\frac{1}{N}\sum_{i=1}^{n} f_i u_i^2) - (\frac{1}{N}\sum_{i=1}^{n} f_i u_i)^2$ where $u_i = \frac{x_i - AssumedMean}{h}$

x_i	f_i	$u_i = \frac{x_i - 34.5}{h}$	u_i^2	$f_i u_i$	$f_i u_i^2$
4.5	1	-3	9	-3	9
14.5	5	-2	4	-10	20
24.5	12	-1	1	-12	12
34.5	22	0	0	0	0
44.5	17	1	1	17	17
54.5	9	2	4	18	36
64.5	4	3	9	12	36
	N=70			$\sum_{i=1}^{n} f_i u_i = 22$	$\sum_{i=1}^{n} f_i u_i^2 = 130$

Assumed Mean=34.5 and h=10

$Var(X) = h^2(\frac{1}{N}\sum_{i=1}^{n} f_i u_i^2) - (\frac{1}{N}\sum_{i=1}^{n} f_i u_i)^2$

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x_i	f_i	$u_i = \frac{x_i - 34.5}{h}$	u_i^2	$f_i u_i$	$f_i u_i^2$
4.5	1	-3	9	-3	9
14.5	5	-2	4	-10	20
24.5	12	-1	1	-12	12
34.5	22	0	0	0	0
44.5	17	1	1	17	17
54.5	9	2	4	18	36
64.5	4	3	9	12	36
	N=70			$\sum_{i=1}^{n} f_i u_i = 22$	$\sum_{i=1}^{n} f_i u_i^2 = 130$

Assumed Mean=34.5 and h=10

$Var(X) = h^2(\frac{1}{N}\sum_{i=1}^{n} f_i u_i^2) - (\frac{1}{N}\sum_{i=1}^{n} f_i u_i)^2$

$= 100[\frac{130}{70} - (\frac{22}{70})^2] = 175.82$