

Calculating Variance of Continuous Frequency Distribution

Data Science and A.I. Lecture Series

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Class Interval	f_i					
0-1000	18					
1000-2000	26					
2000-3000	30					
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	$N = \sum f_i = 100$					

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Class Interval	f_i	MidValues(x_i)	$u_i = \frac{x_i - A}{h}$	$f_i u_i$	u_i^2	$f_i u_i^2$
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	$N = \sum f_i = 100$			$\sum f_i u_i = -18$		$\sum f_i u_i^2 = 186$

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0-1000	18	500	-2	-36	4	72
1000-2000	26	1500	-1	-26	1	26
2000-3000	30	2500	0	0	0	0
3000-4000	12	3500	1	12	1	12
4000-5000	10	4500	2	20	4	40
5000-6000	4	5500	3	12	9	36
	$N = \sum f_i = 100$			$\sum f_i u_i = -18$		$\sum f_i u_i^2 = 186$

Here

$A=2500$ and $h=1000$

Here $\sum f_i u_i = -18$ and $\sum f_i u_i^2 = 186$

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

Find the variance of continuous frequency distribution.

Class Interval	f_i	MidValues(x_i)	$u_i = \frac{x_i - A}{h}$	$f_i u_i$	u_i^2	$f_i u_i^2$
0-1000	18	500	-2	-36	4	72
1000-2000	26	1500	-1	-26	1	26
2000-3000	30	2500	0	0	0	0
3000-4000	12	3500	1	12	1	12
4000-5000	10	4500	2	20	4	40
5000-6000	4	5500	3	12	9	36
	$N = \sum f_i = 100$			$\sum f_i u_i = -18$		$\sum f_i u_i^2 = 186$

Here

$A=2500$ and $h=1000$

Here $\sum f_i u_i = -18$ and $\sum f_i u_i^2 = 186$

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

Plugin all values we will have $Var(X) = (1000)^2 \left[\frac{186}{100} - \left(\frac{-18}{100} \right)^2 \right] = 1827600$