Analyzing the Dynamics of Salary: A Multifaceted Approach

Computer and Technology Group 1

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Hypothesis 1: Experience Level and Salary

We wanted to see if there significant difference in salaries across the 4 different experience levels we had from our dataset (Entry-Level, Mid-Level, Senior, Executive)

H0: There is no significant difference in salaries (USD) across different experience levels
H1: There is a significant difference in salaries (USD) across different experience levels

Hypothesis 1: Experience Level and Salary (Cont.)

Entry-Level	Mid-Level	Senior	Executive
95000	95012	186000	210000
75000	224400	81800	168000
72000	138700	212000	219650
64000	43064	93300	136000
100000	36912	130000	170000
75000	140000	100000	145000
49216	120000	224400	250000
36912	204500	138700	210000
105000	142200	300000	212000
133000	155000	234000	190000
58300	110000	266500	220000
43187	222200	152000	120000
31310	136000	273400	185000
92280	185000	182200	125000
67672	79600	167500	212000
92280	133000	106500	190000
67672	58400	185900	125000
85000	90000	129300	87500
65000	70000	122000	135000
32974	170884	94500	100000
32974	113923	247300	230000
133000	184000	139700	180000
58400	123000	176000	247500
163800	165000	100000	172200
88200	118800	204500	220000

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	281	25823418	91898.2847	2512662834
Column 2	281	34900004	124199.3025	2596971326
Column 3	281	46016943	163761.363	3279772591
Column 4	281	53239079	189462.9146	4732473682

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.56036E+12	3	5.20121E+11	158.5508031	1.20663E-85	2.612848859
Within Groups	3.67413E+12	1120	3280470108			
Total	5.23449E+12	1123				

With a p-value of 1.21e–85, which is lower than our alpha of 0.05 **we reject our null hypothesis** therefore we know there is a significant difference of salaries across different experience levels.

Hypothesis 2: Company Size and Salary

We wanted to see if there significant difference in salaries across different company sizes (Small, Median, Large)

H0: Salaries is the same across different company sizes

H1: Salaries are different across different company sizes.

Hypothesis 2: Company Size and Salary (Cont.)

Small	Medium	Large
36912	186000	95012
100000	81800	222200
21000	212000	136000
96313	93300	185000
100000	130000	79600
53984	100000	247600
54000	224400	127300
170000	138700	75577
120000	210000	185000
140000	168000	79600
130000	224400	222200
105000	138700	136000
210000	43064	247600
80000	36912	127300
25912	95000	260000
50000	75000	136000
140000	300000	261500
40000	234000	134500
104024	140000	239000

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	159	14412173	90642.59748	3593113114
Column 2	159	24303500	152852.2013	3121491953
Column 3	159	24384172	153359.5723	4882694833

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.13597E+11	2	2.06798E+11	53.49478264	1.12609E-21	3.014745659
Within Groups	1.83237E+12	474	3865766633			
Total	2.24597E+12	476				

With a p-value of 1.12e-21 **we reject the null hypothesis,** meaning there is a significant difference in salaries from different size companies.

Hypothesis 3: United States vs Other Countries and Salary

We wanted to see if there is any significant difference in salaries among United States and Other Countries.

HO: There is no significant difference in salaries between employees working in the United States and other countries.

H1: There is a significant difference in salaries between employees working in the United States and other countries.

Hypothesis 3: United States vs Other Countries and Salary

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	1269	2E+08	155184.2	3.62E+09
Column 2	1269	1.2E+08	97497.51	3.85E+09

ANOVA

Source of Varia	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between G	2.11E+12	1	2.11E+12	565.6624	4.8748747666396E-113	3.845128
Within Gro	9.47E+12	2536	3.73E+09			
Total	1.16E+13	2537				

P value is extremely small showing zero significance so **we reject the null hypothesis**. There is significant difference in salaries in the United States vs other countries

Hypothesis 4: Job Category and Salary

We want to determine if there is a significant difference in salary based on job category.

HO: There is no significant difference in salary across different job categories.

H1: There is a significant difference in salary across different job categories.

Hypothesis 4: Job Category and Salary (Cont.)

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Data Enginee	2260	330406703	146197.656	3262261521
Data Archite	259	40404611	156002.359	3252368739
Data Science	3014	493568348	163758.576	4007867059
Machine Lea	1428	255506110	178925.847	4726396791
Data Analysis	1457	158092836	108505.721	1924846713
Leadership a	503	73174438	145476.02	3609265750
BI and Visual	313	42283828	135092.102	2428585987
Data Quality	55	5548371	100879.473	2834288206
Data Manage	61	6291536	103139.934	1937547759
Cloud and Da	5	775000	155000	825000000

ANOVA

Source of Variati	SS	df	MS	F	P-value	F crit
Between Gro	4.6618E+12	9	5.1798E+11	148.146914	9.327E-263	1.88088427
Within Group	3.2674E+13	9345	3496370579			
Total	3.7335E+13	9354				

The p-value is very small, less than the significance level of 0.05 meaning **we reject the null hypothesis (H0)** and conclude that there is a significant difference in salaries across job categories

Hypothesis 5: Employment Type and Salary

We wanted to see whether salary is getting affected in terms of employment type such as full-time, part-time, contract and freelance or not.

H0: There is no significant difference in salary among full-time and part-time, contract and freelance employees.

H1: There is a significant difference in salary among full-time and part-time, contract and freelance employees.

Hypothesis 5: Employment Type & Salary (Cont.)

	Employement Type (Full-time)	Employement Type (Part time)	Employement Type (Contract)	Employement Type (Freelance)
Salary in USD	95012	133000	50000	21000
	186000	58300	44753	36000
	81800	56000	35000	60000
	212000	34320	97712	50000
	93300	18160	118539	50000
	130000	25216	180000	50000
	100000	125404	105000	100000
	224400	19073	83200	45555
	138700	110000	60000	100000
	210000	52533	323905	20000
	168000	100000	30000	60000

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	11	732006	66546	1860497201
Column 2	11	1128109	102555.3636	7339502078
Column 3	11	592555	53868.63636	699212820
Column 4	11	1639212	149019.2727	2850628006

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	60065957582	3	20021985861	6.2814861	0.00135309	2.8387454
Within Groups	1.27498E+11	40	3187460026			
Total	1.87564E+11	43				

Since the p-value (0.00135309) is less than the standard significance level of 0.05, **we can reject the null hypothesis (HO)**. This means there is a statistically significant difference in salaries among the different employment types (part-time, contract, freelance, full-time)

Hypothesis 6: Work Setting and Salary

We wanted to see whether salary is getting affected in terms of work settings such as remote, hybrid and in-person or not.

H0: There is no significant difference in salary among remote, hybrid and in-person employees.

H1: There is a significant difference in salary among remote, hybrid and in-person employees.

Hypothesis 6: Work Setting and Salary (Cont.)

	Work Setting (Remote)	Work Setting (Hybrid)	Work Setting (In Person)
Salary in USD	130000	95012	186000
	100000	75577	81800
	210000	161952	212000
	168000	57223	93300
	223400	21593	224400
	186200	56500	138700
	72000	80976	224400
	64000	18000	138700
	90000	42107	43064
	70000	44753	36912
	170884	29691	95000
	113923	107968	75000
	165000	80000	300000
	118800	64781	234000
	225000	90000	140000
	150000	134960	120000
	220000	131721	204500
	150000	77737	142200
	160000	185000	155000
	140000	164000	110000
	185900	113366	266500

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	191	27384600	143374.869	3.357E+09
Column 2	191	16982247	88912.288	3.903E+09
Column 3	191	28491323	149169.23	3.608E+09

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.2215E+11	2	2.1108E+11	58.266581	9.458E-24	3.0115322
Within Groups	2.0649E+12	570	3622583916			
Total	2.487E+12	572				

Since the p-value (9.458E-24) is less than the standard significance level of 0.05, **we reject the null hypothesis (HO).** This means there is a statistically significant difference in salaries among the work settings of remote, hybrid, and in-person.

Conclusion

- Significant difference in salaries…
  - across different experience levels
  - from different size companies
  - in the United States vs. other countries
  - across job categories
  - among the different employment types
  - among the work settings