

Fallout: Shelter



Fallout: Shelter

- ▶ Postapocalyptic mobile game
- ▶ You control a shelter full of dwellers
- ▶ One thing dwellers can do is scout
- ▶ Scouts retrieve bottlecaps and items
- ▶ Scouts face deadly challenges

Seven stats determine success

- ▶ Strength
- ▶ Perception
- ▶ Endurance
- ▶ Charisma
- ▶ Intelligence
- ▶ Agility
- ▶ Luck

Retrieval: Intro

- ▶ We wanted to know what determined how fast a scout found items and bottlecaps
- ▶ We performed a linear analysis and looked at the p-values
- ▶ The goal is to figure out if some dwellers are better scouts than others

Retrieval: Items

Table: Number of items per hour

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.290960	0.771921	1.672	0.0959
level	-0.021353	0.017178	-1.243	0.2152
dmg	-0.060882	0.057463	-1.059	0.2906
s	-0.003986	0.055532	-0.072	0.9428
p	-0.079242	0.095350	-0.831	0.4069
e	0.031539	0.070731	0.446	0.6561
c	-0.057148	0.091382	-0.625	0.5324
i	0.324587	0.335993	0.966	0.3351
a	0.214665	0.133610	1.607	0.1096
l	0.042945	0.073570	0.584	0.5600

Retrieval: Bottlecaps

Table: Average number of caps per hour

	Estimate	t value	Pr(> t)	
(Intercept)	83.81787937	11.63356	<2e-162	***
s	-0.21649106	-0.43309	0.665802	
p	0.61211724	0.91113	0.364235	
e	-0.88781188	-1.67151	0.097489	.
c	-0.18453188	-0.31035	0.756888	
i	0.19836365	0.35132	0.726024	
a	-0.04815488	-0.08799	0.930043	
l	13.48815469	26.55579	<2e-16	***
start.level	-0.68088744	-4.25171	0.00004495	***
start.damage	-1.56703535	-1.97083	0.051278	.
level.increase	-3.44085855	-1.97599	0.050683	.
death.damage	0.30906873	0.88693	0.377067	

Retrieval: Conclusions

- ▶ Difficult to determine what affects items found. Two p-values stand out, but are still bad.
 - ▶ Intercept has p-value 0.96
 - ▶ Agility has p-value 1.1
- ▶ Caps found clearly determined by Luck (infinitesimal p-value). There's also a base value (intercept). There is also a small but clear negative correlation with level, hard to tell why this is.

Survival: Intro

- ▶ Scouts face a variety of threats.
- ▶ Threats can deal damage both as lost hit points and radiation, too much of either results in death.
- ▶ Death is nonpermanent but expensive.
- ▶ By calculating the expected time of death for a scout we can choose how long we dare to let our scouts roam.

Survival: P-values

Table: Survival time

	t value	Pr(> t)	
(Intercept)	-1.7983755246	0.074911	.
s	2.4166724012	0.017339	*
p	0.9644124169	0.336994	
e	7.6484812878	9e-11	***
c	0.6092526555	0.543637	
i	1.9626433352	0.052260	.
a	1.0647793211	0.289351	
l	-5.9440869849	3e-7	***
start.level	12.3797838804	<2e-16	***
start.damage	4.1308435539	7e-4	***
level.increase	6.4636998849	3e-8	***
caps	6.2586709017	8e-8	***
death.damage	0.7153117136	0.475960	

Survival: Models

- ▶ The best p-values among the controllable variables belong to endurance, luck, level, and starting damage.
- ▶ Selected models
 - ▶ Linear model over all four
 - ▶ Polynomial models over one of the above
 - ▶ Random forest

Survival: Performance

Survival: Conclusions

Questions

- ▶ Questions?