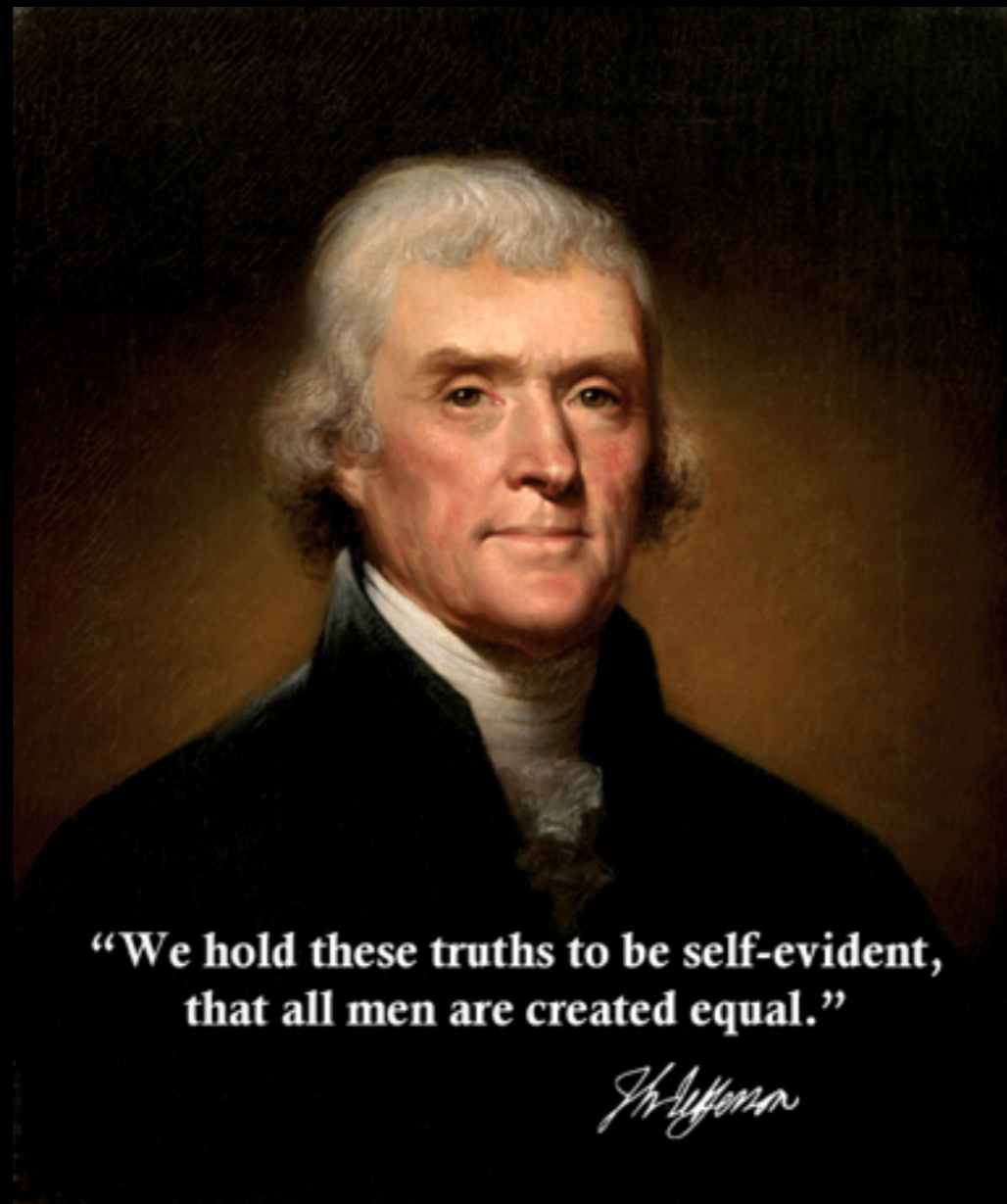


你的客户，价值几何？

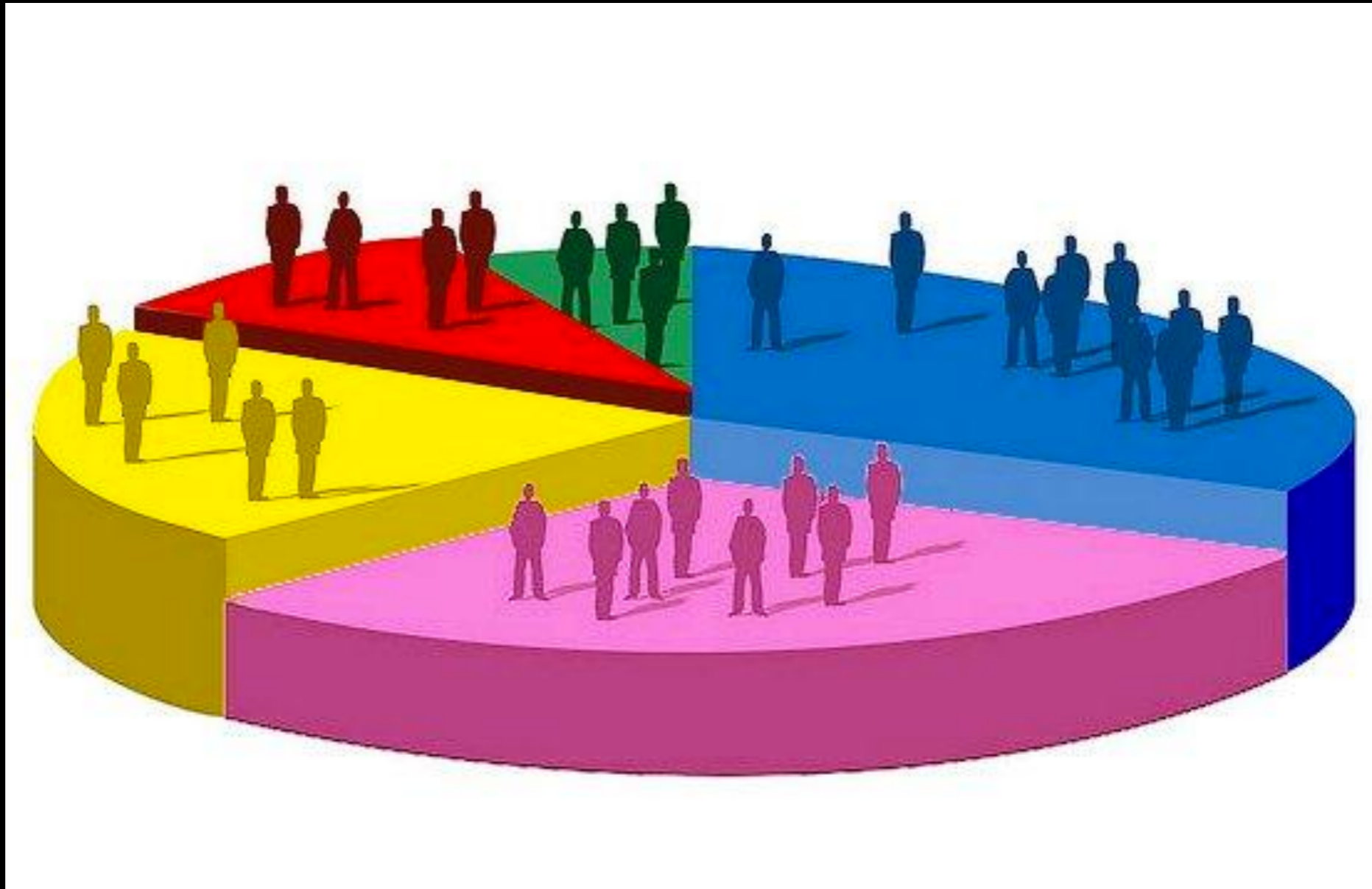
How Much Are Your Customers Worth?

猎聘 单艺

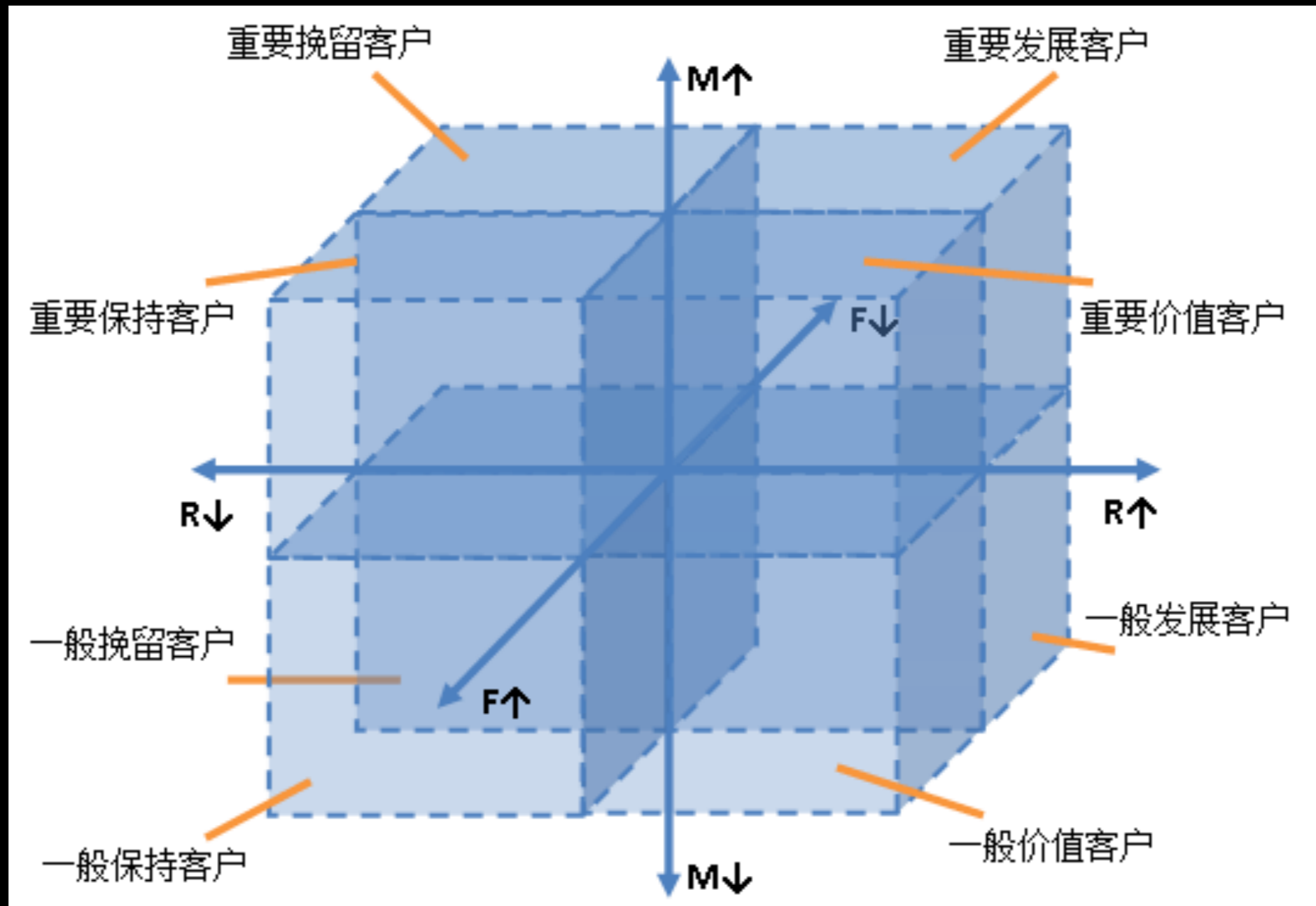
“All Men Are Created Equal”



Not All Customers Are Created Equal



RFM分析



Customer Lifetime Value

- 衡量一个客户（用户）在一段时期内对企业有多大价值
- 举个🍎：客户X在**未来两年里**会在店里花2000元
- 预测性
- 简称CLV或者LTV

CLV的用途

- 客户获取计划
- 推广效果评估和优化
- 客户留存策略
- 定价
- 促销
- 客户细分

在美国，不到5%的电商计算过CLV!

为什么没人用?

$$1 \quad CLV = \sum_{t=0}^T \frac{(p_t - c_t)r_t}{(1+i)^t} - AC$$

$$2 \quad CLV = \sum_{t=0}^{\infty} \frac{(p - c)r^t}{(1+i)^t} = m \frac{r}{(1+i-r)}$$

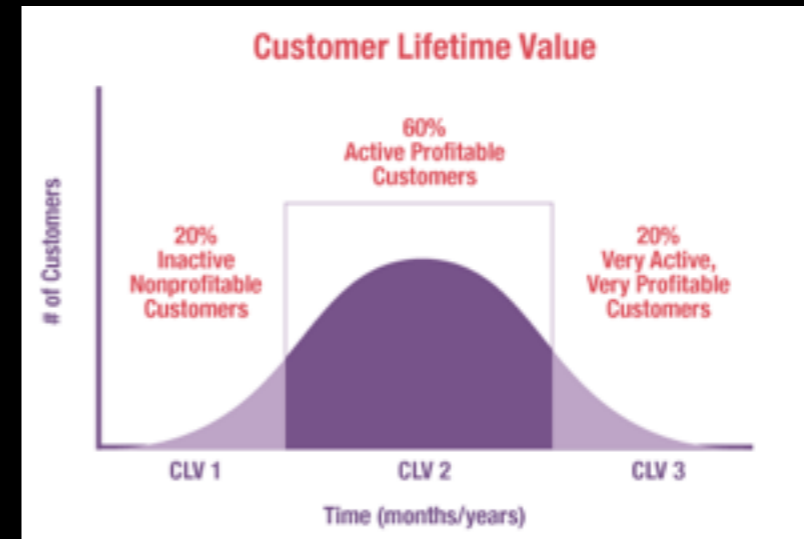
$$CLV(\delta|r, \alpha, s, \beta, p, q, \gamma, x, t_x, T)$$

$$3 \quad = \frac{\alpha^r \beta^s \delta^{s-1} \Gamma(r+x-1) \Psi(s, s; \delta(\beta+T))}{\Gamma(r)(\alpha+T)^{r+x+1} L(r, \alpha, s, \beta|x, t_x, T)} \\ \times \frac{(\gamma + m_x x)p}{px + q - 1}$$

* Source: Modeling Customer Lifetime Value. Journal of Service Research, Volume 9, No. 2, November 2006 139-155

$$CLV = GC \cdot \sum_{i=0}^n \frac{r^i}{(1+d)^i} - M \cdot \sum_{i=1}^n \frac{r^{i-1}}{(1+d)^{i-0.5}}$$

$$CLV = \sum_{n=1}^N \frac{(CR_n - C_n) \times R^n}{(1+d)^n} - AC$$



有比没有强！

- 没有考虑CLV的恶果：
 - 无理性的烧钱
 - 流失有价值的客户
 - ...
- 简单的估算比没有强百倍

普通青年的做法

$$CLV = AOV * APY * Margin$$

AOV: Average Order Value

APY: Average Purchase per Year

文艺青年的做法

$$CLV = ARPA \cdot \sum_{t=0}^{n-1} (1 - c)^t$$

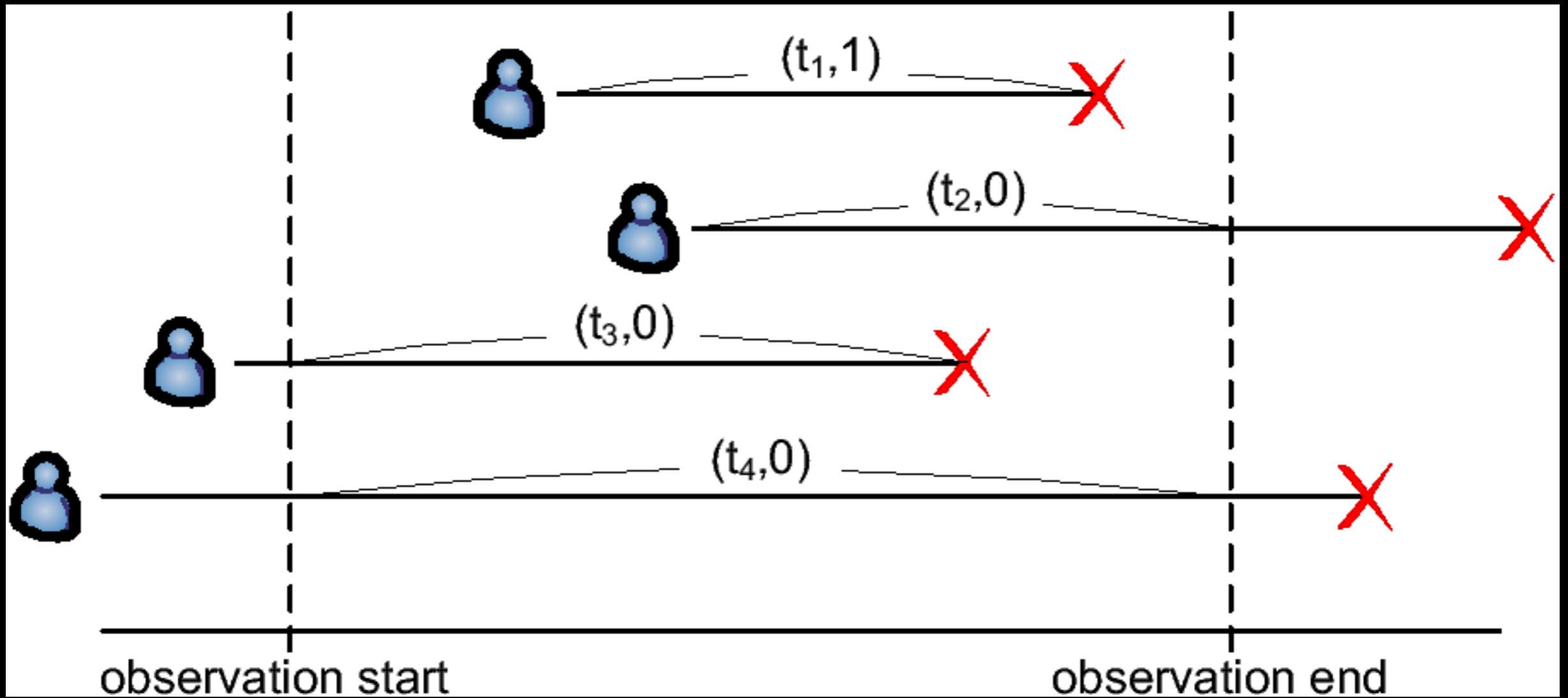
ARPA: Average Revenue Per Account
c: churn rate

科学青年的做法

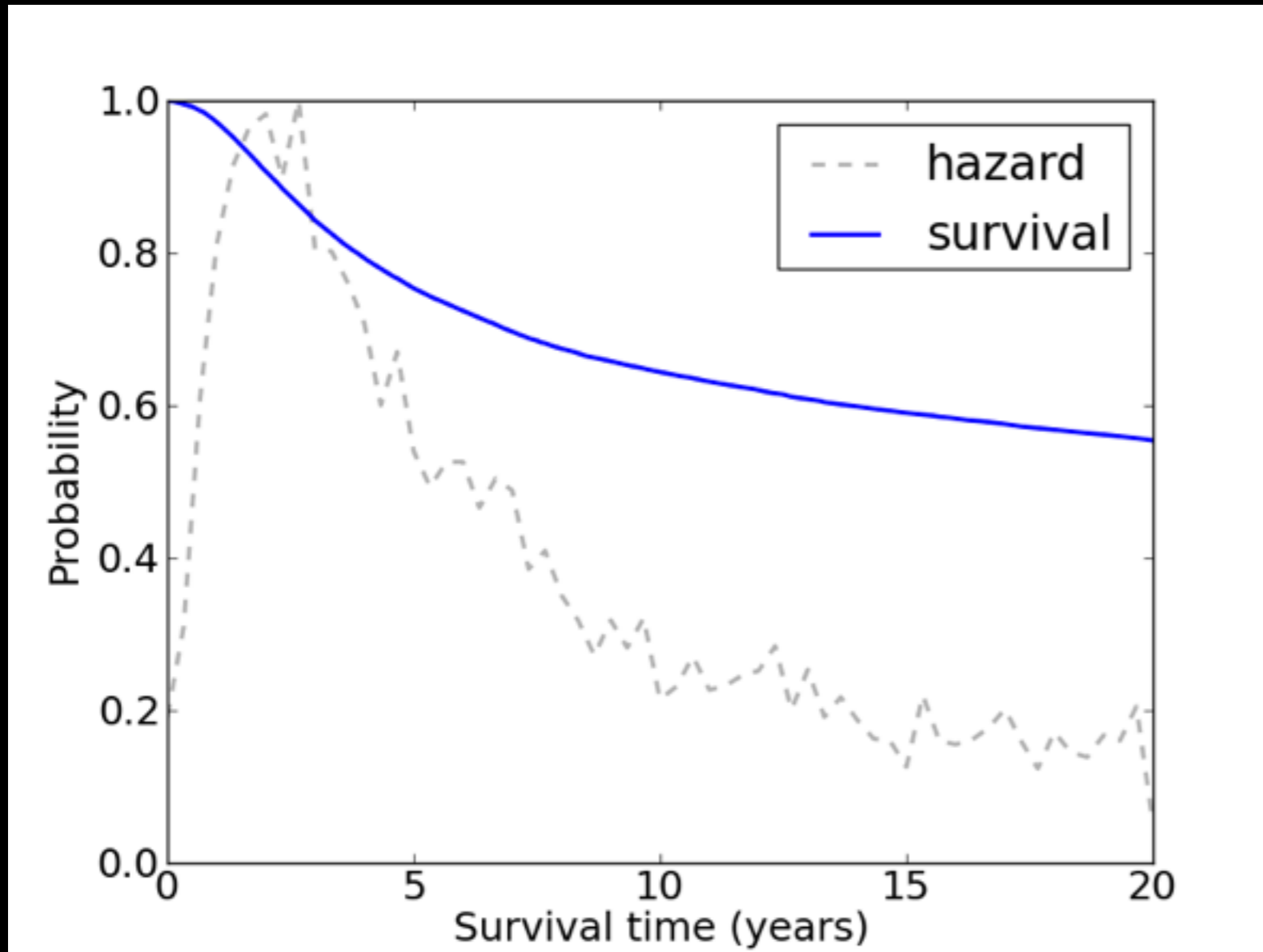
$$CLV = \sum_{t=0}^{n-1} \frac{V(t)S(t)}{(1+r)^t}$$

$$CLV = \int_0^n \frac{V(t)S(t)}{(1+r)^t} dt$$

生存分析



Survival/Hazard Functions



$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t < T < t + \Delta t | T \geq t)}{\Delta t}$$

$$h(t) = -\frac{S'(t)}{S(t)}$$

一个🍎：电影租赁

```
In [16]: data
```

```
Out[16]:
```

	female	age	coupon	churn	followtime
0	0	64	0	1	158
1	0	22	0	0	25
2	0	37	0	0	150
3	0	55	0	0	311
4	0	71	0	0	149
5	0	38	0	0	92
6	0	44	0	0	260
7	0	59	0	1	203
8	0	26	1	1	14
9	1	27	0	0	258
10	1	61	0	0	18
11	0	49	0	1	255

Cox Regression Analysis

```
In [17]: cf.fit(data, 'followtime', 'churn')
```

```
Out[17]: <lifelines.CoxPHFitter: fitted with 5124 observations, 4381 censored>
```

```
In [18]: cf.print_summary()
```

```
n=5124, number of events=743
```

	coef	exp(coef)	se(coef)		z	p	lower 0.95	upper 0.95	
female	-1.519e-02	9.849e-01	3.687e-02	-4.119e-01	6.804e-01	-8.746e-02	5.709e-02		
age	-1.171e-01	8.895e-01	3.670e-02	-3.190e+00	1.424e-03	-1.890e-01	-4.513e-02	**	
coupon	2.316e-01	1.261e+00	3.199e-02	7.239e+00	4.516e-13	1.688e-01	2.943e-01	***	

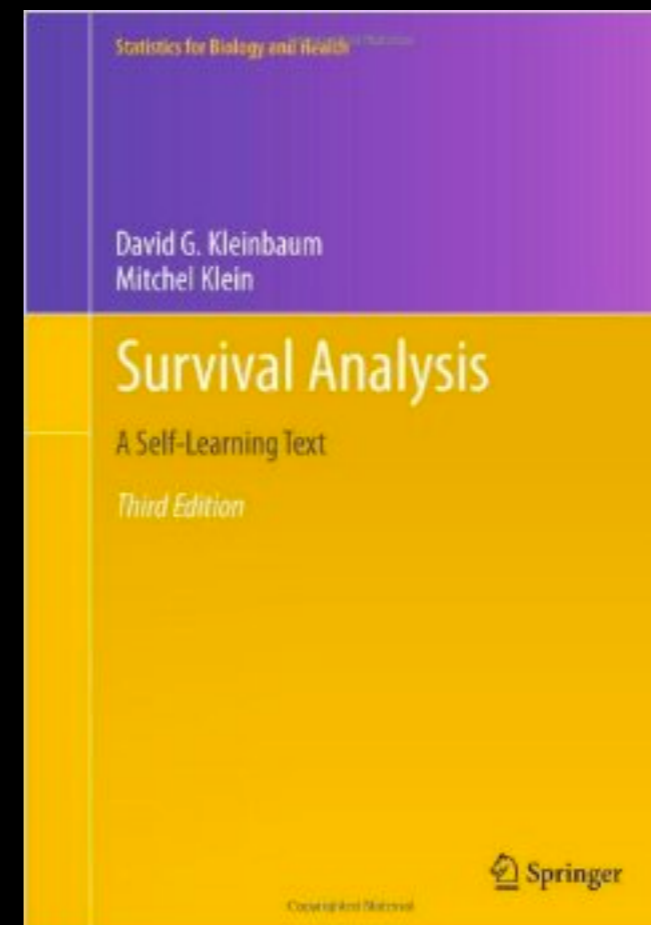
```
---
```

```
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Concordance = 0.599
```


Estimation of Survival Function

- Parametric:
 - MLE with assumed distributions of survival time
- Non-Parametric:
 - Kaplan-Meier
 - Nelson-Aalen
- Semi-Parametric:
 - Cox Model
 - Aalen Model
- Python Package: lifelines, lifetimes



从业务出发

- $V(t)$ 要基于业务设计：
 - 基于客户花费
 - 基于用户贡献
- 简单的经验规则也可能很有效

谈客户 / 用户时，如果不谈CLV，就是...

GrowingIO

Thank you



扫描二维码，加入微信讨论群



扫描二维码，关注GrowingIO