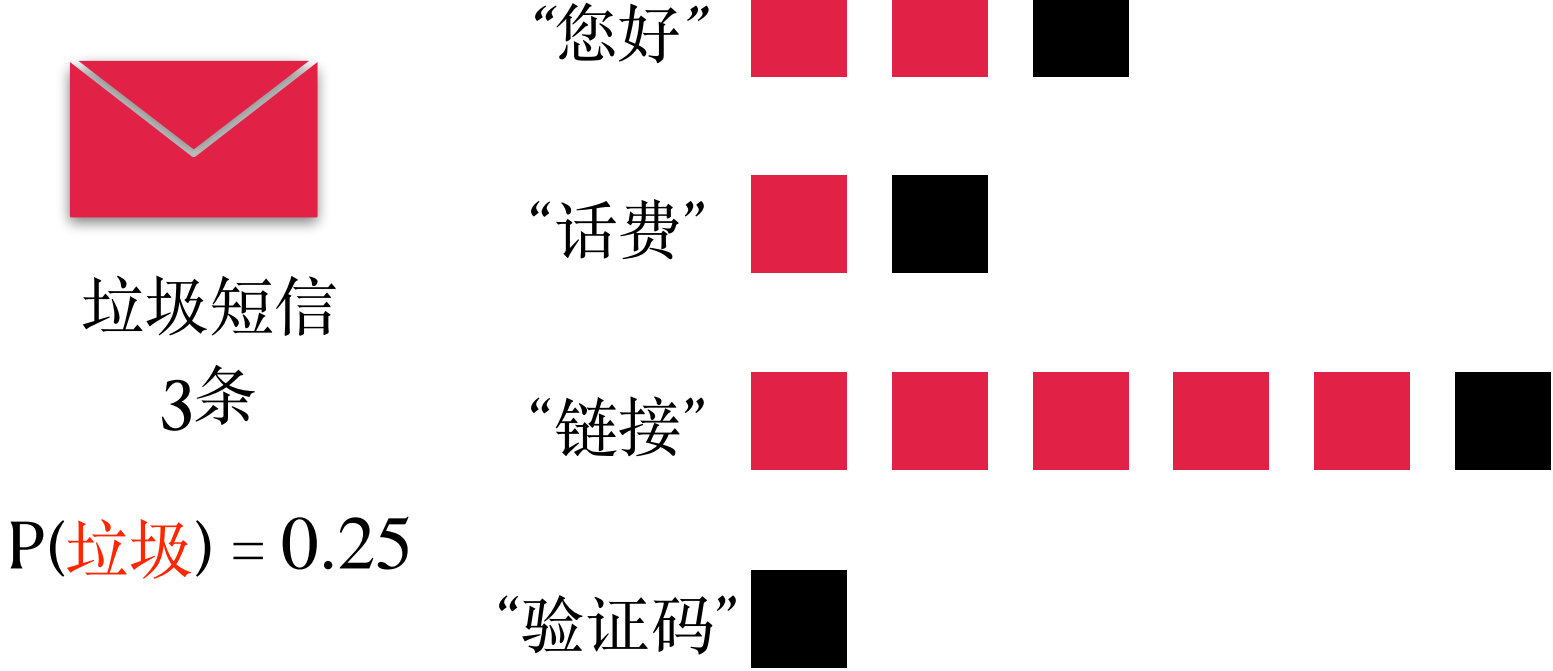
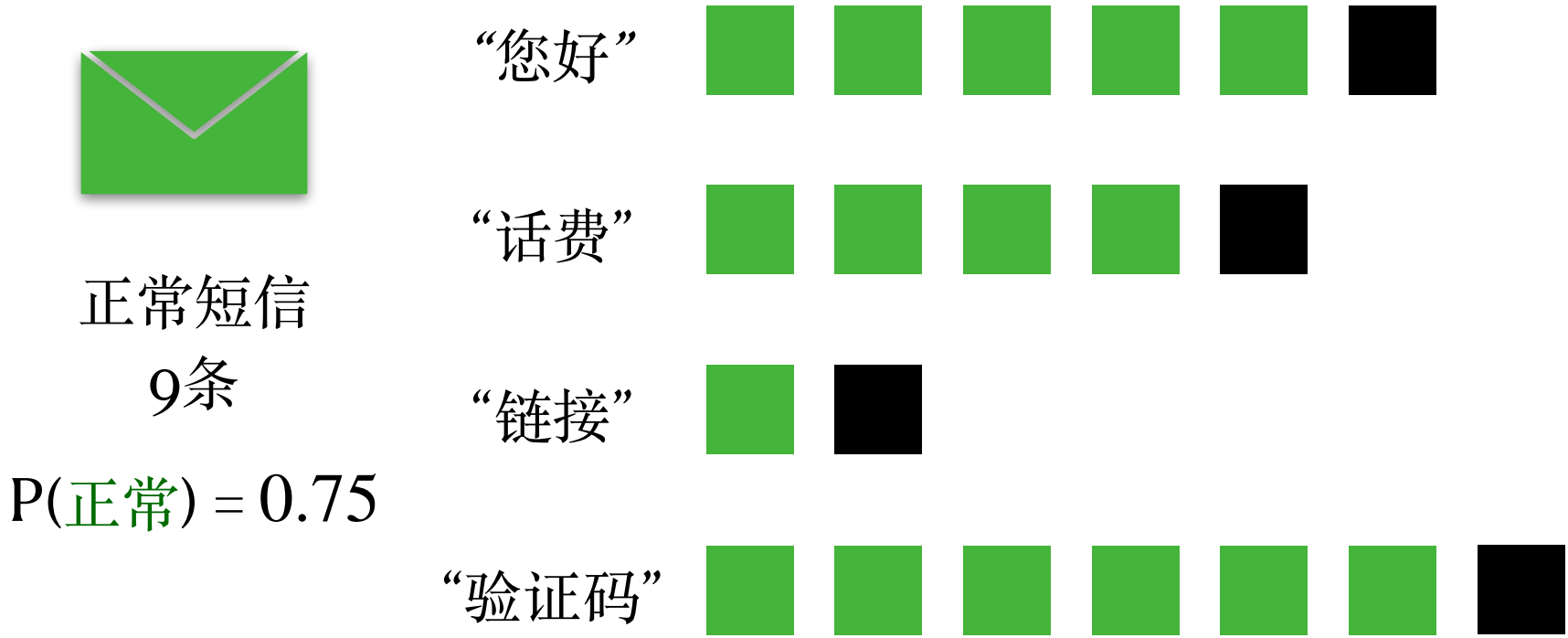


# 4. 总结

筛选 .....

学习 .....

应用 .....



$$\begin{aligned} P(\text{“您好”}|\text{正常}) &= \frac{5+1}{16+4} = \frac{6}{20} \\ P(\text{“话费”}|\text{正常}) &= \frac{4+1}{16+4} = \frac{5}{20} \\ P(\text{“链接”}|\text{正常}) &= \frac{1+1}{16+4} = \frac{2}{20} \\ P(\text{“验证码”}|\text{正常}) &= \frac{6+1}{16+4} = \frac{7}{20} \end{aligned}$$

$$\begin{aligned} P(\text{“您好”}|\text{垃圾}) &= \frac{2+1}{8+4} = \frac{3}{12} \\ P(\text{“话费”}|\text{垃圾}) &= \frac{1+1}{8+4} = \frac{2}{12} \\ P(\text{“链接”}|\text{垃圾}) &= \frac{5+1}{8+4} = \frac{6}{12} \\ P(\text{“验证码”}|\text{垃圾}) &= \frac{0+1}{8+4} = \frac{1}{12} \end{aligned}$$

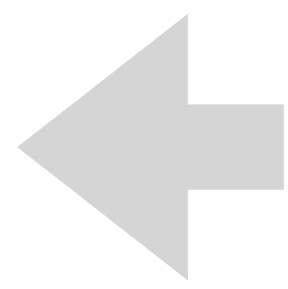
“验证码 链接 链接 链接”

$P(\text{正常}) \times P(\text{“验证码”}|\text{正常}) \times P(\text{“链接”}|\text{正常})^3 = 0.75 \times \frac{7}{20} \times (\frac{2}{20})^3 = 0.0002625$  “验证码 链接 链接 链接” 为正常短信的概率

$P(\text{垃圾}) \times P(\text{“验证码”}|\text{垃圾}) \times P(\text{“链接”}|\text{垃圾})^3 = 0.25 \times \frac{1}{12} \times (\frac{6}{12})^3 = 0.0026$  “验证码 链接 链接 链接” 为垃圾短信的概率

0.0026 > 0.0002625, 垃圾短信。

Made by Mike\_Zhang  
<https://ultrafish.cn>



### 3. 计算机-学习优化:

正常短信  
9条



$P(\text{正常}) = 0.75$

$$P(\text{“您好”}|\text{正常}) = \frac{5 + 1}{16 + 4} = \frac{6}{20}$$
$$P(\text{“话费”}|\text{正常}) = \frac{4 + 1}{16 + 4} = \frac{5}{20}$$
$$P(\text{“链接”}|\text{正常}) = \frac{1 + 1}{16 + 4} = \frac{2}{20}$$
$$P(\text{“验证码”}|\text{正常}) = \frac{6 + 1}{16 + 4} = \frac{7}{20}$$

此时，我们手机又收到一条短信：  
“验证码 链接 链接 链接”



$$P(\text{正常}) \times P(\text{“验证码”}|\text{正常}) \times P(\text{“链接”}|\text{正常})^3 = 0.75 \times \frac{7}{20} \times \left(\frac{2}{20}\right)^3 = 0.0002625$$

“验证码 链接 链接 链接”为正常短信的概率

再把优化后的学习结果应用到此短信上，

$0.0026 > 0.0002625$

计算机得出此短信为一条垃圾短信，符合实际。

垃圾短信  
3条



$P(\text{垃圾}) = 0.25$

$$P(\text{“您好”}|\text{垃圾}) = \frac{2 + 1}{8 + 4} = \frac{3}{12}$$
$$P(\text{“话费”}|\text{垃圾}) = \frac{1 + 1}{8 + 4} = \frac{2}{12}$$
$$P(\text{“链接”}|\text{垃圾}) = \frac{5 + 1}{8 + 4} = \frac{6}{12}$$
$$P(\text{“验证码”}|\text{垃圾}) = \frac{0 + 1}{8 + 4} = \frac{1}{12}$$

$$P(\text{垃圾}) \times P(\text{“验证码”}|\text{垃圾}) \times P(\text{“链接”}|\text{垃圾})^3 = 0.25 \times \frac{1}{12} \times \left(\frac{6}{12}\right)^3 = 0.0026$$

“验证码 链接 链接 链接”为垃圾短信的概率

