**蚂蚁金服可解释风控模型**

对于如下违约数据集合，标签为1代表违约，0代表不违约。数据集如下：



**传统方法**：我们使用lightgbm训练出决策树对违约标签进行判定。得到的只有0/1标签

Diagram

Description automatically generated

**改进方法**：对lightgbm安装包进行了大规模修改，可以提取规则和阈值

实际上可以从决策树中提取出优质的规则集合

规则集合效果如下：

规则1：当case when (review\_increase <= 1.5 or review\_increase is null) and (sales\_5 <= 8.5 or sales\_5 is null) and (sales\_9 <= 7.5 or sales\_9 is null) and (sales\_2 <= 13.5 or sales\_2 is null)

解释：本条规则覆盖了13376个正样本，4177个负样本，可见满足本条规则的样本违约占比达到76%。因此是一条优质规则，该规则覆盖的数据大概率违约。

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| --- | --- | --- |
| rule\_info | rule\_link | rule |
| [{0: 2803, 1: 12620, 'recall': 0.2097321013095792, 'precision': 0.8182584451792777, 'accuracy': 0.1817415548207223, 'pred': 0, 'score': 0.8182584451792777, 'pos\_count': 12620.0, 'neg\_count': 2803.0, 'F': 0.33388451613922515}] | 0->1->4->6->9 | case when (review\_increase <= 1.5 or review\_increase is null) and (sales\_5 <= 8.5 or sales\_5 is null) and (sales\_9 <= 7.5 or sales\_9 is null) and (sales\_2 <= 13.5 or sales\_2 is null) then 0.818258 |
| [{0: 2689, 1: 4453, 'recall': 0.07400452037492522, 'precision': 0.6234948193783254, 'accuracy': 0.3765051806216746, 'pred': 0, 'score': 0.6234948193783254, 'pos\_count': 4453.0, 'neg\_count': 2689.0, 'F': 0.132305315368618}] | 0->2->3->7->8->10 | case when review\_increase > 1.5 and (sales\_3 <= 10.5 or sales\_3 is null) and (sales\_9 <= 6.5 or sales\_9 is null) and (sales\_1 <= 8.5 or sales\_1 is null) and (sales\_6 <= 9.5 or sales\_6 is null) then 0.623495 |
| [{0: 2522, 1: 1423, 'recall': 0.023648873230073787, 'precision': 0.3607097591888466, 'accuracy': 0.3607097591888466, 'pred': 1, 'score': 0.3607097591888466, 'pos\_count': 1423.0, 'neg\_count': 2522.0, 'F': 0.044387603900050615}] | 0->1->4->14 | case when (review\_increase <= 1.5 or review\_increase is null) and (sales\_5 <= 8.5 or sales\_5 is null) and sales\_9 > 7.5 then 0.36071 |
| [{0: 1374, 1: 756, 'recall': 0.012563983248022336, 'precision': 0.35492957746478876, 'accuracy': 0.35492957746478876, 'pred': 1, 'score': 0.35492957746478876, 'pos\_count': 756.0, 'neg\_count': 1374.0, 'F': 0.02426888381735039}] | 0->1->4->6->16 | case when (review\_increase <= 1.5 or review\_increase is null) and (sales\_5 <= 8.5 or sales\_5 is null) and (sales\_9 <= 7.5 or sales\_9 is null) and sales\_2 > 13.5 then 0.35493 |
| [{0: 5257, 1: 1864, 'recall': 0.030977863458086816, 'precision': 0.2617609886251931, 'accuracy': 0.2617609886251931, 'pred': 1, 'score': 0.2617609886251931, 'pos\_count': 1864.0, 'neg\_count': 5257.0, 'F': 0.05539952147662476}] | 0->1->11 | case when (review\_increase <= 1.5 or review\_increase is null) and sales\_5 > 8.5 then 0.261761 |
| [{0: 2168, 1: 722, 'recall': 0.011998936382370538, 'precision': 0.24982698961937716, 'accuracy': 0.24982698961937716, 'pred': 1, 'score': 0.24982698961937716, 'pos\_count': 722.0, 'neg\_count': 2168.0, 'F': 0.022898100273516356}] | 0->2->3->7->8->18 | case when review\_increase > 1.5 and (sales\_3 <= 10.5 or sales\_3 is null) and (sales\_9 <= 6.5 or sales\_9 is null) and (sales\_1 <= 8.5 or sales\_1 is null) and sales\_6 > 9.5 then 0.249827 |
| [{0: 5073, 1: 1370, 'recall': 0.022768064880675398, 'precision': 0.21263386621139221, 'accuracy': 0.21263386621139221, 'pred': 1, 'score': 0.21263386621139221, 'pos\_count': 1370.0, 'neg\_count': 5073.0, 'F': 0.0411318771873607}] | 0->2->3->7->17 | case when review\_increase > 1.5 and (sales\_3 <= 10.5 or sales\_3 is null) and (sales\_9 <= 6.5 or sales\_9 is null) and sales\_1 > 8.5 then 0.212634 |
| [{0: 18786, 1: 3698, 'recall': 0.061457156152363225, 'precision': 0.1644725137875823, 'accuracy': 0.1644725137875823, 'pred': 1, 'score': 0.1644725137875823, 'pos\_count': 3698.0, 'neg\_count': 18786.0, 'F': 0.08947928761041442}] | 0->2->3->13 | case when review\_increase > 1.5 and (sales\_3 <= 10.5 or sales\_3 is null) and sales\_9 > 6.5 then 0.164473 |
| [{0: 199591, 1: 32869, 'recall': 0.5462507478561457, 'precision': 0.14139636926783103, 'accuracy': 0.14139636926783103, 'pred': 1, 'score': 0.14139636926783103, 'pos\_count': 32869.0, 'neg\_count': 199591.0, 'F': 0.2246439213429842}] | 0->2->5->12 | case when review\_increase > 1.5 and sales\_3 > 10.5 and (sales\_5 <= 799.5 or sales\_5 is null) then 0.141396 |
| [{0: 31008, 1: 397, 'recall': 0.006597753107757761, 'precision': 0.012641299156185322, 'accuracy': 0.012641299156185322, 'pred': 1, 'score': 0.012641299156185322, 'pos\_count': 397.0, 'neg\_count': 31008.0, 'F': 0.008670299265896214}] | 0->2->5->15 | case when review\_increase > 1.5 and sales\_3 > 10.5 and sales\_5 > 799.5 then 0.012641 |