**CREDIT LIMIT STRATEGY:**

* Credit given to a user has been decided based on the 2 factors:

1. Credibility: Quantified by probability of getting approved.
2. Credit capacity: Quantified by income.

* To know credibility, the probability from the model is considered.
* To know the credit capacity, the actual income is unknown.
* To add income as a feature, <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-people.html> is used to obtain data.
* Income based on Age, Occupation, education, relationship, marital status, work class is available.
* We have considered weighted sum of these incomes to determine the actual income. These weights are considered from the trained model.

….(1)

Where,

w1, w2, w3, w4, w5, w6, w7 : Weights considered from feature importance.

iage: Income based on age.

iocc: Income based on occupation

ied: Income based on education

iwcls: Income based on work class

irel: Income based on relationship status

imsts: Income based on marital status

cap\_gain: Net capital gain

* These incomes are mapped to (0,1)
* Final income score is calculated based on probability and net income.

…. (2)

Where, p is the probability of the data point to get approved

On optimizing,

w1 = 10, w2 = 540, w3 = 200, w4 = 70,w5 = 50, w6 = 110, w7 = 80

w11 = 0.35, w22 = 0.65

* To increase the revenue, we allot $ 8000 to users with final score > 5800 and $ 1000 to users with final score < 3000 and credit = score for others.
* Max train income = 86240260



Fig 1: flowchart for credit determination

Chart, line chart

Description automatically generated

Fig 2: Variation of TP, FP, TN, FN with threshold

Examples:

From equation (1),

Net income =

1. P=0.89 Gender: Male

Occupation: Prof specialty = 72039

Education: Masters : 88280

Net capital gain: -40000

Work class: State govt = 55030

Relationship status: Husband = 55727

Marital status: Married\_civ\_spouse = 57404

Age group: 25-35: 54139

**Net income = 66851340**

**Income score = 0.749**

**Final score = 0.84**

**Credit = 6725 => $8000**

1. P = 0.78 Gender: Female

Occupation: Exec managerial = 60576

Education: Masters : 66601

Net capital gain: : 10000

Work class: Private : 34321

Relationship status: Not in family : 31968

Marital status: Never married : 26420

Age group: 45-55 = 57151

**Net income = 56631820**

**Income score = 0.63**

**Final score = 0.73**

**Credit = 6725 => 5791 => $6000**

1. P = 0.35 Gender: Male

Occupation: Cleaner: = 28163

Education: 9th : 24420

Net capital gain: : 0

Work class: Private = 46956

Relationship status: Own child : 16471

Marital status: Divorced : 42286

Age group: 55 and above = 58576

**Net income = 29439710**

**Income score = 0.34**

**Final score = 0.35**

**Credit = 6725 => 2775 => $1000**

**Results:**

Chart, line chart

Description automatically generated

Fig 3: Variation of business metrics with threshold

**Results based on selected threshold, 0.42**

Revenue: $ 10.22M

Actual loss = $ 2.87M

Pseudo loss = $ 0.93M