ISyE-6501

Homework 12

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We want to determine which shutoffs to do given the capacity constraints. To determine the shutoffs to be done we need to identify people who have not paid their bill and amongst them determine who are those who can’t pay and who can pay but still haven’t. The latter group can be further divided into 2 groups – those who will eventually pay and those who will never pay. The second part is to determine how to do the shutoffs which consists of prioritizing the shutoffs and how the workers should do shutoffs.

We can use various models such that the output of one model can feed into the input of another model. We need to keep the number of models to use in check as using many models can lead to magnification of error as each model will introduce its own error.

Problem 1: To identify which customer’s power to shutoff?

Given:

* Customer’s average usage
* Customer’s amount due
* Customer’s association with the company (account age)
* Customer’s current active and ongoing complaints
* Customer’s complaint history
* Customer’s credit score
* Customer’s income
* Customer’s occupation

Use: We can use logistic regression to find out the probability whether a customer is capable of paying their power bill.

After finding out people who are not capable of paying their power bill, we can exclude them from the group whose power needs to shutoff.

Problem 2: To identify customers who will eventually pay, and people will never pay?

Given:

* Customer’s association with the company (account age)
* Customer’s power use until next billing period

Use: We can logistic regression to find out the probability of whether a customer will eventually pay or will never pay.

After finding out customers who will never pay, we can proceed to focus on how these shutoffs should be done.

Problem 3: How the shutoffs should be done?

Given:

* No. of workers available
* Location of the shutoff
* Workers’ availability (Workers’ schedule)
* Average time it takes to perform a shutoff
* Average cost associated with each shutoff

Use: We can use an optimization model to maximize the benefit subject to constraints (given below) to the company associated with each cutoff.

Sample constraints could be basis:

* Capacity (of Workers other resources)
* Rules to exclude specific users says Hospitals etc
* Work Schedule
* Distances etc.