CLAIMS

1. A congestion management apparatus comprising:

an option generating unit configured to generate action options by time slot for a user;

a choice probability calculating unit configured to calculate for each of the action options generated by the option generating unit, choice probabilities of the action options with respect to the user;

a memory configured to store, on a per-action-option basis, upper limits on numbers of users allowed to be guided to actions indicated by the action options; and

an estimated number calculating unit configured to calculate for each of the action options, estimated numbers of previous users assumed to have selected the action options, based on choice probabilities of each of the action options with respect to the previous users,

wherein the option generating unit is configured to extract, based on the upper limits and the estimated numbers for the action options, action options to be presented to the user.

2. The congestion management apparatus according to claim 1, wherein the action options extracted by the option generating unit to be presented to the user are action options whose estimated numbers are less than the upper limits.

3. The congestion management apparatus according to claim 1 or 2, wherein the choice probability calculating unit is configured to calculate the choice probabilities of the action options, based on values indicating user satisfaction levels upon selecting the action options.

4. The congestion management apparatus according to any one of claims 1 to 3, comprising an option determining unit configured to determine, from the action options extracted by the option generating unit, an action option to be presented to the user based on congestion-reducing contribution levels obtained from the action options.

5. The congestion management apparatus according to claim 4, comprising a congestion-reducing contribution level calculating unit configured to calculate the congestion-reducing contribution levels based on the upper limits and the estimated numbers for the action options.

6. The congestion management apparatus according to claim 4 or 5, wherein the option determining unit is configured to

generate, from the extracted action options, all patterns of action options to be possibly presented to the user,

calculate, for each of the patterns, products of the choice probabilities and the congestion-reducing contribution levels of action options so as to obtain a sum of the products, and

determine action options included in a pattern having the largest sum of the products as action options to be presented to the user.

7. The congestion management apparatus according to anyone of claims 1 to 3, comprising an option determining unit configured to determine an action option to be presented to the user from the action options extracted by the option generating unit, based on sales contribution levels obtained from the action options.

8. The congestion management apparatus according to claim 7, wherein the sales contribution levels are calculated based on the time slot and presence or absence of monetary values, the monetary values being obtained from the action options.

9. The congestion management apparatus according to claim 7 or 8, wherein the option determining unit is configured to

generate, from the extracted action options, all patterns of action options to be possibly presented to the user,

calculate, for each of the patterns, products of the choice probabilities and the sales contribution levels of action options so as to obtain a sum of the products, and

determine action options included in a pattern having the largest sum of the products as action options to be presented to the user.

10. A congestion management program for causing a computer to execute processes of:

generating action options by time slot for a user;

calculating for each of the generated action options, choice probabilities of the action options with respect to the user, and

calculating for each of the action options, estimated numbers of previous users assumed to have selected the action options, based on choice probabilities of each of the action options with respect to the previous users,

wherein the generating includes, by referring to a memory in which upper limits on numbers of users allowed to be guided to actions indicated by the action options are stored on a per-action-option basis, extracting action options to be presented to the user

based on the upper limits and the estimated numbers for the action options.

11. A congestion management method performed by a computer, the method comprising:

generating action options by time slot for a user;

calculating for each of the generated action options, choice probabilities of the action options with respect to the user, and

calculating for each of the action options, estimated numbers of previous users assumed to have selected the action options, based on choice probabilities of each of the action options with respect to the previous users,

wherein the generating includes, by referring to a memory in which upper limits on numbers of users allowed to be guided to actions indicated by the action options are stored on a per-action-option basis, extracting action options to be presented to the user based on the upper limits and

the estimated numbers for the action options.