

Neighbourhood Heuristic for Monkey Music Challenge

Sebastian Ånerud (910407-5958)
anerud@student.chalmers.se

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Let m be the agents position, let i denote an item in the set of items I and c be the number of items that your inventory can hold at most. Let $N_k(i)$ define the neighbourhood of size k around i including i . Also, let:

$$D_k(i) = \sum_{i' \in N_k(i)} d(i, i')$$
$$P_k(i) = p(i) + \sum_{i' \in N_k(i)} p(i'),$$

where $d(i, i')$ is the shortest distance between i and i' and $p(i)$ is the number of point that item i gives. Now define the value of a user u as:

$$V(u) = \min_i \frac{d(u, i) + D_c(i)}{P_c(i)}$$

The heuristic for the pair $(N_k(i), u)$ is then defined as:

$$H(N_k(i), u) = \frac{d(m, i) + D_k(i) + d(i, u)}{P_k(i) + p(CI)} + V(u)$$

where $p(CI)$ is the number of points the items in your inventory are worth. Also, define the heuristic of the null neighbourhood (equivalent to returning to the user immediately) H_0^* as:

$$H_0^* = \min_u \frac{d(m, u)}{p(CI)} + V(u)$$

. Finally, define:

$$H_k^* = \min_{i, u} H(N_k(i), u)$$
$$H^* = \min_k H_k^*$$

Then chose the i, u, k which minimizes H^* .