

# Food Basket Palatability

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Based on [1], a food basket  $\mathbf{x} \in \mathbb{R}^n$  is defined by  $n$  foods (e.g., beans, meat, oil) and their relative amount in grams. Each of the  $n$  foods belongs to one of the five macro-categories: cereals and grains, pulses and vegetables, oils and fats, mixed and blended foods, meat and fish and dairy. For each macro-category  $g \in \mathcal{G}$  an upper and lower bound is available, respectively  $max_g$  and  $min_g$ , see Table 1. While in [1], the authors use bound constraints to ensure the food basket palatability, we extend the definition of palatability by mean of a (non-negative) palatability score that is closer to zero for more palatable diets. The score is defined as

$$Palatability\ Score = \sqrt{\sum_{g \in \mathcal{G}} (\gamma_g (\hat{x}_g - Opt_g))^2}, \quad (1)$$

where

$$\hat{x}_g = \sum_{k \in \mathcal{K}_g} x_k \quad \text{with } g \in \mathcal{G} \text{ and}$$
$$Opt_g = \frac{max_g + min_g}{2} \quad \text{with } g \in \mathcal{G}.$$

Since different macro-categories have different range sizes ( $max_g - min_g$ ), a parameter  $\gamma_g$  is used to scale their impact on the score, see Table 1.

macro-category	$min$	$max$	$\gamma$
Cereals & Grains	200	600	1
Pulses & Vegetables	30	100	5.7
Oils & Fats	15	40	16
Mixed & Blended Foods	0	90	4.4
Meat & Fish & Dairy	0	60	6.6

Table 1: Macro-categories bounds and scaling factor.

## References

- [1] PETERS, K., FLEUREN, H., DEN HERTOOG, D., KAVELJ, M., SILVA, S., GONCALVES, R., ERGUN, O., AND SOLDNER, M. The nutritious supply chain : Optimizing humanitarian food aid. Tech. rep., 2016.