MRes Project Meeting 4

Attendees: Maria Fox, Sophie Turner.

Date: 17/05/22.

Time: 15:00.

Location: Zoom.

Agenda

Progress review.

Progress

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Assignee(s) | Deadline | Done | Comments |
| Figure out how to read in .csv and large amounts of data to MiniZinc. | Sophie | 17/3/22 | No | Deadline extended. |
| Ask Nopi for all the data and information required. | Sophie | 17/3/22 | Yes | Food data not available. Made dummy data. |
| Figure out how to use MiniZinc with other languages. | Sophie | 17/3/22 | No | Deadline extended. |
| Try reconstructing the plots from the kitchen data. | Sophie | 17/5/22 | Yes |  |
| Reduce execution time of current algo where possible. Improve scalability. | Sophie | Ongoing | Yes | Categorised fields and added constraints. Down to 13 seconds for 20 people, 1 week. |
| Continue to expand program skeleton to include more aspects of the project. | Sophie | Ongoing | Ongoing |  |

Created a weekly plan which selects meals, side dishes, desserts, and their quantities on different days of the week, optimising the financial cost while providing variety and meeting all dietary requirements including avoiding allergens and tailoring caloric intake for people’s jobs and circumstances, minimising food waste. Execution time is around 13 seconds in MiniZinc.

Questions/problems

The default solvers in MiniZinc don’t work with floating point numbers. This means small quantities of food are expressed as 0 and division calculations are often impossible. The MIP solver might work with floats but the MIP solver is not available in the list of default solvers. Try and find a download. Alternatively, try using the LP Solve program instead of MiniZinc. Code will need to be converted and LP solve only works with linear numerical calculations with no division but does support floats.

Discussion

Emissions costs of ingredients can be written in the same way as financial costs, considering production, transport, storage and cooking.

When assessing food packaging waste, include alternatives. Dried egg powder exists as an alternative to fresh eggs.

Vitamin D is mostly only found in meat and direct sunlight on the skin and in the eyes. Because of the conditions in Antarctica it is unlikely that most people will be able to get enough vitamin D. The NHS recommends taking vitamin D supplements in these circumstances. It is reasonable to assume that every guest will be given a daily vitamin D supplement tablet but that all other nutritional requirements will be met by their diet.

Include drinks. Guests should also be provided with alcohol (wine and beer) to drink because this improves their mood and morale. Include enjoyment as an objective.

The next stage will be to keep a standard weekly menu but vary the quantities of the servings daily depending on people arriving and leaving. Read in personnel data like a calendar.

Although the code would be more computationally efficient if multiple calculations were performed inside the same loop kernel where possible, loops have been separated out for now to keep it simple and enable changes to be made easily. Later, code will be optimised by modularising similar code into functions, standardising data structures and possibly integrating loop bodies to reduce the number of memory accesses and array iterations.

Next tasks

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| --- | --- | --- |
| Task | Assignee(s) | Deadline |
| Account for people arriving and leaving. | Sophie | 31/5/22 |
| Include emissions data and minimise it. | Sophie | 31/5/22 |
| Include packaging waste data and minimise it. | Sophie | 31/5/22 |
| Try getting floats and division to work with MIP or LP solve. | Sophie | 31/5/22 |
| Try reading in csv data to MiniZinc. | Sophie | 31/5/22 |
| Try combining MiniZinc with an imperative language. | Sophie | 31/5/22 |
| Create a ‘shopping list’ from output. | Sophie | 31/5/22 |

Next meeting

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