

OptiSuite-OptiApp

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This is a template for a simple optimization project

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How to run the library

1. Create an input data instance from a json file:

```
from opti_suite.opti_app.factory.model_data_factory import  
ModelDataFactory  
  
data =  
ModelDataFactory.create_from_json_file(input_json=<file-path-to-json-input>)
```

2. Create and instance of the optimization engine with the input data and execute:

```
from opti_suite.opti_app.model.engine import Engine  
engine = Engine(data=data)  
engine.execute()
```

3. Get the response in json format:

```
json_response = engine.generate_json_response()
```

Engine

class `opti_suite.opti_app.model.engine.Engine` (*data: opti_suite.opti_app.context.model_data.ModelData*)

This class defines the optimization engine for build and solve the optimization problem

Attributes:

status: Status of the optimization execution.

model: Instance of the optimization model.

data: A ModelData data instance.

response: A ModelResponse data instance.

results: Optimization model results

Methods:

execute: Run DataAnalyzer with the instance DataModel, build the model, solve the model and build model response.

get_response: Get the ModelResponse instance generated with the ModelResponseFactory with solution of saved in ModelData.

generate_json_response: Get the json response with the solution.

generate_excel_response: Get the excel response with the solution.

generate_solver_factory: Generate solver factory based on the solver choose

has_solution: Check if the solver founded a solution and the quality of the solution

execute (*verbosity: bool = False, solver: str = 'cbc', opt_parameters: dict = None*)

This method trigger the engine optimization module.

Arguments:

verbosity: Verbosity of engine (by default True).

solver: Solver to be used (string).

opt_parameters: Dictionary with the solver parameters.

generate_excel_report (*filename: str*) → None

Generate the response of the planning engine for the logistic problem in Excel format

Arguments:

output_filename:

(str, optional): Path of the response file.

generate_json_response (*output_filename: str = None, rounded: bool = True*) → dict

Generate the response of the planning engine for the logistic problem in json format

Arguments:

output_filename:

(str, optional): Path of the response file.

rounded: (bool, optional): If True, all the values will be rounded.

Returns:

json_response: dict: Response of the planning engine for the logistic problem in json format if the output_filename param is not provided. Otherwise, None.

generate_solver_factory (*solver: str, opt_parameters: dict*) → <pyomo.opt.base.solvers.SolverFactoryClass object at 0x000001C49FF677C0>

Configure the internal solver and its parameters.

Arguments:

solver:

(str): Name of the internal solver.

opt_parameters: (dict): Parameters for the internal solver.

Returns:

opt: pyo.SolverFactory: A pyo.SolverFactory class instance with the configuration of the internal solver.

get_response ()

Returns the ModelResponse instance with the solution of the optimization problem

has_solution () → bool

Check whether the optimization problem has been solved.

Returns:

bool: If true, the problem has been solved. Otherwise, false.

Model Data

class `opti_suite.opti_app.context.model_data.ModelData`

This class defines the data class `ModelData` for the optimization library. It contains the structures of input data for the optimization problem, loaded from the input request as well as the solution data.

Attributes:

workers: Dataframe with the input data for unit workers.
periods: Dataframe with the input data planning periods.
shifts: Dictionary with the time periods for each shift.
shifts_list: List of shifts.
configuration: Configuration parameters (dataframe).
solution_schedules_worker: Dictionary with the schedule solution of workers.
solution_necessary_worker: Dictionary with the scheduled workers.

Methods:

set_configuration
set_workers
set_periods
set_shifts
set_shifts_ids
add_solution_scheduled_worker
add_solution_needed_worker
get_configuration
get_config_parameter
get_workers
get_periods
get_shifts
get_shifts_ids
get_solution_scheduled_workers
get_solution_needed_worker

Model Response

class `opti_suite.opti_app.context.model_response.ModelResponse`

This class defines the ModelResponse data class with the response of the optimization engine.

Attributes:

schedule: DataFrame that contains the schedule solution.

Methods:

set_schedule: Define the schedule data frame.

get_schedule: Return the schedule data frame.

Exception

```
exception opti_suite.opti_app.context.exception.OptiSuiteDataException ( message,  
errors_dict )
```

```
    OptiSuite Data exception.
```

```
exception opti_suite.opti_app.context.exception.OptiSuiteException ( message )
```

```
    OptiSuite runtime exception.
```

Model Data Factory

```
class opti_suite.opti_app.factory.model_data_factory.ModelDataFactory ( request )  
    This class processes the input raw data and creates a ModelData which  
    provides access to all the available data.
```

Attributes:

```
    data : A ModelData instance.  
    request : Input raw data - json file format.
```

Methods:

```
    create : Execute the internal methods to generate a ModelData  
            instance from the input request.  
    create_from_json_file : Execute the internal methods to generate a  
            ModelData instance from an input json file request.
```

Model Response Factory

```
class opti_suite.opti_app.factory.model_response_factory.ModelResponseFactory  
( data: opti_suite.opti_app.context.model_data.ModelData )
```

This class processes the solution raw data and creates the Response instance (engine response).

Attributes:

data: The ModelData instance that contains the solution data.

response: The response of the optimization engine.

Methods:

create: Execute the private methods to build the solution.

```
static create ( data )
```

Method to create an instance of ModelResponse based on the solution stored in ModelData

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