OptiSuite-OptiApp

Release 0.1

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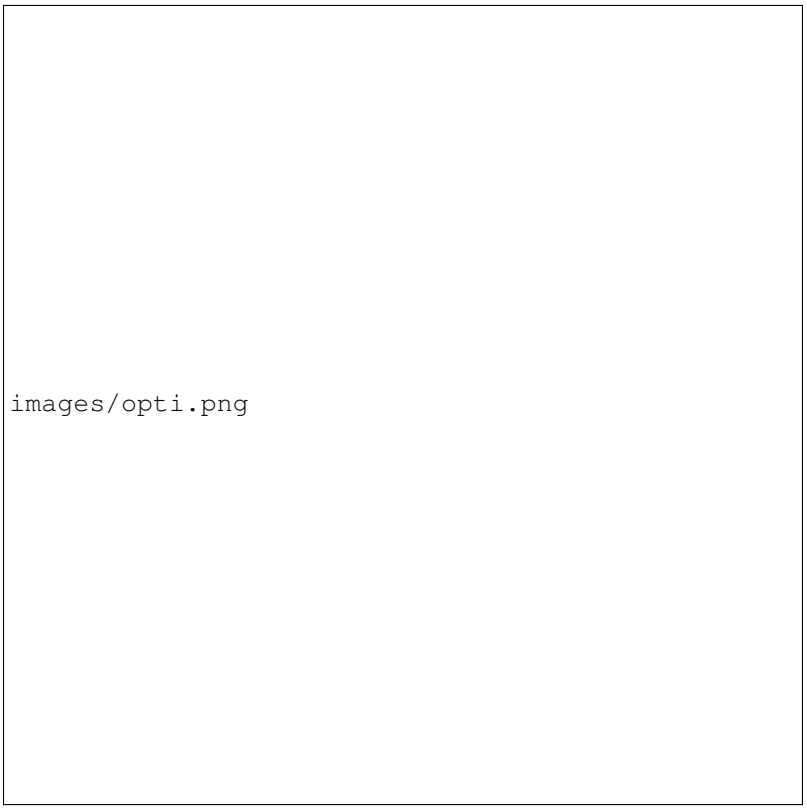
SCHEDULER CONTENTS:

This is a template for a simple optimization project



CHAPTER

ONE

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()
```

CHAPTER

TWO

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 0x0000028C23E41940>

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.**

CHAPTER

THREE

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

CHAPTER

FOUR

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.

CHAPTER

FIVE

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.

CHAPTER

SIX

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.

CHAPTER

SEVEN

MODEL RESPONSE FACTORY

class opti_suite.opti_app.factory.model_response_factory.**ModelResponseFactory**(*data:* opti_suite.opti_app

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

CHAPTER

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