AutoChecker, Specification

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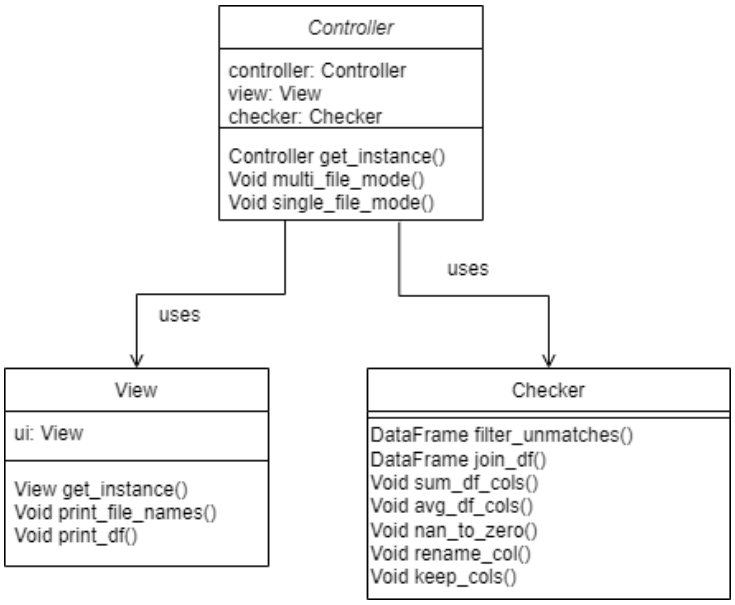
This Module Interface Specification (MIS) document contains modules, types and methods used to support the AutoChecker. The AutoChecker reads, compares and displays data from different Excel files. By specifying the Excel file paths and grouping the file information in utils.py, the AutoChecker reads and compares data from these files, and displays all rows with unmatching values. The AutoChecker can be launched by typing `python Demon.py` in terminal.

1 Overview of the design

This design applies Module View Specification (MVC) design pattern and Singleton design pattern. The MVC components are *Checker* (model module), *View* (view module), and *Controller* (controller module). Singleton pattern is specified and implemented for *View* and *Controller*

An UML diagram is provided below for visualizing the structure of this software architecture



The MVC design pattern are specified and implemented in the following way: the abstract object *Checker* compare, aggregate and transform the data gather from external (excel) files. A view module *View* displays prompt messages and rows with different values. The controller *Controller* is responsibe for handling input actions and the work flow of the automation

For *View* and *Controller*, use the get_instance() method to obtain the abstract object.

Checker Module (Abstract Object)

Module

Checker

Uses

pandas

Syntax

Exported Constants

None

Exported Types

Checker = ?

Exported Access Programs

Routine name	In	Out	Exceptions
get_unmatch	DataFrame, String, String	DataFrame	
join_df	DataFrame, DataFrame, String, String	DataFrame	
diff_df_1	DataFrame, DataFrame, String	DataFrame	
diff_df_2	DataFrame, DataFrame, String	DataFrame	
sum_df_col	DataFrame		
avg_df_cols	DataFrame		
get_rows_sum	DataFrame, String	$\mathbb{N}$	
find_val_idx	DataFrame, String, String	Seq of $\mathbb{N}$	
nan_to_zero	DataFrame		
rename_col	DataFrame, Map of String and String		
keep_cols	DataFrame, Seq of String		

Semantics

State Variables

None

State Invariant

None

Assumptions

None

Access Routine Semantics

get_unmatch(df, col1, col2):

- output: filter out every row in the DataFrame that has different values in the two specified columns
- exception: none

join_df(df1, df2, key, how):

- output: join (default inner) two DataFrames on the specified key
- exception: none

diff_df_1(df1, df2, header):

- output: create another DataFrame that contains values in df1 but not in df2
- exception: none

diff_df_2(df1, df2, key):

- output: create another DataFrame that contains values in df1 but not in df2 and vice versa
- exception: none

sum_df_cols(df):

- transition: add an additional column the DataFrame that stores the sum of every row from the specified starting index to the ending index
- exception: none

avg_df_cols(df):

- transition: add an additional column to the DataFrame that stores the average of every row from the specified starting index to the ending index
- exception: none

get_rows_sum(df, header):

- output: the sum of all rows under the specified header
- exception: none

find_val_idx(df, header, value):

- output: a list of indices in the specified column that contains the input value
- exception: none

nan_to_zero(df):

- transition: fill out all the nan cells with 0
- exception: none

rename_col(df, name_map):

- transition: rename the column headers in the DataFrame using the name map
- exception: none

keep_cols(df, cols):

- transition: drop all the columns in the DataFrame and keep the ones specified from the input
- exception: none

View Module

Module

View

Uses

None

Syntax

Exported Constants

None

Exported Types

None

Exported Access Programs

Routine name	In	Out	Exceptions
print_file_names	Seq of String		
print_df	DataFrame		

Semantics

Environment Variables

window: A portion of computer screen to display the messages (i.e. the terminal)

State Variables

ui: View

State Invariant

None

Assumptions

- The View constructor is called for each object instance before any other access routine is called for that object.
- The constructor can only be called once.

Access Routine Semantics

get_instance():

- transition: ui := (ui = null ⇒ new View())
- output: *self*
- exception: none

print_file_names(f_names):

- transition: window := Displays a sequence of file names

print_df(df):

- transition: window := Displays the DataFrame

Local Function:

__init__: void → View
__init__() ≡ new View()

Controller Module

Controller Module

Uses

Checker, View, pandas

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

Routine name	In	Out	Exceptions
get_instance	Checker, View	Controller	
single_col_mode	Pair of String and Map, Pair of String and Map, Boolean		
multi_col_mode	Map of String and Map, Pair of String and Map		

Semantics

Environment Variables

None

State Variables

view: View
controller: Controller
checker: Checker

State Invariant

None

Assumptions

- The Controller constructor is called for each object instance before any other access routine is called for that object.
- The constructor can only be called once.
- Assume that the view instances are already initialized before calling Controller constructor

Access Routine Semantics

get_instance(c, v):

- transition: controller := (controller = null ⇒ new Controller (c, v))
- output: *self*
- exception: None

single_col_mode(file1, file2, check_idx):

- transition: operational method

  f1_pfx := file1[1]["prefix"]
  f2_pfx := file2[1]["prefix"]
  f1_hd := file1[1]["header"]
  f2_hd := file2[1]["header"]
  df1 := get_df_col(file1[0],file1[1])
  checker.rename_col(df1, f1_pfx, "prefix")
  df2 := get_df_col(file2[0], file2[1])
  checker.rename_col(df2, f2_pfx, "prefix")
  dfj := checker.join_df(df1, df2, "prefix")
  checker.nan_to_zero(dfj)
  file_name = file1[0] + file2[0]

check_idx ⇒ process_df(df1, df2, dfj, file_name) | !check_idx ⇒ df_umatches := checker.get_unmatch(dfj, f1_hd, f2_hd) ∧ view.out_file(df_umatches, file_name)

dfd := checker.diff_df(df1, d2, "prefix");

view.out_file(dfd, file_name)

- output: none

multi_col_mode(f_map, file2):

- transition: operational method

  use the data form f_map to generate a DataFrame

  aggregate the DataFrame from f_map by summing or averaging the columns

  drop the extra columns from the f_map DataFrame

  use the data form file2 to generate a DataFrame

  compare the two DataFrames and display all the unmatching rows

- output: none

Local Function:

__init__: View → Controller
__init__(*checker*, *view*) ≡ new Controller(*checker*, *view*)

process_df: DataFrame × DataFrame × DataFrame × String → void
process_df(dfj, df1, df2, file_name) ≡ (r : Tuple of ℕ and Seriers $|r \in$ dfj.iterrows() | process_util(r[1], df1, df2, file_name))

process_util: Seriers × DataFrame × DataFrame × String → void
process_util(row, df1, df2, f_name):

idx1 := checker.find_val_idx(df1, 'prefix', row['prefix'])

idx2 := checker.find_val_idx(df2, 'prefix', row['prefix'])

view.print_sheet_input()

idx1 ≠ idx2 ⇒ view.out_file(row, f_name, idx1, idx2) | idx1 = idx2 ⇒ (row[1] ≠ row[2] ⇒ view.out_file(row, f_name))