SSVE White Balance Data Visualization

20 Dec 2021, SSVE started a trial which is an activity to write White Balance data into Pmod T-Con board.

To ensure effectiveness, PE wanna check log data compared with JND.

This small VBA project helps to accelerate the whole process.

Author

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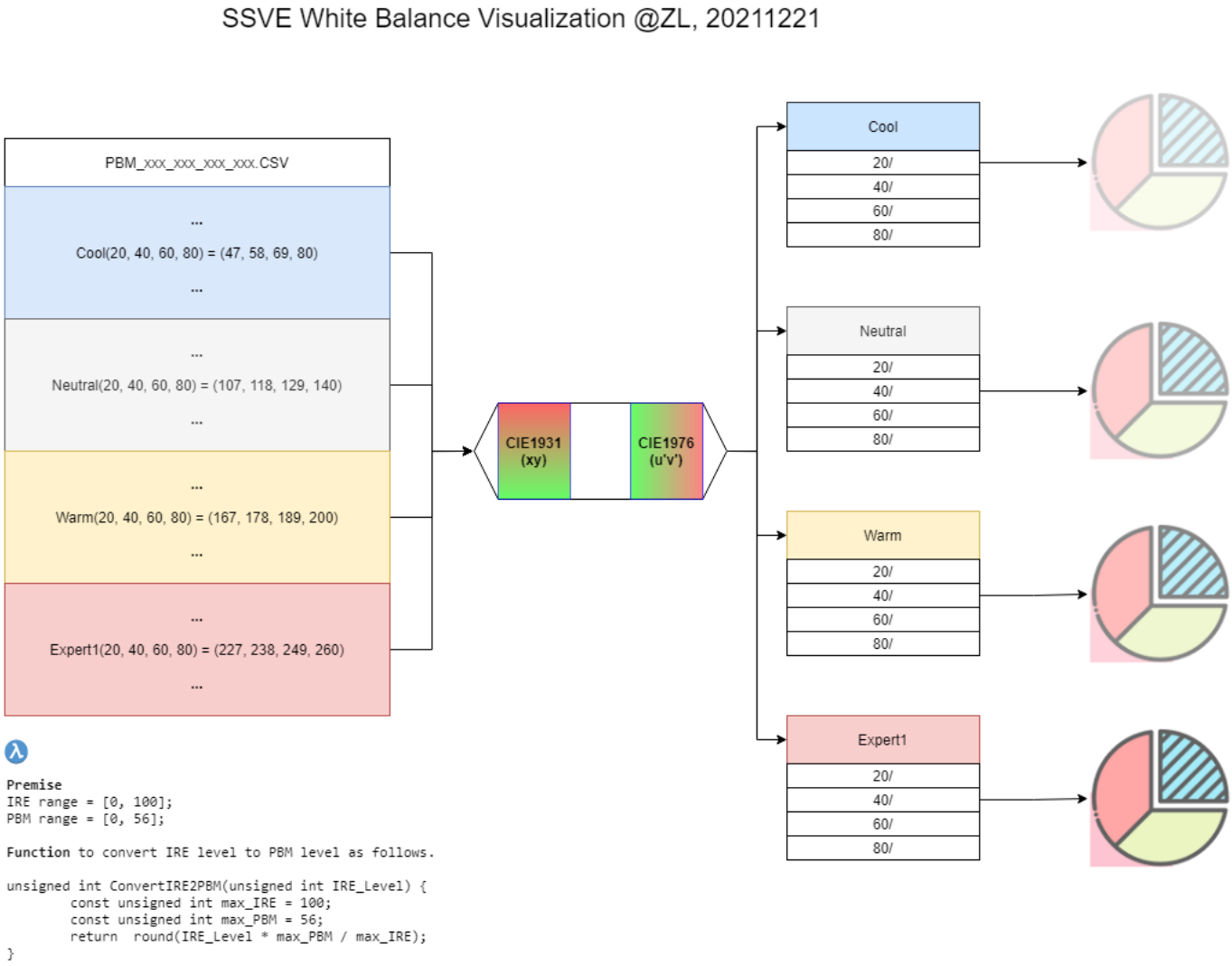
Changelog

- v0.01, initial build
- v0.02, fix visualization bug (screw non-standard charts..)
- v0.03, resize `named range` dynamically
- v0.04, create `Python3 + Rlang` solution for scaling data and workload;

Diagram

the following the diagram of the whole process



Solution 01

toolkits: VB.NET + Excel + VBA;

using this approach when workload and dataset are small (<= 1,000);

Implementation

some core functionality as follows.

```
Private Sub read_PBM_csv(ByVal csv_path As String, ByRef dstWB As Workbook)
    ''' read data from a PBM csv log files at SSVE @ZL, 20211220
    Const col_x As Integer = 5
    Const col_y As Integer = 6
    Const idx_x As Integer = 0
    Const idx_y As Integer = 1
    Const sheet_no As Integer = 1
    Dim cool, neutral, warm, expert1, color_temps

    cool = Array(47, 58, 69, 80)
```

```
    neutral = Array(107, 118, 129, 140)
    warm = Array(167, 178, 189, 200)
    expert1 = Array(227, 238, 249, 260)

    color_temps = Array(cool, neutral, warm, expert1)

    Dim src_wb As Workbook
    Dim src_ws As Worksheet

    Set src_wb = GetObject(csv_path)
    Set src_ws = src_wb.Worksheets(sheet_no)

    Dim i As Integer
    Const wsn_cool As String = "Cool"
    Const wsn_neutral As String = "Neutral"
    Const wsn_warm As String = "Warm"
    Const wsn_expert1 As String = "Expert1"
    Dim dstWS_cool As Worksheet: Set dstWS_cool = dstWB.Sheets(wsn_cool)
    Dim dstWS_neutral As Worksheet: Set dstWS_neutral = dstWB.Sheets(wsn_neutral)
    Dim dstWS_warm As Worksheet: Set dstWS_warm = dstWB.Sheets(wsn_warm)
    Dim dstWS_expert1 As Worksheet: Set dstWS_expert1 = dstWB.Sheets(wsn_expert1)

    Const lb As Integer = 0
    Const ub As Integer = 3
    Dim dstRow As Integer
    Const dstCol_dt As Integer = 2
    Const dstCol_ser As Integer = 3
    Const dstCol_u As Integer = 7
    Const dstCol_v As Integer = 8

    For i = lb To ub
        dstRow = GetLastRow(dstWS_cool, dstCol_u) + 1
        dstWS_cool.Cells(dstRow, dstCol_ser).Value = dstWS_cool.Cells(dstRow,
dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_cool.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(cool(i), col_x), src_ws.Cells(cool(i), col_y))
' cool

        dstWS_neutral.Cells(dstRow, dstCol_ser).Value =
dstWS_neutral.Cells(dstRow, dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_neutral.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(neutral(i), col_x), src_ws.Cells(neutral(i), col_y))
' neutral

        dstWS_warm.Cells(dstRow, dstCol_ser).Value = dstWS_warm.Cells(dstRow,
dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_warm.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(warm(i), col_x), src_ws.Cells(warm(i), col_y))
' warm

        dstWS_expert1.Cells(dstRow, dstCol_ser).Value =
dstWS_expert1.Cells(dstRow, dstCol_ser).Value & parse_pbm_fp(csv_path)
        dstWS_expert1.Cells(dstRow, dstCol_u).Resize(1, 2) =
ConvXY_to_uv(src_ws.Cells(expert1(i), col_x), src_ws.Cells(expert1(i), col_y))  '
```

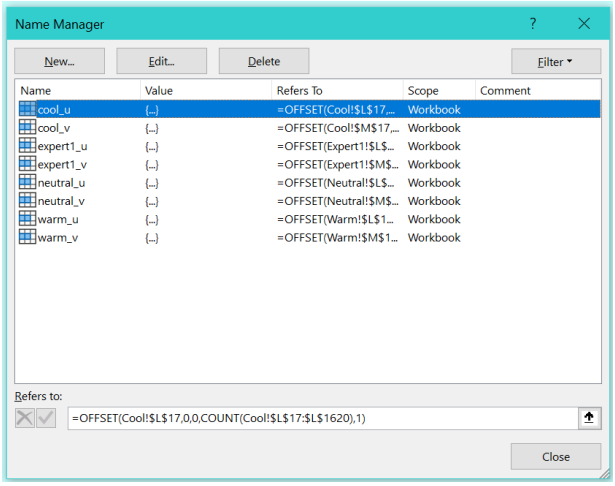
```
expert1
    Next i

    src_wb.Close False
    Set src_wb = Nothing
End Sub
```

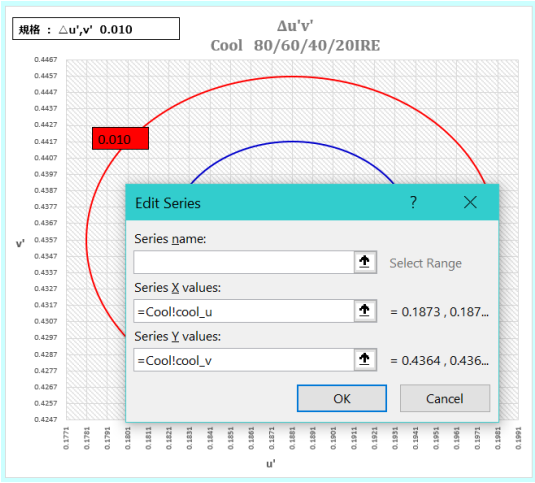
Visualization

using some tricks to make dynamic charts.

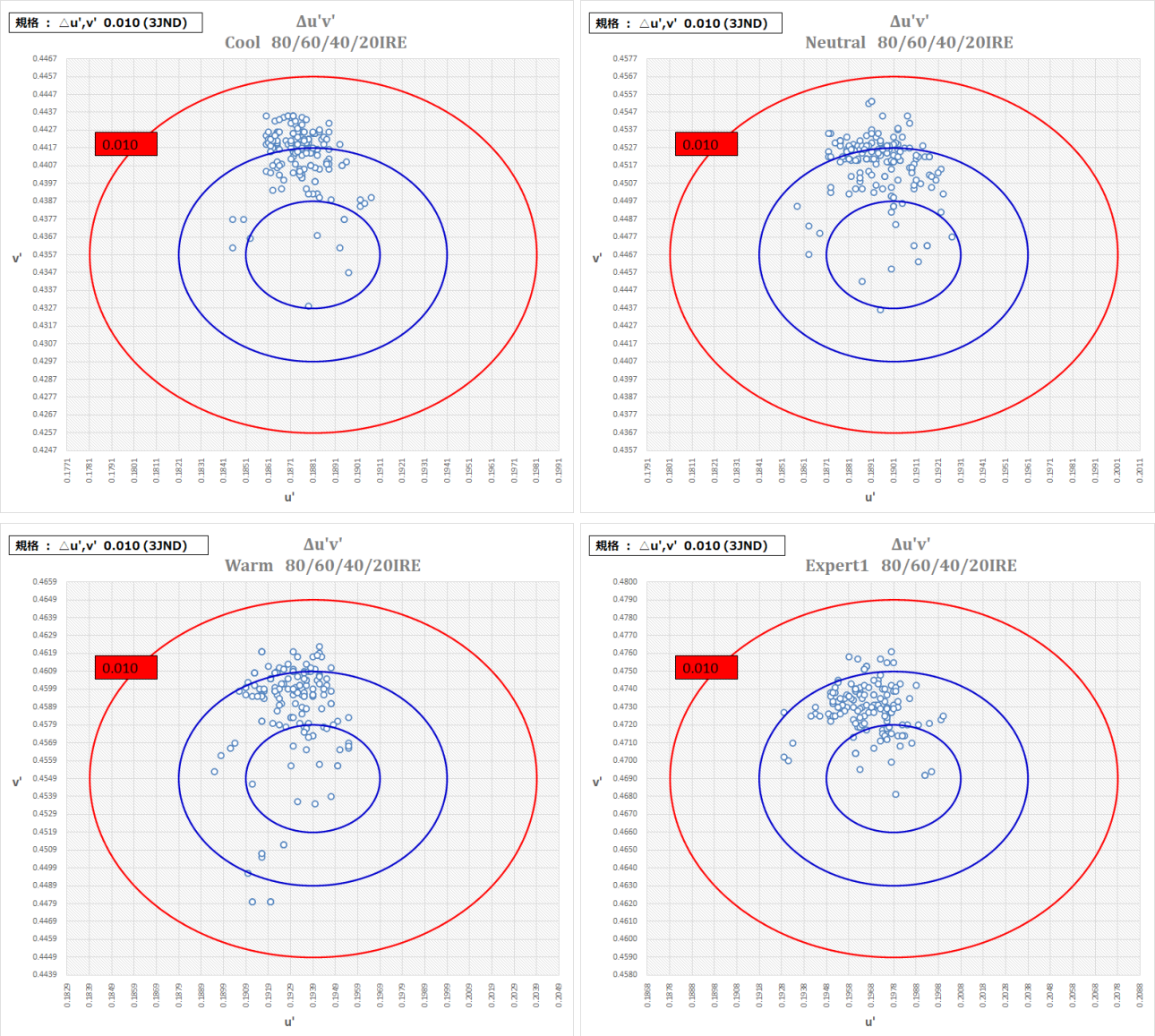
Dynamic Chart

```
''' Dynamic Chart
' [ trick ]
' step1: using Formula -> Define Name to cusomize target series + offset()
function
' step2: using Click Chart -> select data series -> target series

' ref: https://support.microsoft.com/en-us/office/offset-function-c8de19ae-dd79-
4b9b-a14e-b4d906d11b66
' syntax: OFFSET(reference, rows, cols, [height], [width])
```





Gallary



Solution 02

toolkits: Python3 + Pandas + Rlang + ggplot2;

using this approach when workload and dataset are enormous (>=1,000);

Implementation

```
class PBM_Wrangler:
    def __init__(self, src_folder:Path) -> None:
        self._src_folder = src_folder

    def _filter(self)->Path:
        for path in sorted(pathlib.Path(self._src_folder).glob(f'*.
{self.fn_ext}')):
            if path.name.startswith(self.fn_prefix):
                yield path.absolute()
```

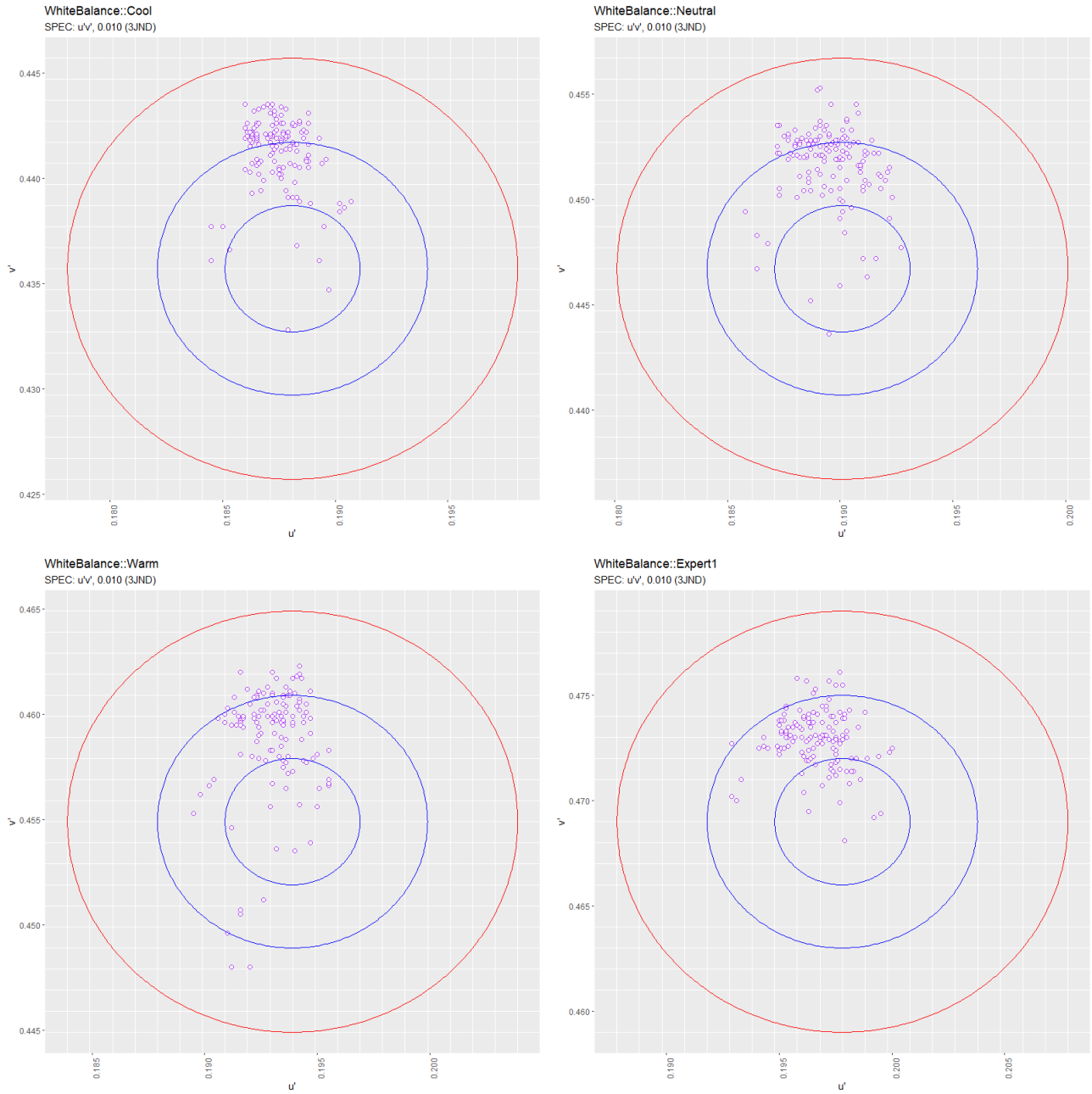
```
    def __read(self)->None:
        for pbm_file in self._filter():
            df:DataFrame = pd.read_csv(pbm_file, skiprows=self.dummy_rows,
engine='python')
            df[self.head_picmode] = self.temps
            self.df_temp = df[np.isin(df[self.head_level], self.ires)]

    def __categorize(self, color_temp:str, dst_df:List[DataFrame])->None:
        df:DataFrame = self.df_temp[self.df_temp[self.head_picmode] ==
color_temp].loc[:, [self.head_x, self.head_y]]
        df[self.head_u] = df.apply(lambda x: self.xy2u(x[self.head_x],
x[self.head_y]), axis=1)
        df[self.head_v] = df.apply(lambda x: self.xy2v(x[self.head_x],
x[self.head_y]), axis=1)
        fixed_df = df.loc[:, self.head_uv]
        dst_df.append(fixed_df)

    def __wrangle(self)->None:
        self.__categorize('COOL', self.df_cools)
        self.__categorize('NEUTRAL', self.df_neutrals)
        self.__categorize('WARM', self.df_warms)
        self.__categorize('EXPERT1', self.df_expert1s)

    def __concat(self, color_temp:str, src_df:List[DataFrame])->None:
        df:DataFrame = pd.concat(src_df, ignore_index=True, sort=False)
        df.to_csv(f'./src/{color_temp}.csv', index=False)

    def __tocsv(self)->None:
        self.__concat('COOL', self.df_cools)
        self.__concat('NEUTRAL', self.df_neutrals)
        self.__concat('WARM', self.df_warms)
        self.__concat('EXPERT1', self.df_expert1s)

    @timer
    def work(self)->None:
        logging.info('start working..')
        self.__read()
        self.__wrangle()
        self.__tocsv()
        logging.info('successed.')
```

Visualization

```
### plot
plot.wb <- function(df.temp, temp, temp.minor.x, temp.minor.y, temp.jnd1,
temp.jnd2, temp.jnd3) {
  ggplot(df.temp) +
    geom_point(aes(x=u,
                   y=v),
```

```
                colour = "purple",
                shape = 21,
                fill = 'white',
                stroke = .5,
                alpha = 0.9,
                size = 2) +
  #  coord_cartesian(xlim=c(0.1771, 0.1991),
  #                  ylim=c(0.4247, 0.4467)) +
    scale_x_continuous(minor_breaks = temp.minor.x) +
    scale_y_continuous(minor_breaks = temp.minor.y) +
    labs(title=paste('White Balance, ', temp),
         subtitle = "SPEC: u\'v\', 0.010(3JND)",
         x="u\'",
         y="v\'") +
    theme(panel.grid.major.x = element_blank(),
          panel.grid.major.y = element_blank(),
          axis.text.x = element_text(angle=90)) +
    geom_path(data=temp.jnd1,
                aes(x=du,
                    y=dv),
                size = 0.2,
                color = 'blue'
                ) +
    geom_path(data=temp.jnd2,
                aes(x=du,
                    y=dv),
                size = 0.2,
                color = 'blue'
    ) +
    geom_path(data=temp.jnd3,
                aes(x=du,
                    y=dv),
                size = 0.2,
                color = 'red'
    )
}
```

Gallary



About

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