Getting started with Fanosoft

Cutting-edge data analytics & image processing for everyone

Content

- Installation & Registration
- Main Window
- Selecting the User Directory
  - Folder module: where to store user data & figures
- Importing Numerical Data
  - Data Type Module
- Line plots
- Correlation plots
- Histograms
- Bar Graphs
- Box Plots
- Violin Plots
- Scatter Plots
- ROC Curves
- Kaplan-Meier Curves

Welcome to Fanosoft

- Cutting-edge data analytics & image processing for everyone
- Machine Learning, Deep Learning and many advanced tools in one easy to use software
- 100% graphical, no coding experience needed
- Get to the result quickly!

Installation & Registration

Installation

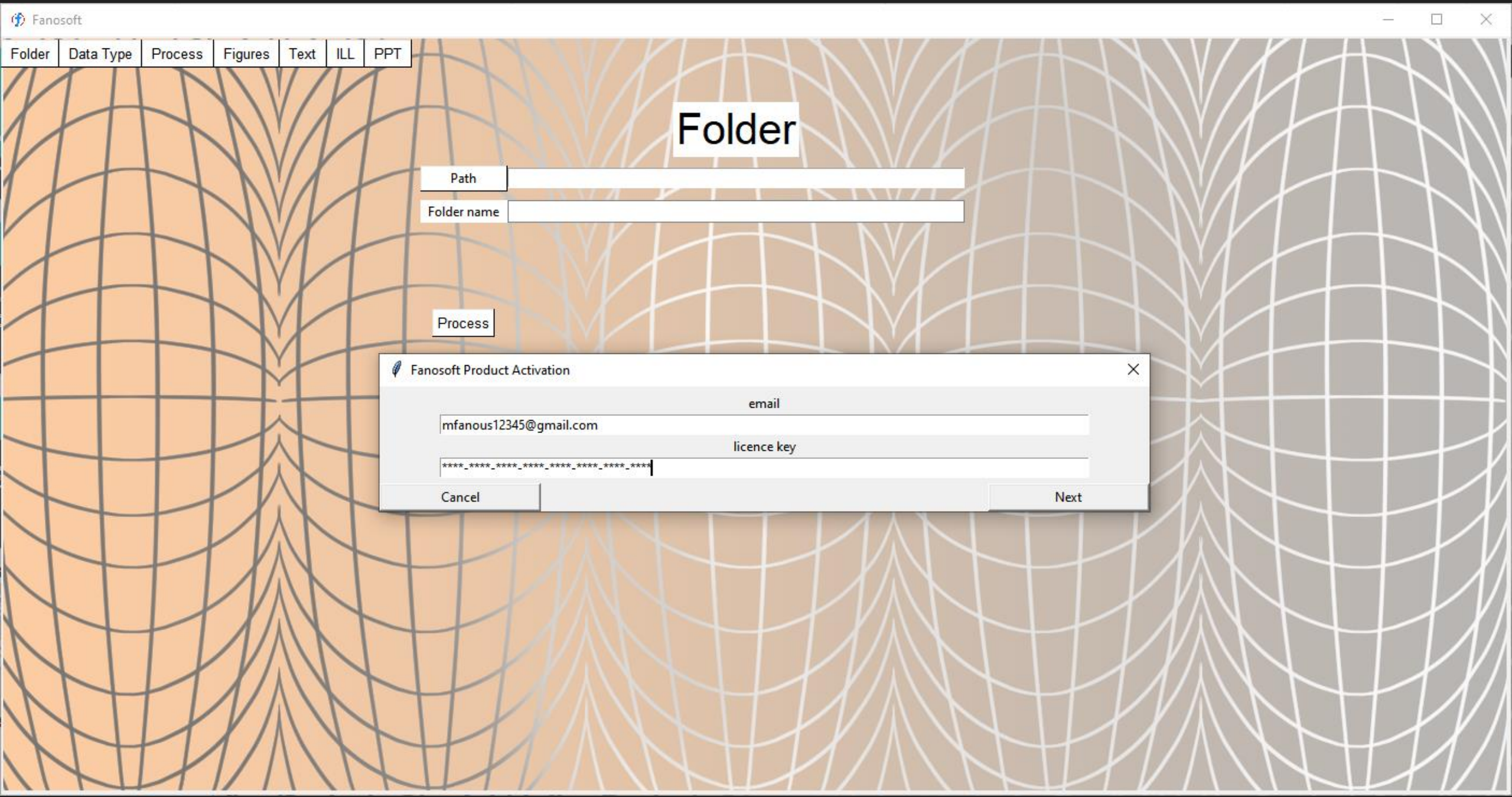
- Pre-requisite: Download & Install Matlab Runtime R2022b (9.13) from
  https://www.mathworks.com/products/compiler/matlab-runtime.html
- Download Fanosoft from www.fanousoft.com
- 2 versions: Windows & Mac
- Fanosoft doesn't need to be installed and can be executed directly
- Double click on the executable to start the software

Product Registration

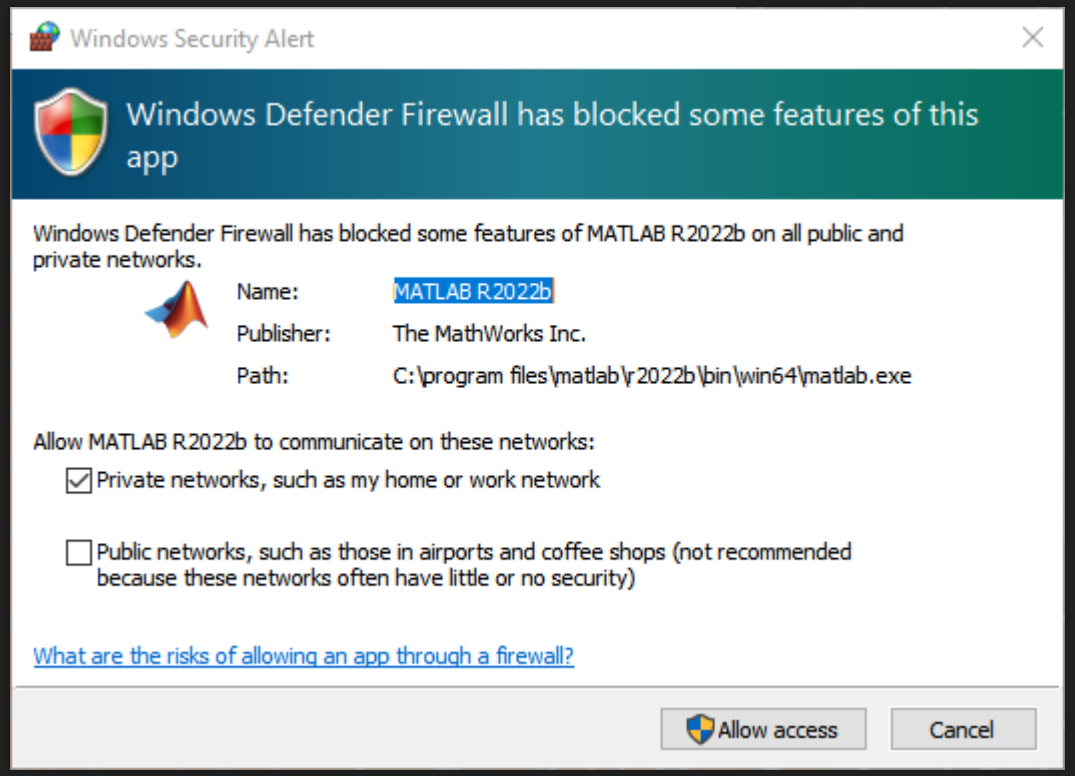
- The software requires a username and a registration key
- Please use the registration key below:

002B-0E10-15EE-EE62-EE3B-A556-C430-503D

- The first time you run the software, you will need to supply this information - see next slide


Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
Folder
Path
Folder name
Process
Fanosoft Product Activation
email
mfanous12345@gmail.com
licence key
****-****-****-****-****-****-****-****
Cancel
Next

Firewall / Communication



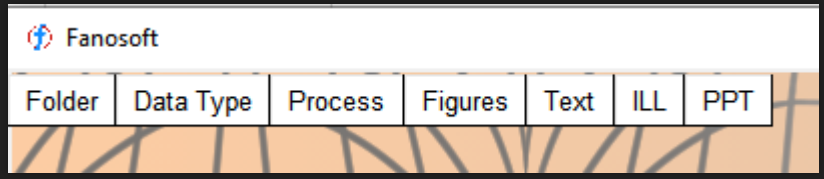
- Under the hood, Fanosoft uses the Matlab runtime to perform some processing
- The first time you run Fanosoft, you will need to allow network communication between Fanosoft and the Matlab runtime
- On Windows, click “Allow access”
- Changing firewall settings requires administrator access

Main Window

Main Window

On the top left corner of the main window, you can navigate between the different modules:

- Folder: Select where to store data
- Data Type: Import data & images
- Process: Data & Image processing
- Figures: Generate plots
- Text: Text generation with AI
- Ill: Images generation with DALL.E
- PPT: Convert figures to PowerPoint slides

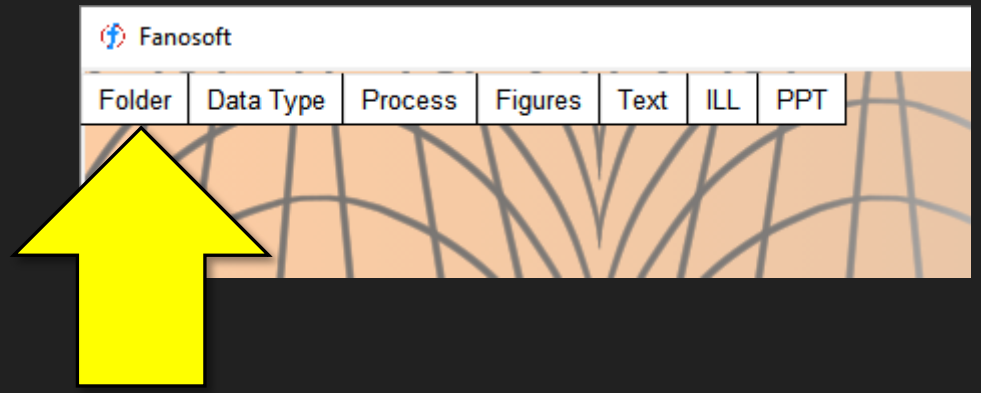


Selecting the User Directory

Folder module: where to store user data & figures

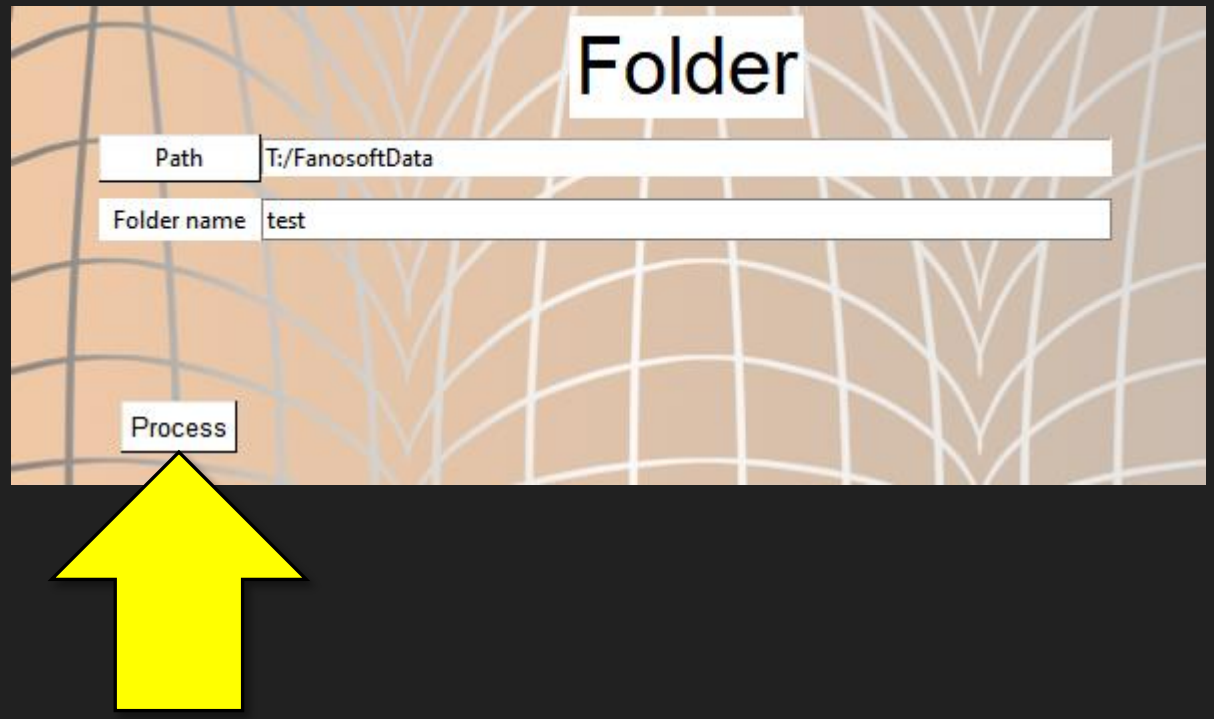
Selecting the User Directory

- The first step is to select where to store the data & figures generated by Fanosoft:
- Click on "Folder" in the upper left corner of the main window



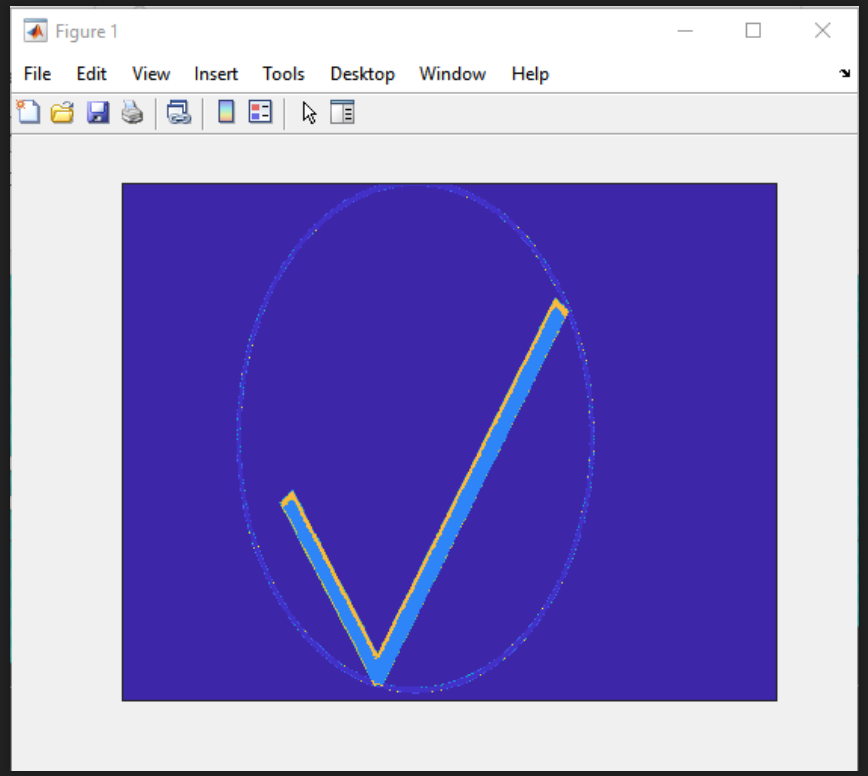
Selecting the User Directory

- Click on “Path” and select the folder where you want to store your data
- Optionally, you can enter a sub-folder which will be created under the provided path to store the data
- Click on “Process”



Selecting the User Directory

- Fanosoft creates the user's folder at the specified path and display a checkmark

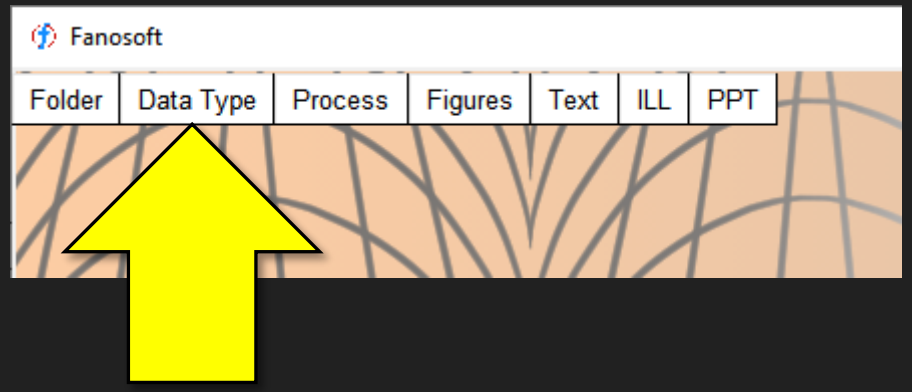


Importing Numerical Data

Data Type Module

Importing Numerical Data

- Click on “Data Type” in the upper left corner of the main window

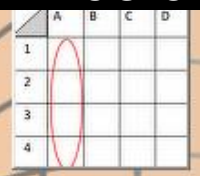


Fanosoft

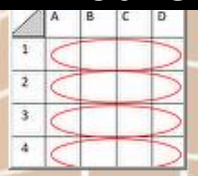
Folder | Data Type | Process | Figures | Text | ILL | PPT

DATA TYPE

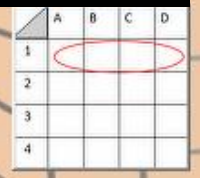
Import column vector



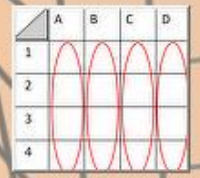
Import matrix as row vectors



Import row vector



Import matrix as column vectors



Supported Data Formats

- Microsoft Excel (.xlsx)
- Comma separated text (.csv)
- Matlab binary files (.mat)

Example: Importing Numerical Data

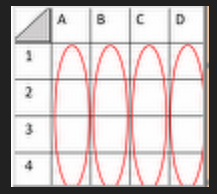
- The file SPX.csv is a comma separated text file downloaded from finance.yahoo.com
- It includes the historical data of S&P500 index from 1927 to 2020 with columns of date, opening price, highest price, lowers price, closing price, adjusted closing price, and the number of shares traded each day.
- The fist 10 lines of the file are shown below:

```
1  Date,Open,High,Low,Close,Adj Close,Volume
2  19271230,17.660000,17.660000,17.660000,17.660000,17.660000,0
3  19280103,17.760000,17.760000,17.760000,17.760000,17.760000,0
4  19280104,17.719999,17.719999,17.719999,17.719999,17.719999,0
5  19280105,17.549999,17.549999,17.549999,17.549999,17.549999,0
6  19280106,17.660000,17.660000,17.660000,17.660000,17.660000,0
7  19280109,17.500000,17.500000,17.500000,17.500000,17.500000,0
8  19280110,17.370001,17.370001,17.370001,17.370001,17.370001,0
9  19280111,17.350000,17.350000,17.350000,17.350000,17.350000,0
10 19280112,17.469999,17.469999,17.469999,17.469999,17.469999,0
```

Example: Importing Numerical Data

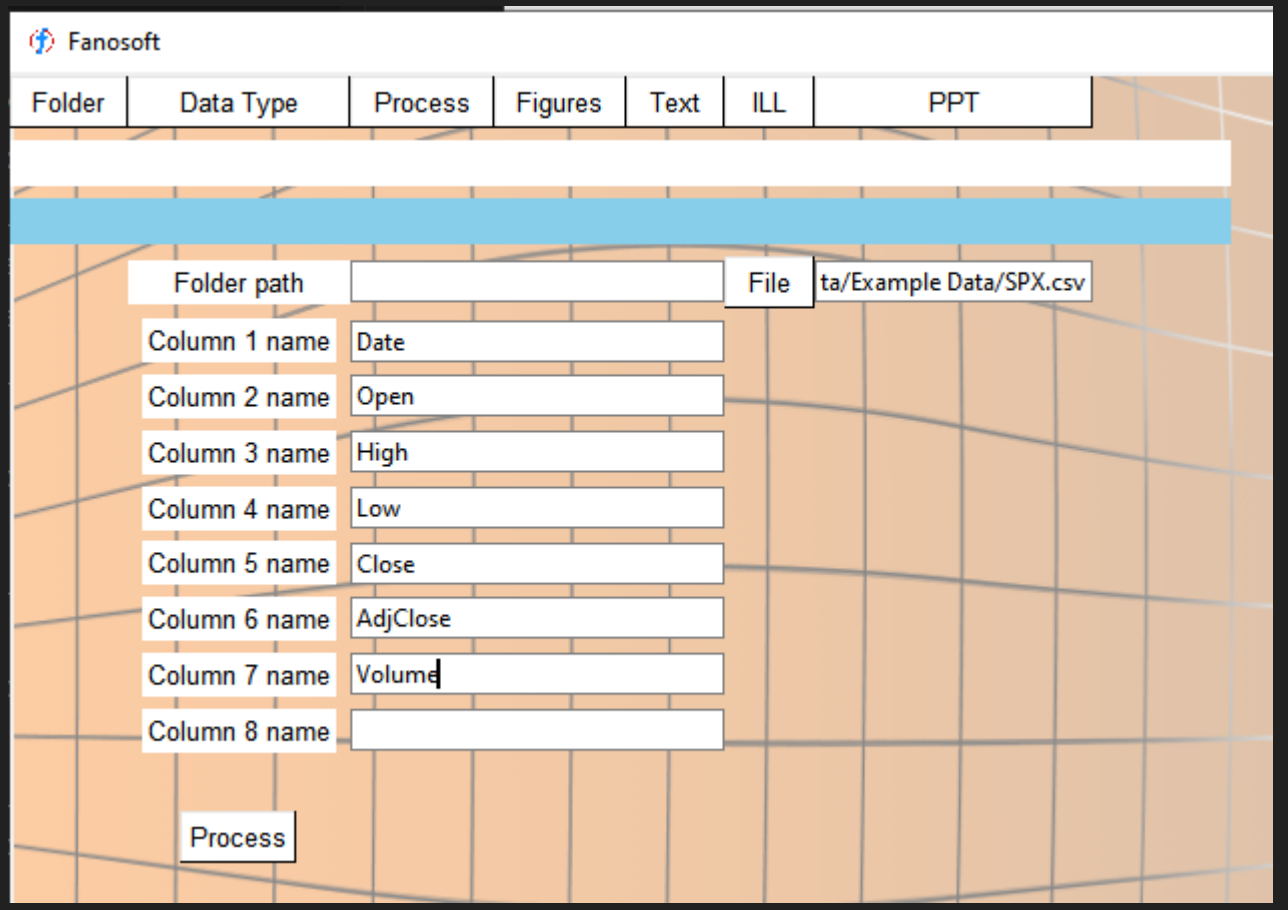
- Click on “Data Type” in the upper left corner of the main window

- Then click on “Matrix to column” vectors



Example: Importing Numerical Data

- Click on the "File" Button and select "SPX.csv" in the example data
- Name the columns
  - Must be valid variable names: no space, no special character etc.
  - Only non empty column names are imported
  - The column names don't need to match the names in the .csv file
- Click on "Process"

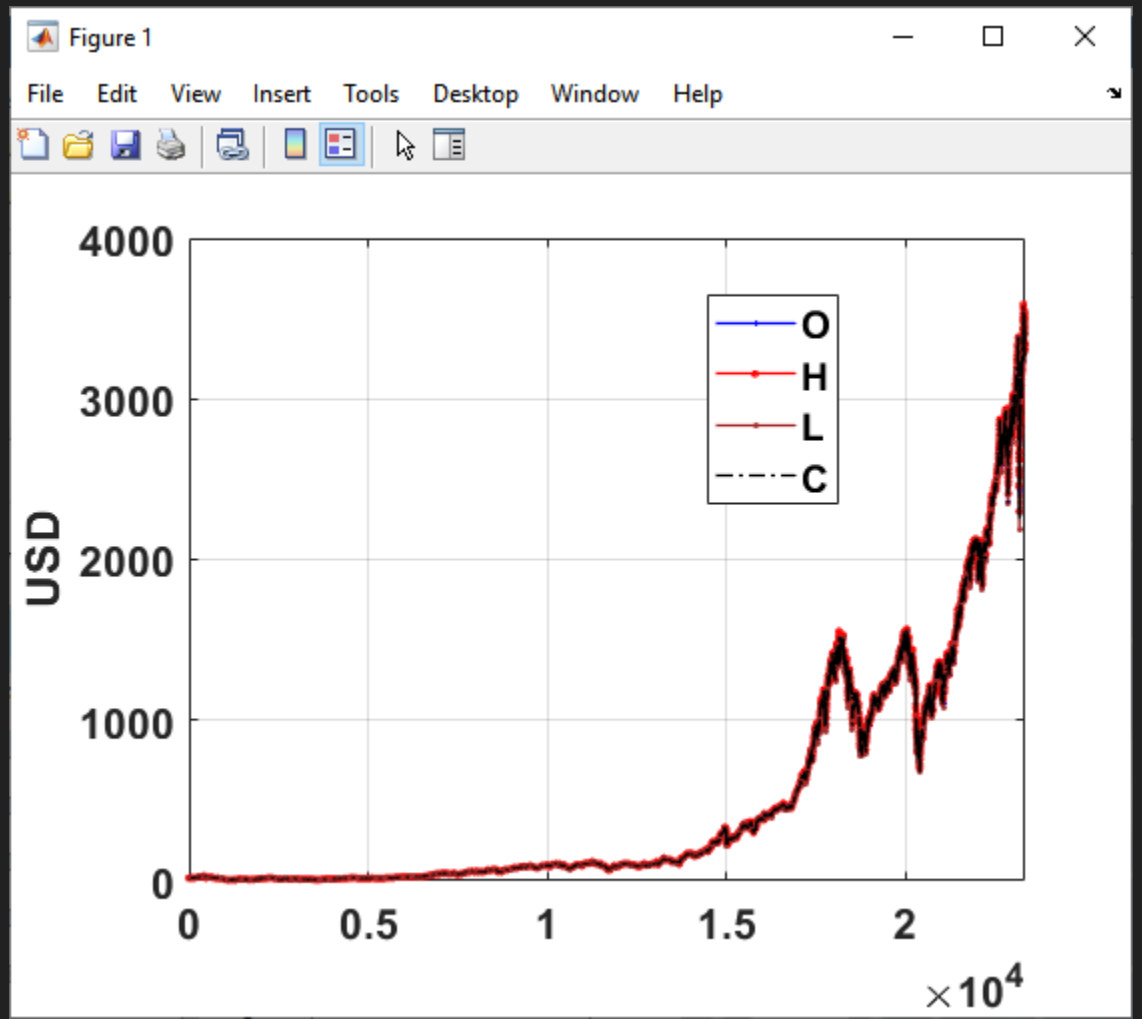


Example: Importing Numerical Data

- If the process is successful, a checkmark is displayed
- The imported variables are visible in the white banner and can be referenced:

Line plots

Line Plots Example



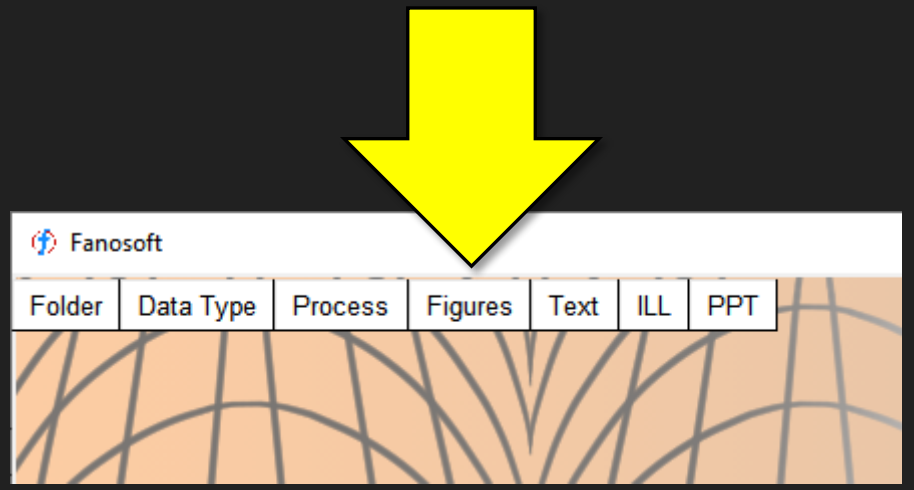
Line plots

- Up to 8 line plots (X→Y) on the same figure
- Optional X axis. If X axis is supplied, it must have the same number of rows as Y
- Variables must have been imported (See Importing Numerical Data) and exist in the user's directory

- Plot options are configurable:
  - Grid: on or off
  - Line style: solid or dashed
  - Marker style: Circles, Diamonds, Squares or Varied
  - 7 color schemes: Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Optional Log or Log/Log plot
  - X label, Y label and figure name

Line Plots

- Click on Figures

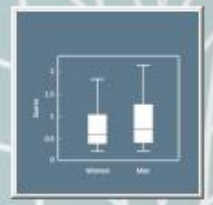
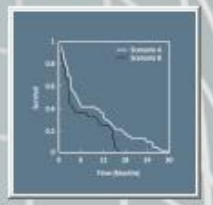


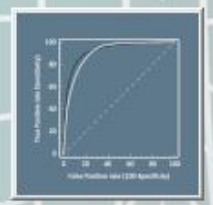
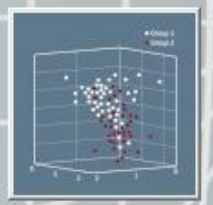
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

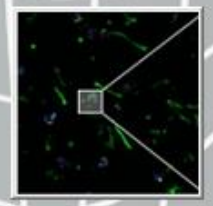
Figures

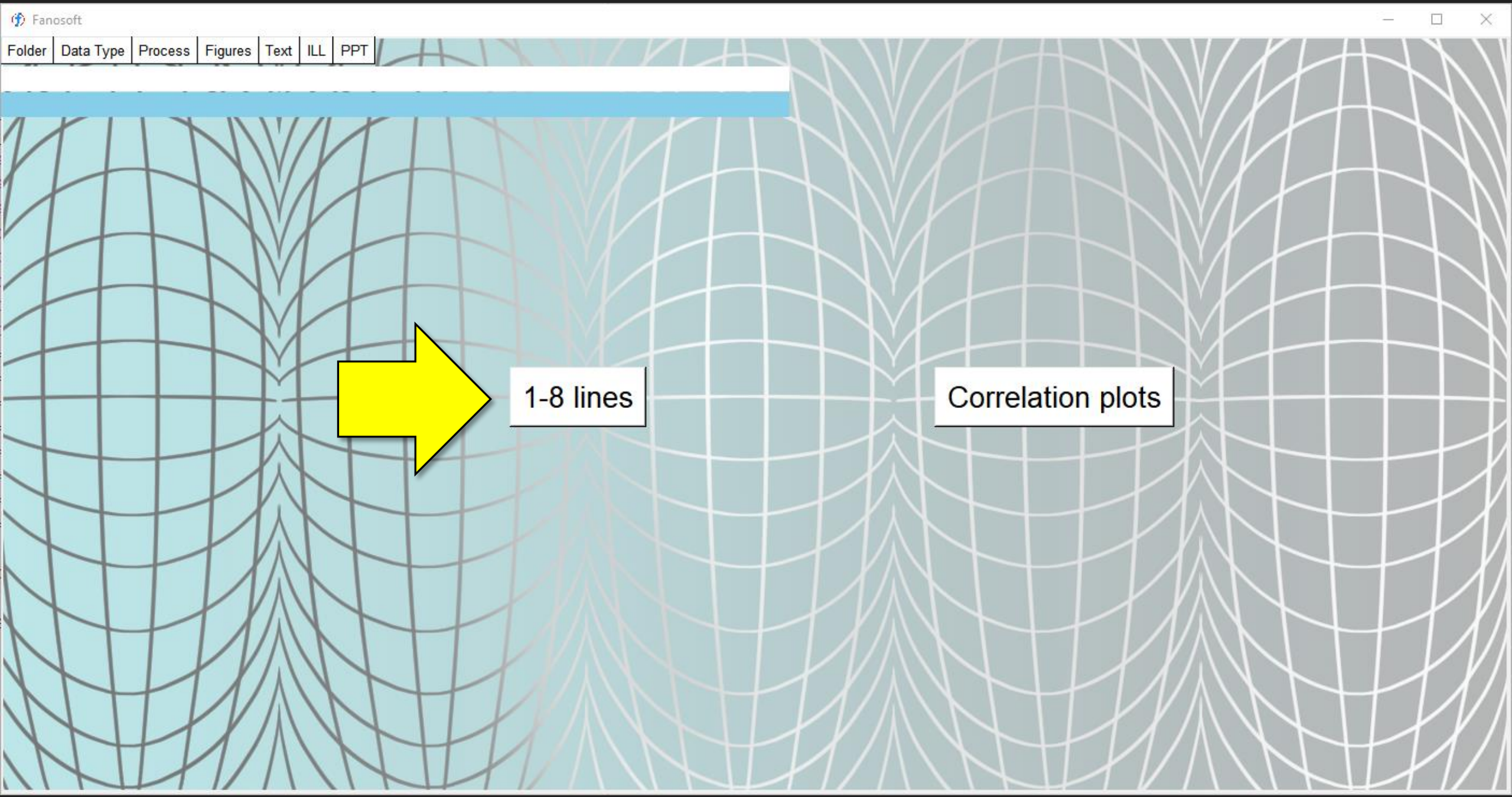





Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
1-8 lines
Correlation plots

Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

Left Y Axis

Line #1	Open	Legend	O	ME	STD	grid on
Line #2	High	Legend	H	ME	STD	log y
Line #3	Low	Legend	L	ME	STD	
Line #4	Close	Legend	C	ME	STD	log x
Line #5		Legend		ME	STD	
Line #6		Legend		ME	STD	
Line #7		Legend		ME	STD	
Line #8		Legend		ME	STD	

Bar Type

X axis	
Y Left Label	USD
X Label	
Figure Name	S&P500 index from 1927
xTick step	

solid	
Navy	
Stats Style	
Varied	
Legend Position	

SUBMIT

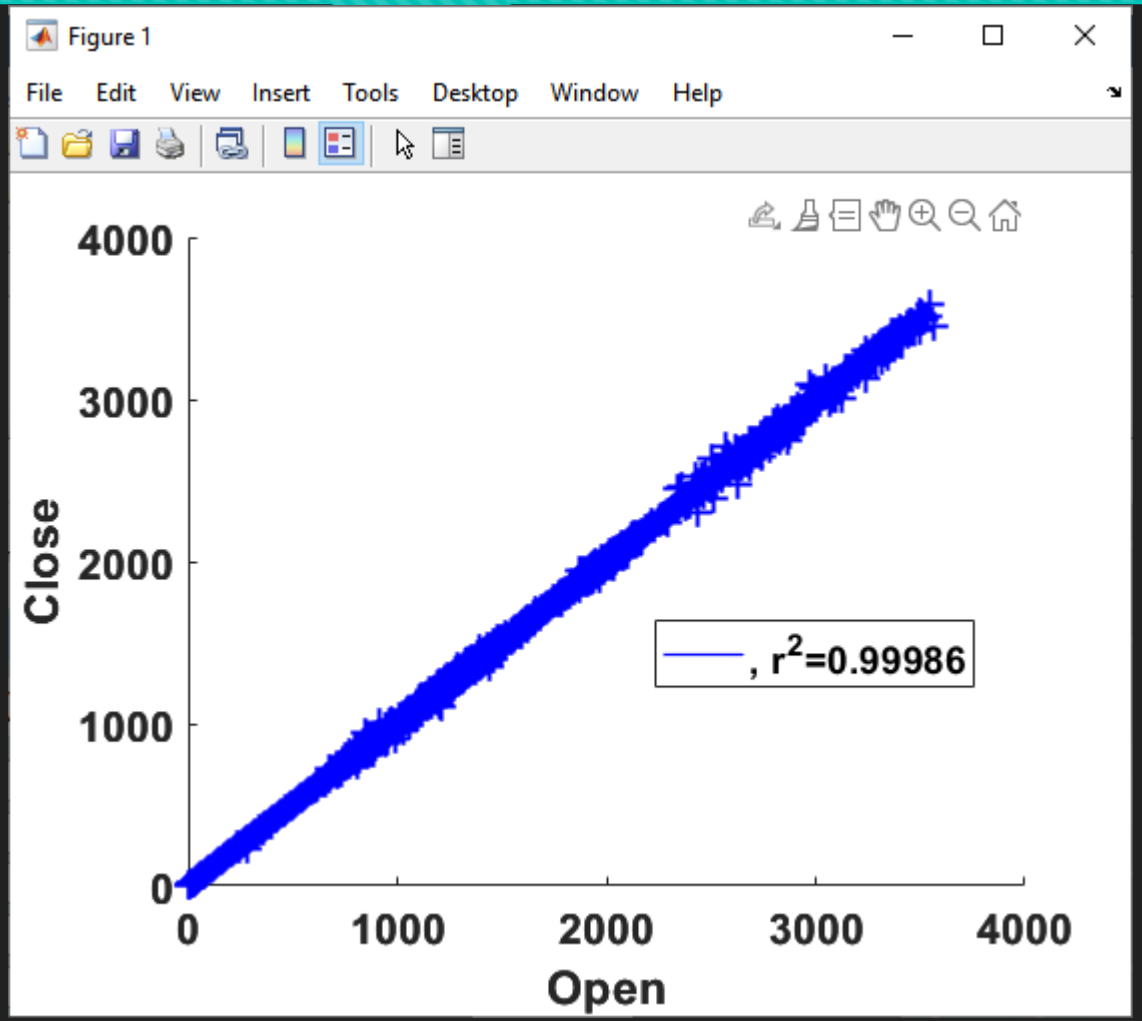
Preview

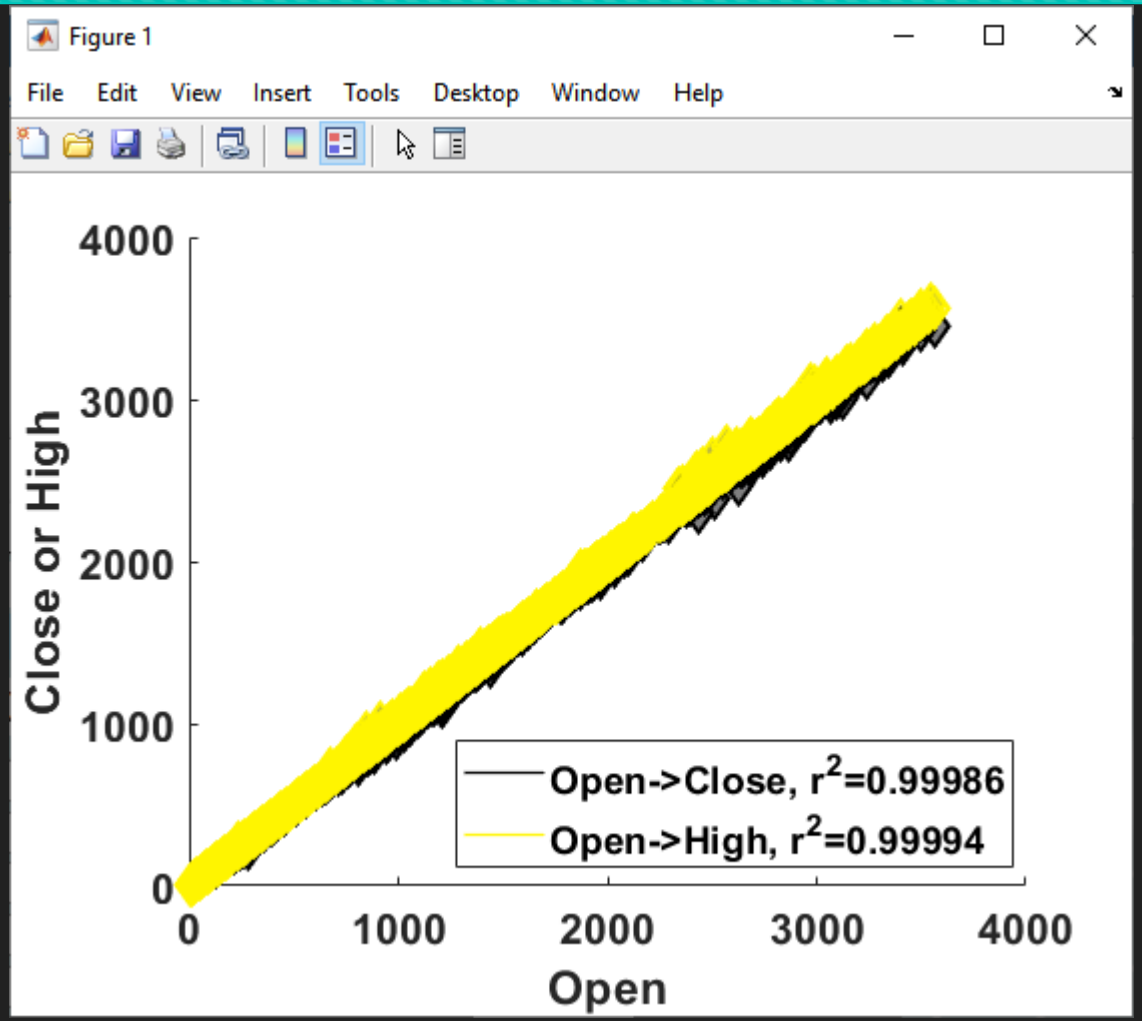
Line plots

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Correlation plots

Correlation Plots Examples



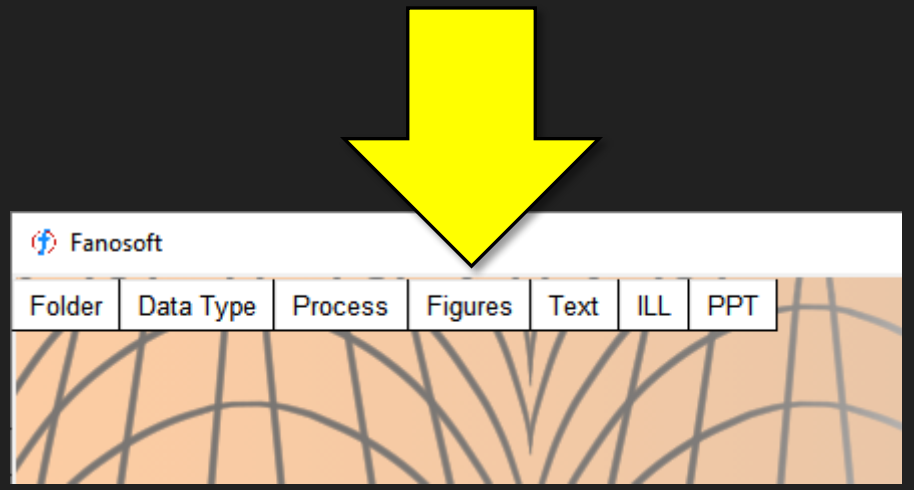


Correlation plots

- Up to 8 correlation plots on the same figure
- Display the coefficient of determination (r^2) for each correlation plot
  - r^2 is a measure of goodness of fit (between 0 and 1: 0 = bad fit, 1 = perfect fit)
- Variables must have been imported (See Importing Numerical Data)
- Plot options are configurable:
  - Line style: solid or dashed
  - Symbols: Circles, Diamonds, Squares or Varied
  - Colors: No color, Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - X label, Y label and figure name

Correlation Plots

- Click on Figures

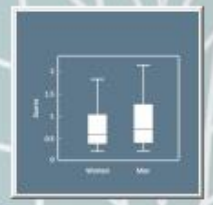
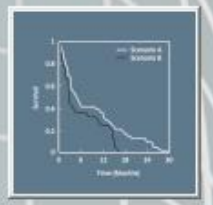


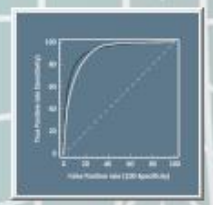
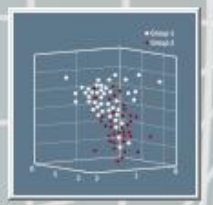
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

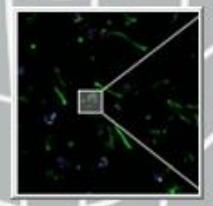
Figures

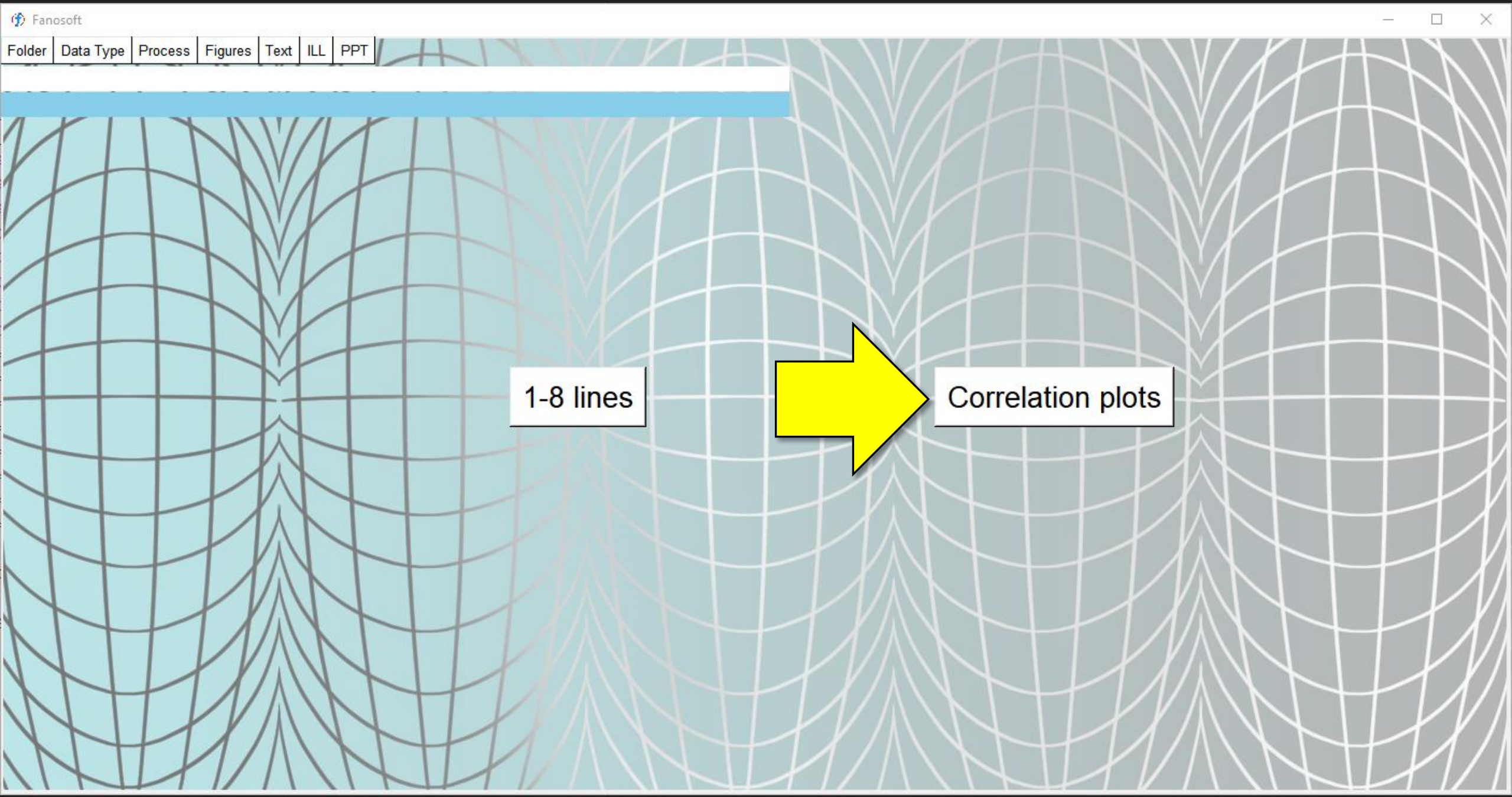





Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
1-8 lines
Correlation plots

Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

{S&P500 index from 1927 to 2020} Correlation

	X Axis	Y Axis		
Line #1	Open	Close	Legend	
Line #2			Legend	
Line #3			Legend	
Line #4			Legend	
Line #5			Legend	
Line #6			Legend	
Line #7			Legend	
Line #8			Legend	

Figure Name: Correlation

Color | Style | Symbols

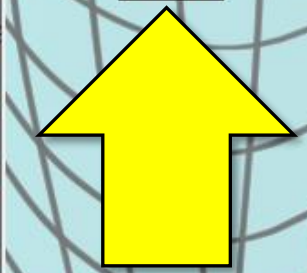
Data Name

Y Left Label: Close

X Label: Open

SUBMIT

Preview

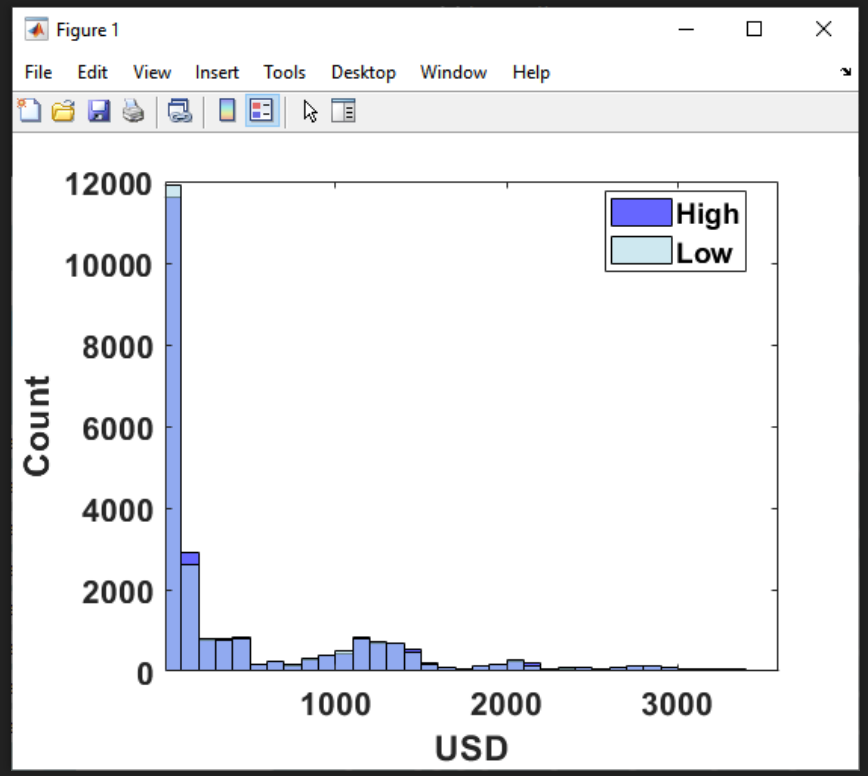


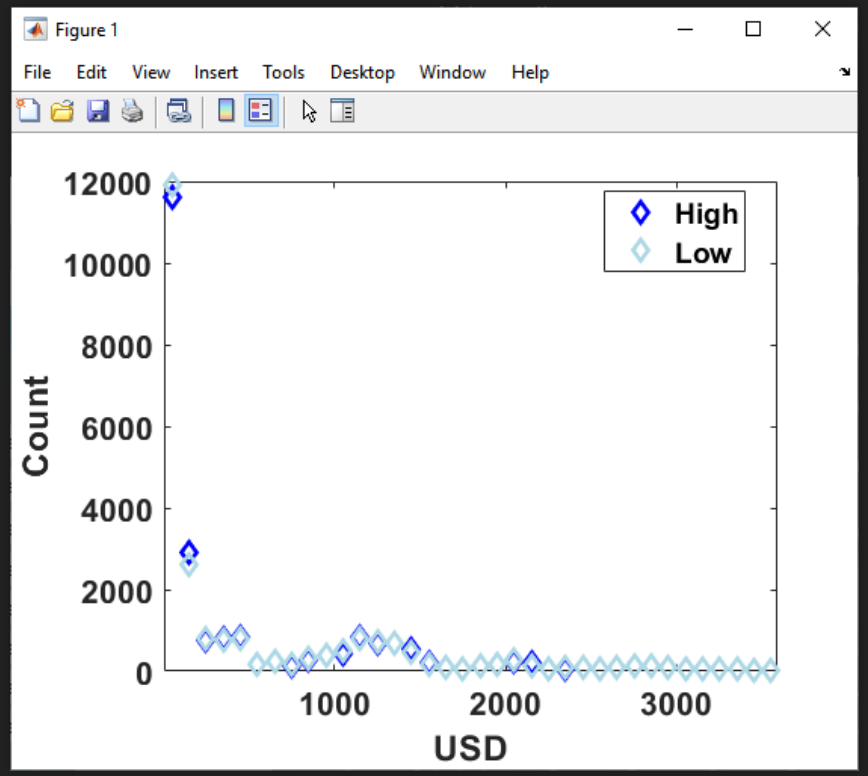
Correlation plots

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Histograms

Histograms Examples



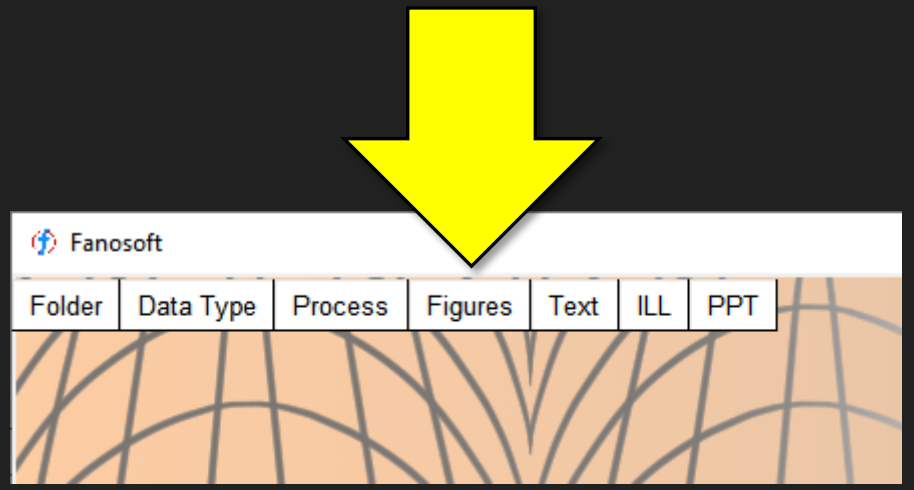


Histograms

- An histogram shows how often each different value in a set of data occurs
- Up to 8 histograms on the same figure
- Variables must have been imported (See Importing Numerical Data)
- Histogram options are configurable:
  - Style: Bars, Circles, Diamonds, Squares or Varied
  - Colors: Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Opacity: can be set between 0 and 1 (for bars only)
  - X label, Y label and figure name
  - Optional log or log/log axes

Histograms

- Click on Figures

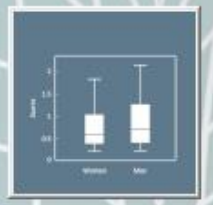
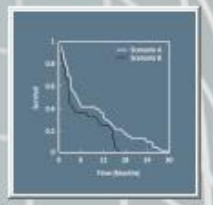


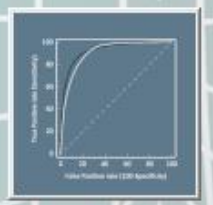
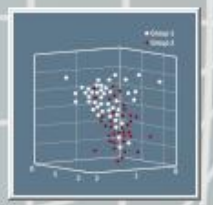
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

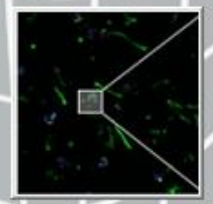
Figures



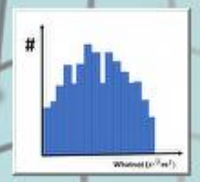




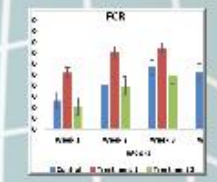


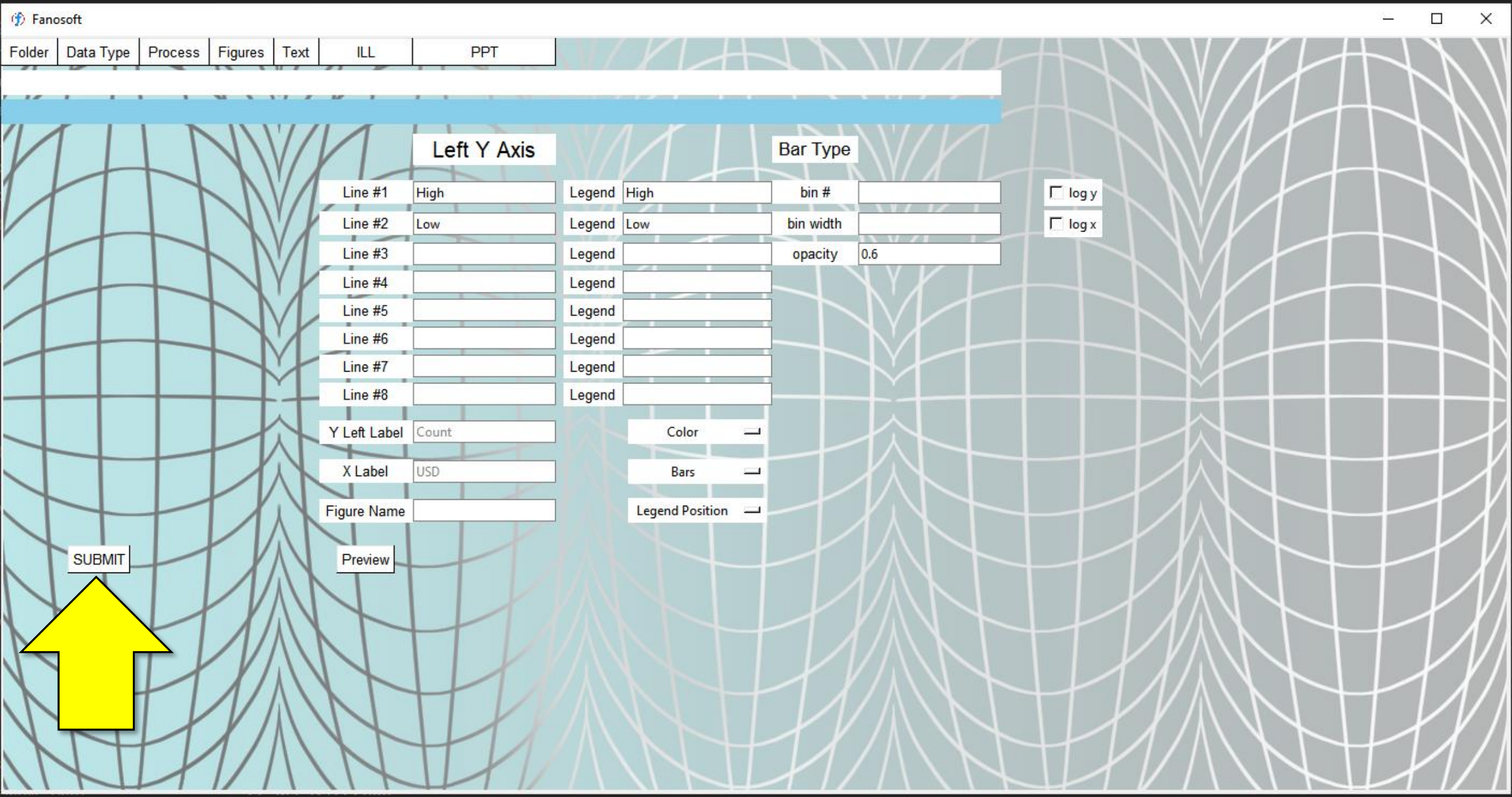



Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT





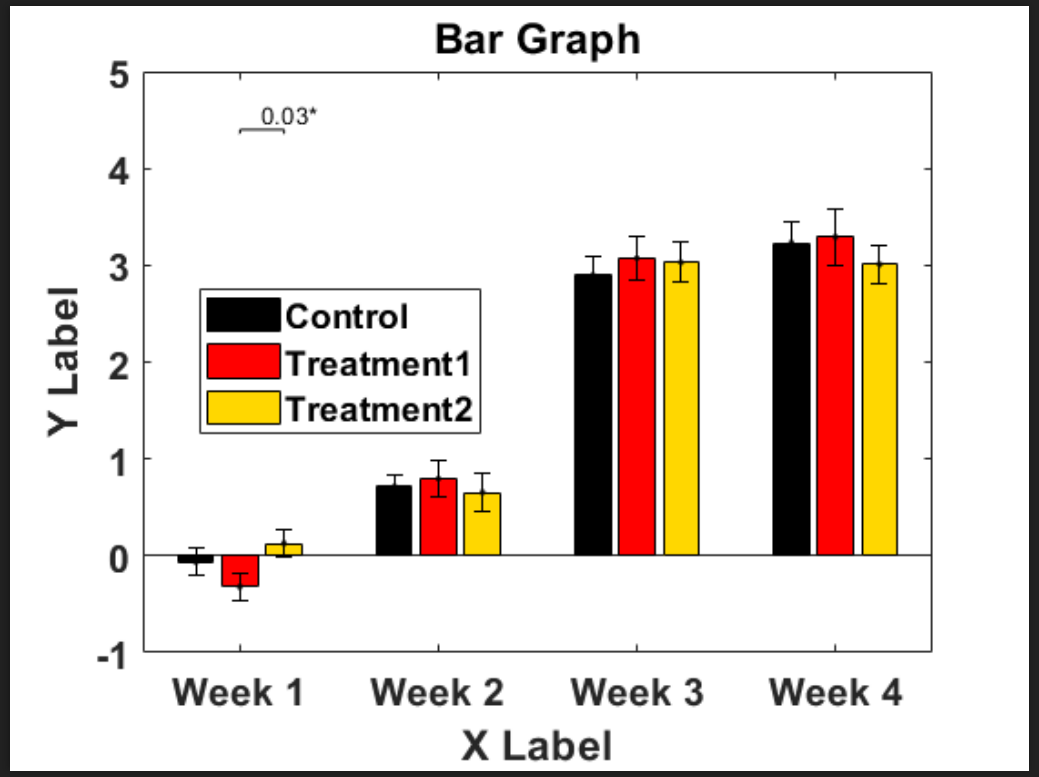

Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
Left Y Axis
Bar Type
Line #1
High
Legend
High
bin #
log y
Line #2
Low
Legend
Low
bin width
log x
Line #3
Legend
opacity
0.6
Line #4
Legend
Line #5
Legend
Line #6
Legend
Line #7
Legend
Line #8
Legend
Y Left Label
Count
Color
X Label
USD
Bars
Figure Name
Legend Position
SUBMIT
Preview

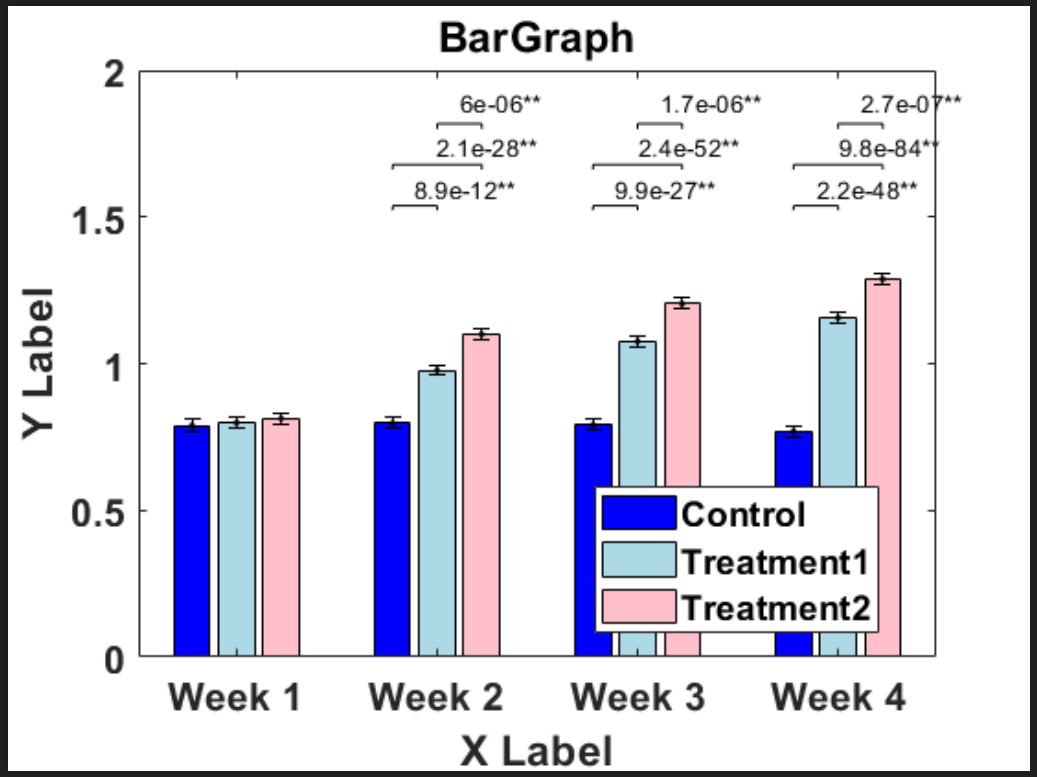
Histograms

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Bar Graphs

Bar Graphs Examples





Bar Graphs

- Bar charts plot bars for categorical groups, e.g.
  - Bars: Control, Treatment1, Treatment 2
  - Groups: Week1, Week2, Week3, Week4

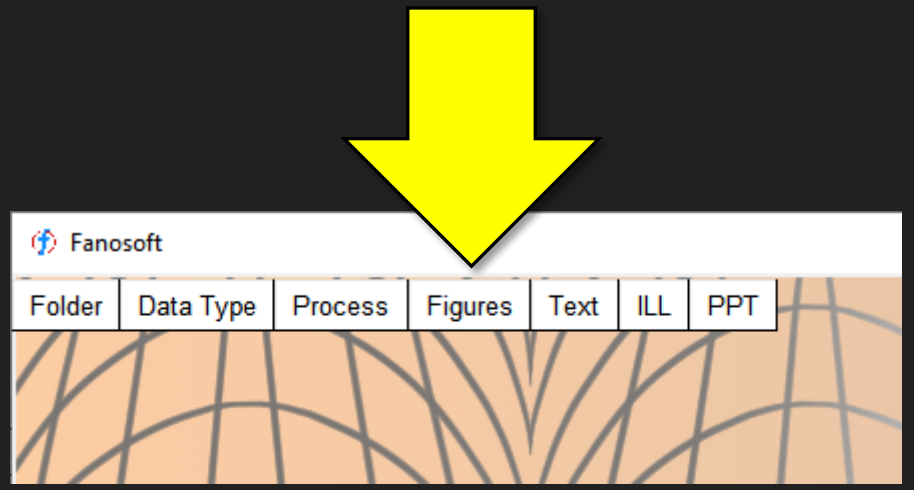
- Each “bar” displays the mean value +/- standard error of the meanos the data

Bar Graphs

- Up to 5 groups of 4 bars
- Variables must have been imported (See Importing Numerical Data)
- Bar chat options are configurable:
  - Colors: Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Bar Names, group names, X label, Y label and figure name
  - Display gird: on or off
  - Display standard error of the mean: on or off
  - Display p-values: on or off
    - Low p-value => the difference between the means of 2 bars is statistically significant

Bar Graphs

- Click on Figures

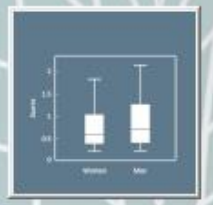
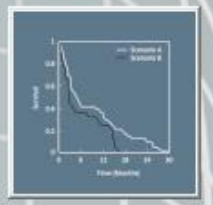


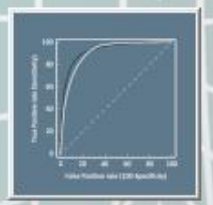
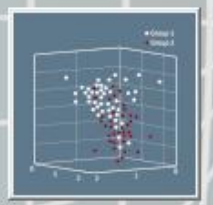
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

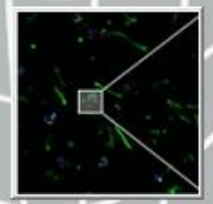
Figures



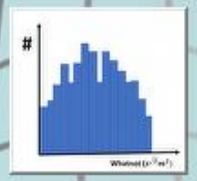




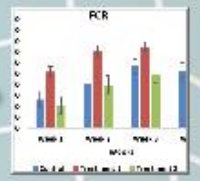


Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT





Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

w1c w1t1 w1t2 w2c w2t1 w2t2 w3c w3t1 w3t2 w4c w4t1 w4t2

	Bar 1	Bar 2	Bar 3	Bar 4
Group 1	w1c	w1t1	w1t2	
Group 2	w2c	w2t1	w2t2	
Group 3	w3c	w3t1	w3t2	
Group 4	w4c	w4t1	w4t2	
Group 5				
Bar Names	Control	Treatment1	Treatment2	

Group 1 Name: Week 1
Group 2 Name: Week 2
Group 3 Name: Week 3
Group 4 Name: Week 4
Group 5 Name:

X Label: X Label
Y Label: Y Label
Figure Name: BarGraph

Color
Legend Position

☐ grid on
☐ log y
☑ stdError
☑ pvalue

SUBMIT

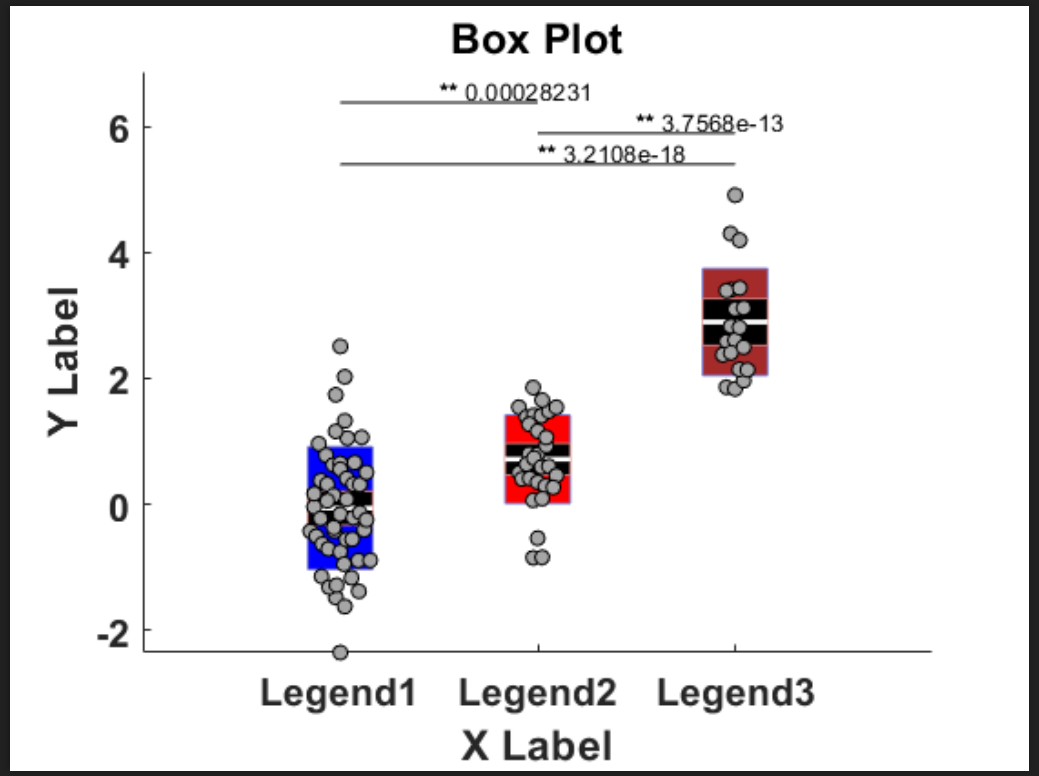
Preview

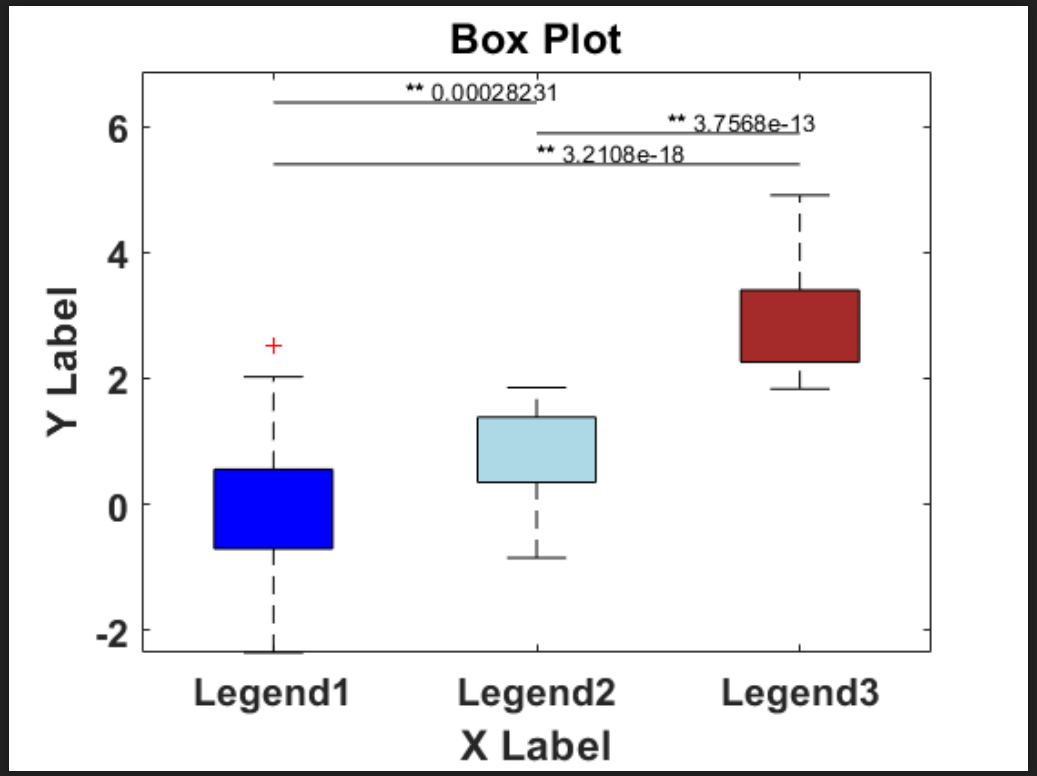
Bar Graphs

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

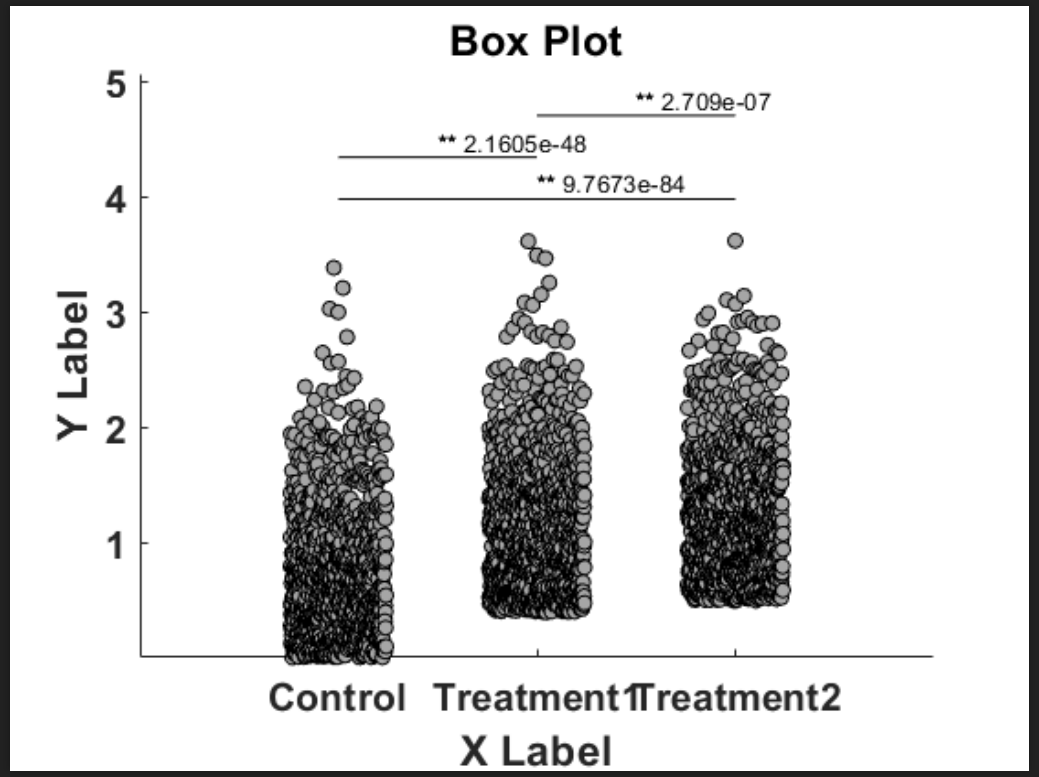
Box Plots

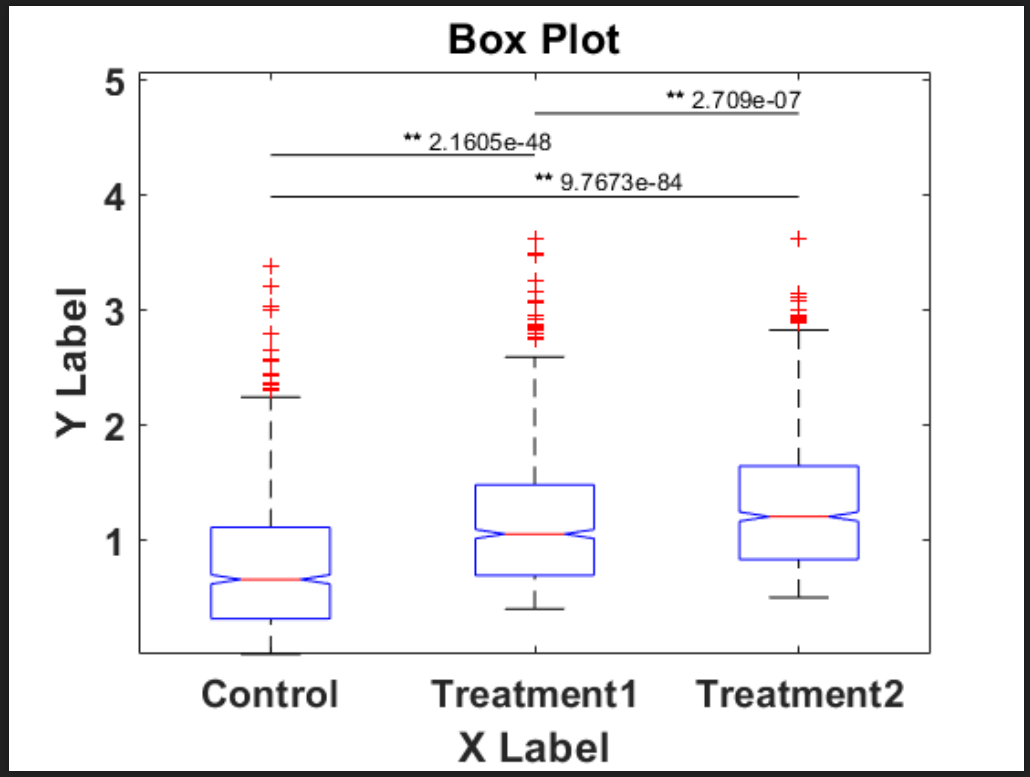
Box Plots Examples





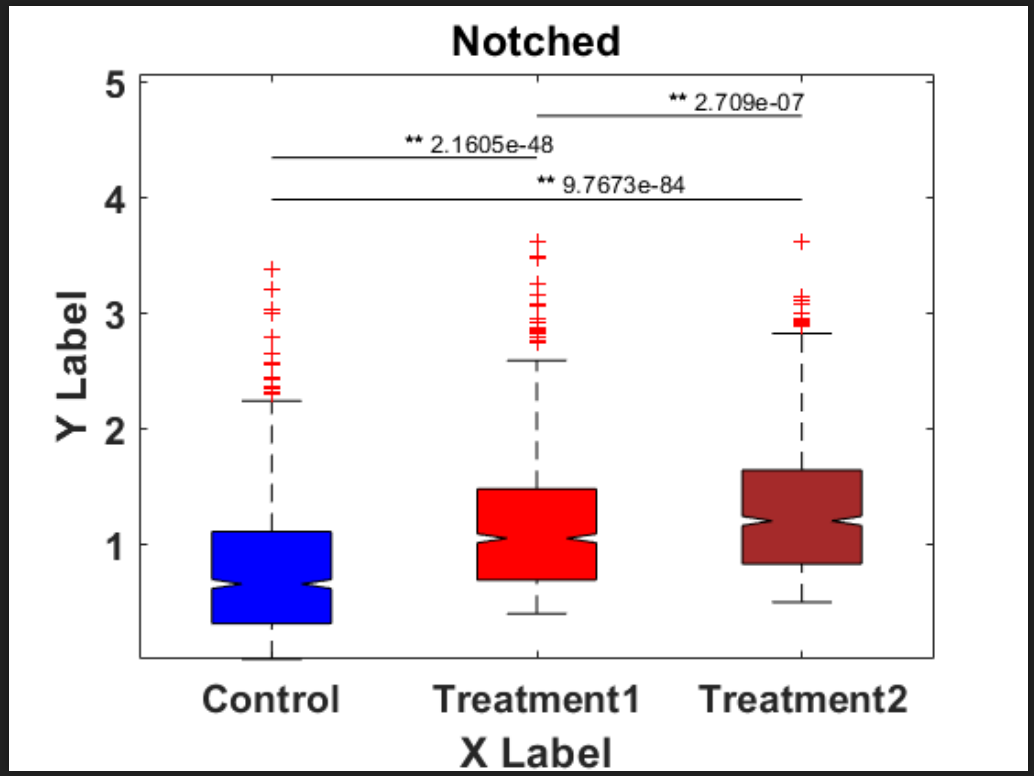
Box Plots Examples



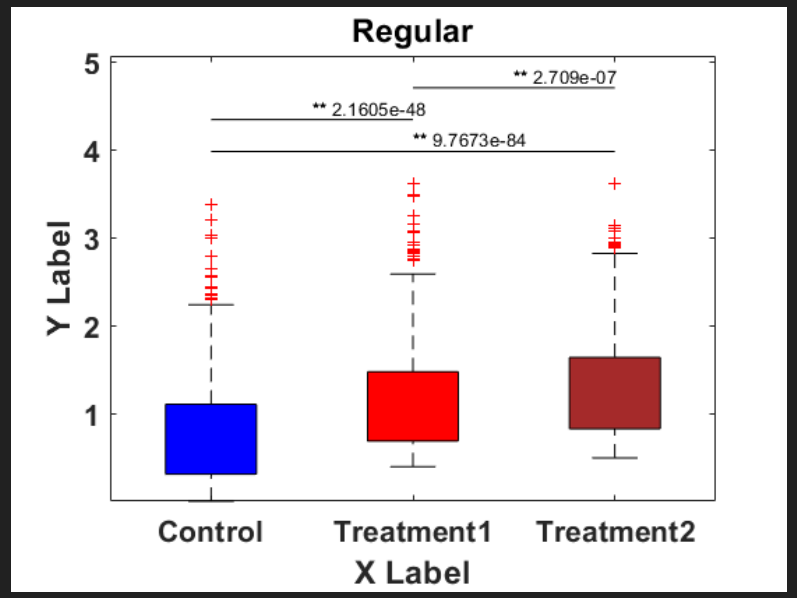


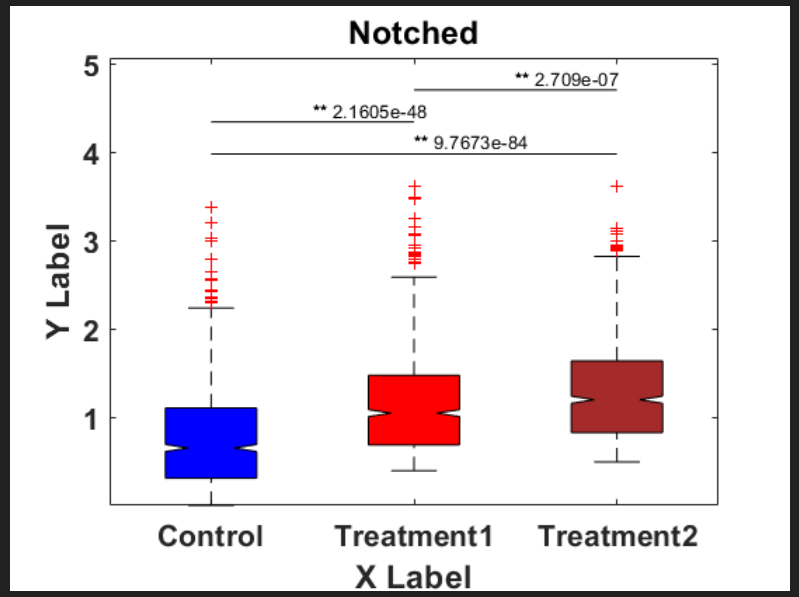
Box Plots

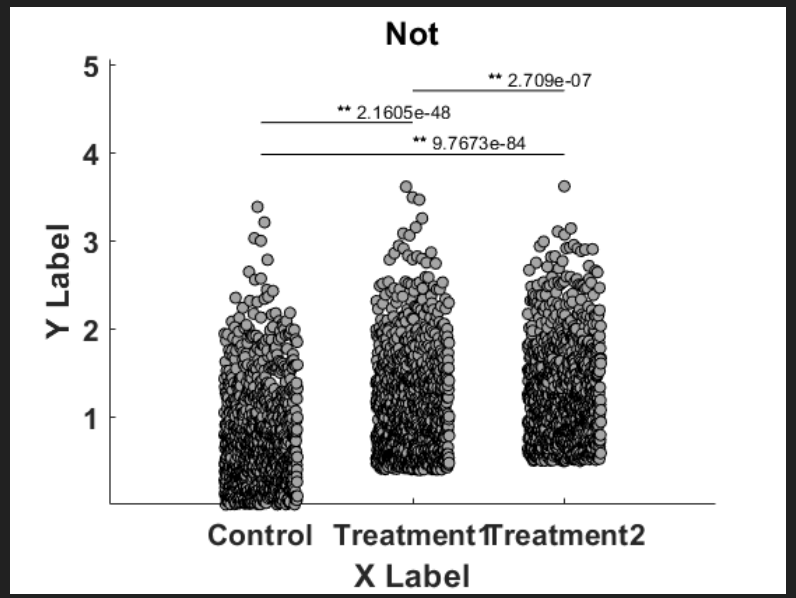
- Creates a box for each column
- On each box:
  - The bottom and top edges of the box indicate the 25th and 75th percentiles respectively
  - The central mark indicates the median
  - The whiskers extend to the most extreme points not considered outliers
  - The outliers are plotted individually



Box Plots Styles

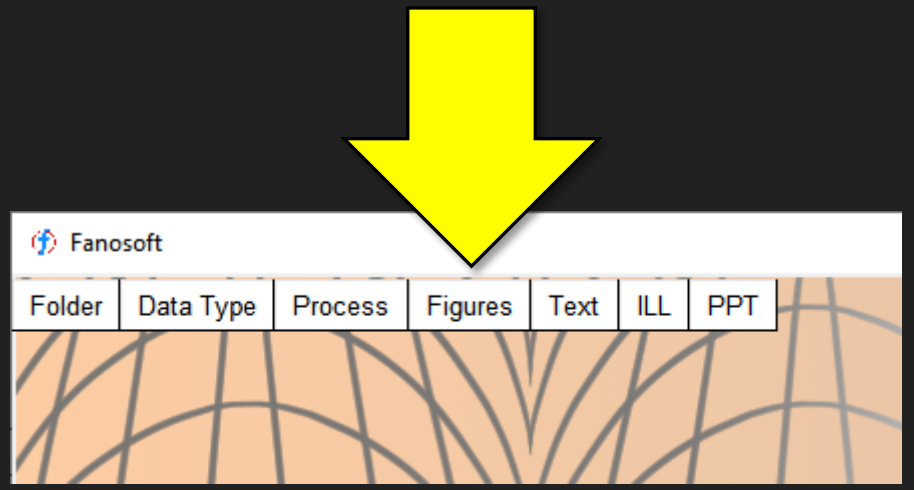






Box Plots

- Click on Figures

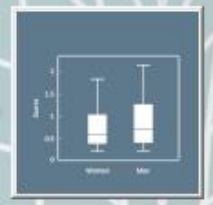
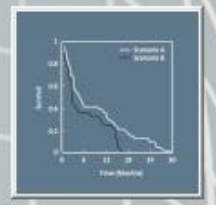


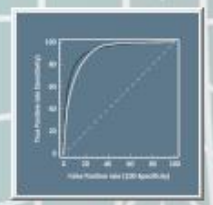
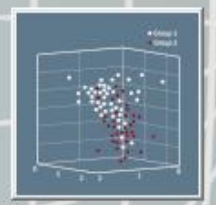
Fanosoft

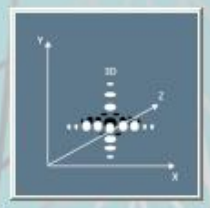
Folder | Data Type | Process | Figures | Text | ILL | PPT

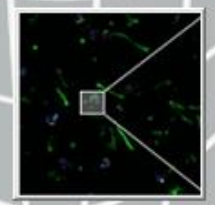
Figures



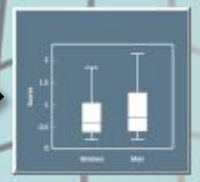


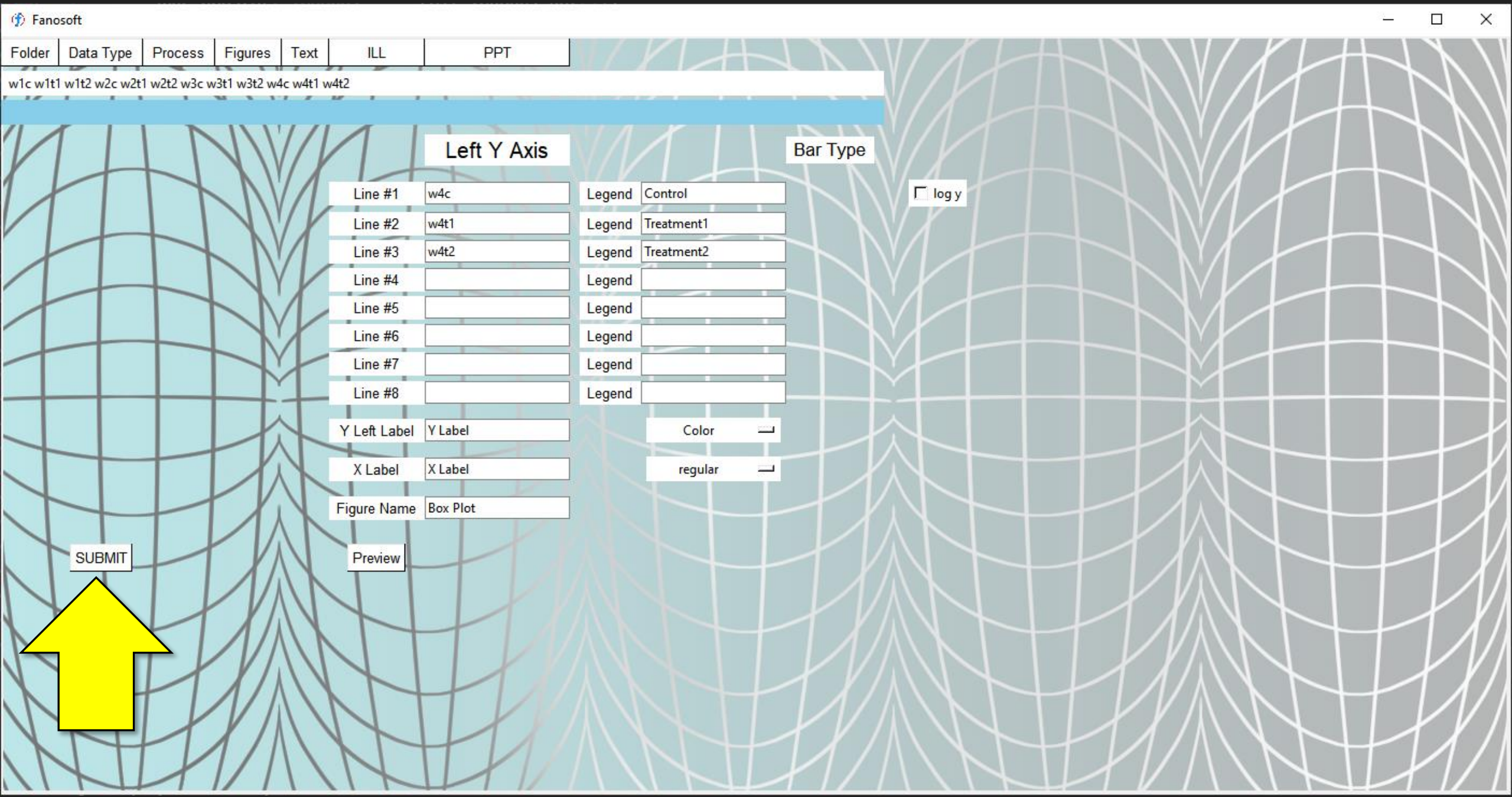



Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

w1c w1t1 w1t2 w2c w2t1 w2t2 w3c w3t1 w3t2 w4c w4t1 w4t2



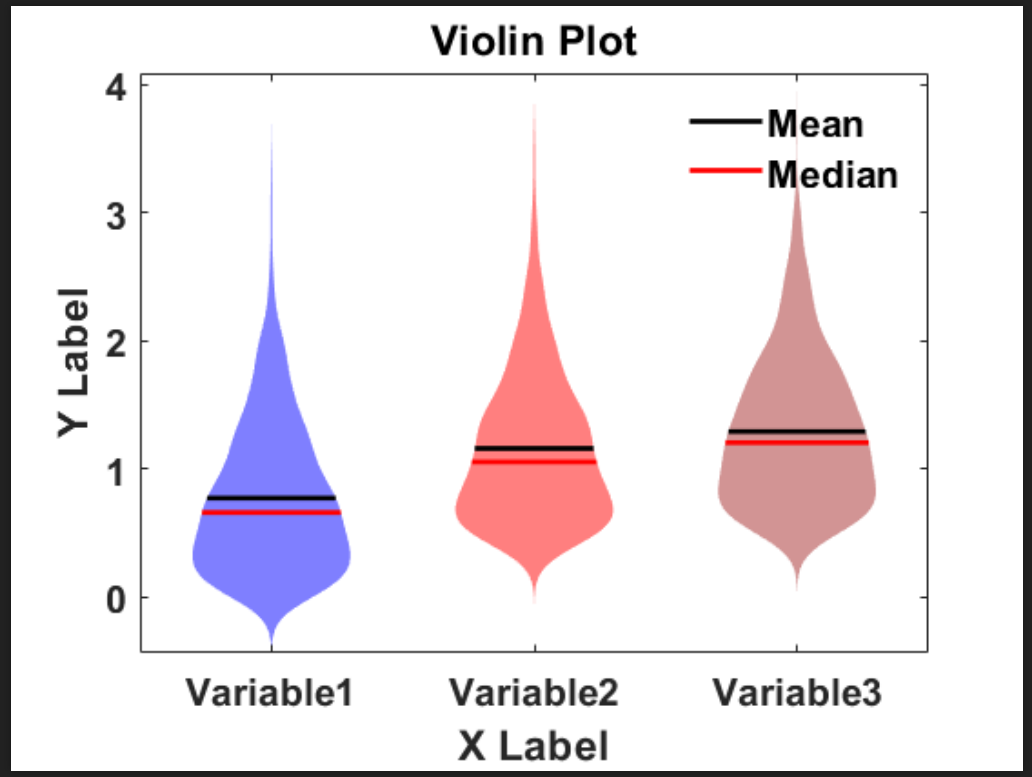

Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
w1c w1t1 w1t2 w2c w2t1 w2t2 w3c w3t1 w3t2 w4c w4t1 w4t2
Left Y Axis
Bar Type
log y
Line #1
w4c
Legend
Control
Line #2
w4t1
Legend
Treatment1
Line #3
w4t2
Legend
Treatment2
Line #4
Legend
Line #5
Legend
Line #6
Legend
Line #7
Legend
Line #8
Legend
Y Left Label
Y Label
Color
X Label
X Label
regular
Figure Name
Box Plot
SUBMIT
Preview

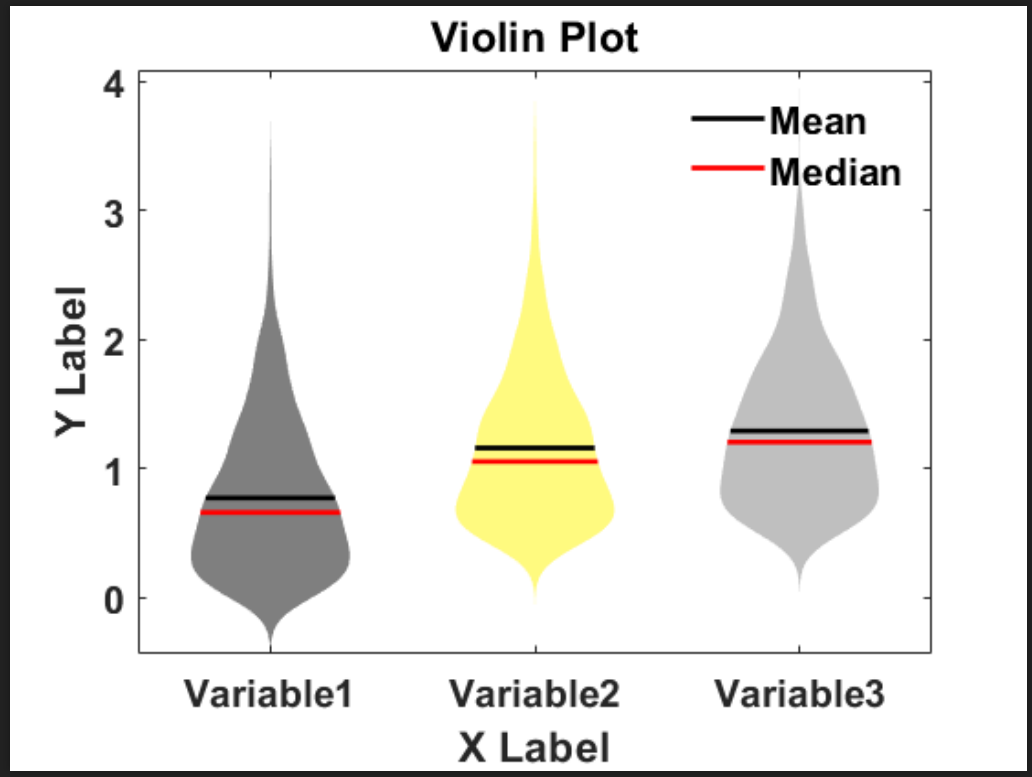
Box Plots

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Violin Plots

Violin Plots Examples



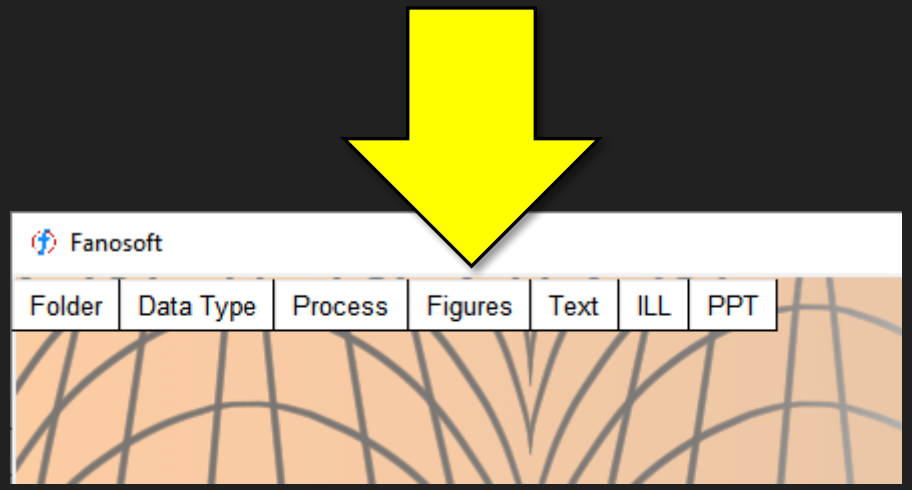


Violin Plots

- Violin plots plot the estimated probability density of the data
- The estimate probability density is based on a normal kernel function
- The mean and median of the data is also displayed

Violin Plots

- Click on Figures

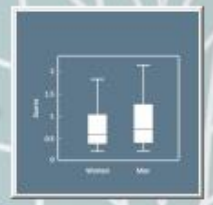
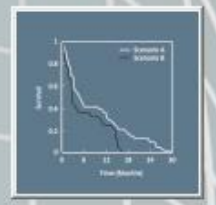


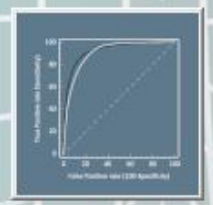
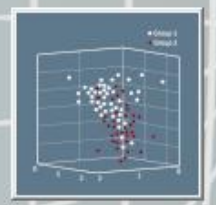
Fanosoft

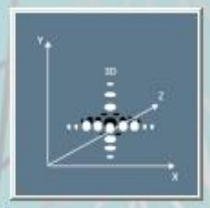
Folder | Data Type | Process | Figures | Text | ILL | PPT

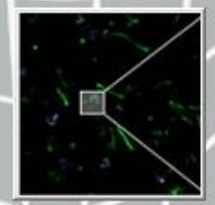
Figures



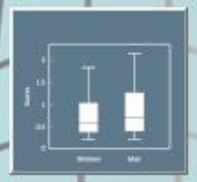


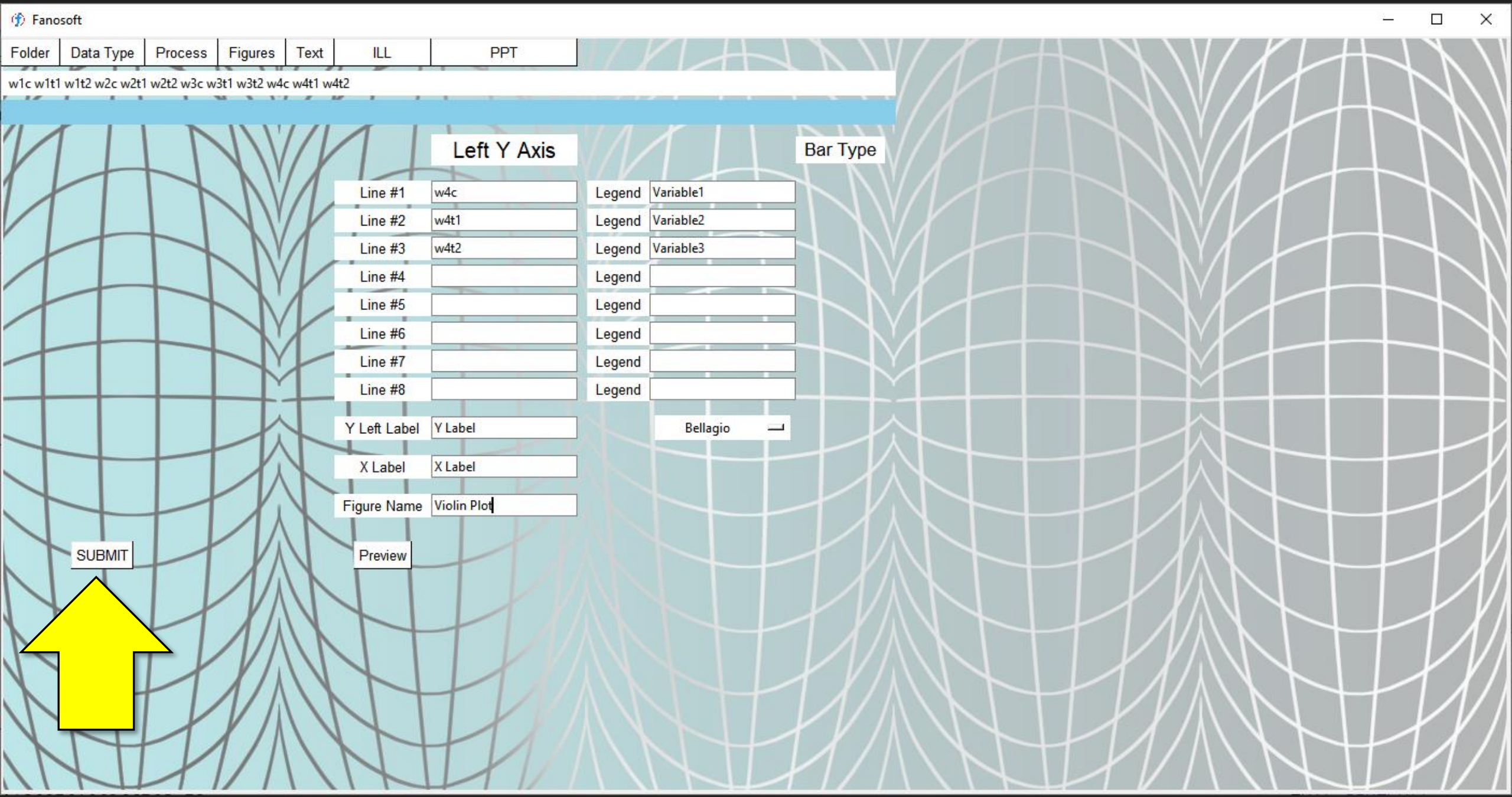



Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

w1c w1t1 w1t2 w2c w2t1 w2t2 w3c w3t1 w3t2 w4c w4t1 w4t2



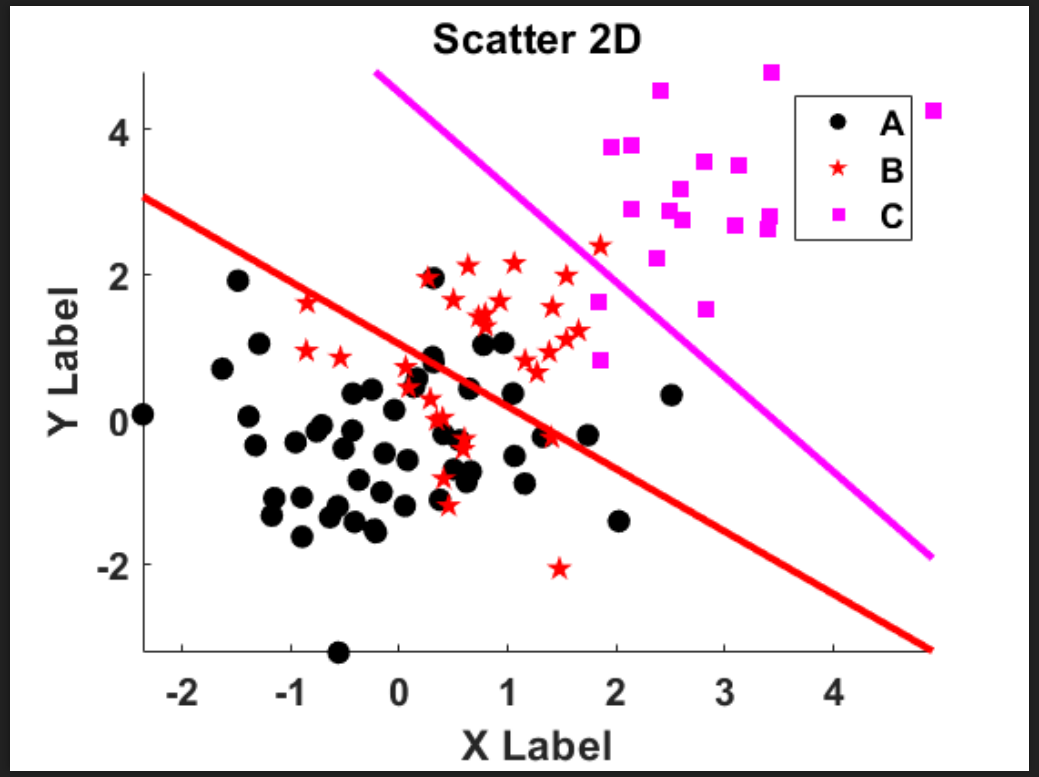

Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
w1c w1t1 w1t2 w2c w2t1 w2t2 w3c w3t1 w3t2 w4c w4t1 w4t2
Left Y Axis
Bar Type
Line #1
w4c
Legend
Variable1
Line #2
w4t1
Legend
Variable2
Line #3
w4t2
Legend
Variable3
Line #4
Legend
Line #5
Legend
Line #6
Legend
Line #7
Legend
Line #8
Legend
Y Left Label
Y Label
Bellagio
X Label
X Label
Figure Name
Violin Plot
SUBMIT
Preview

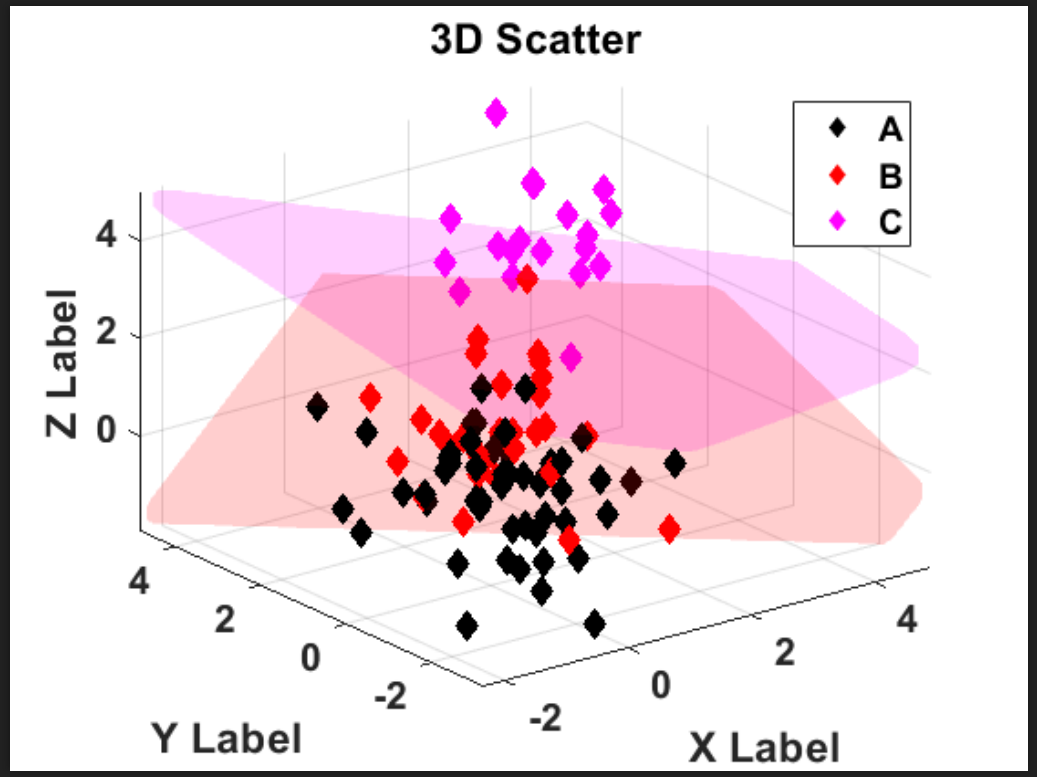
Violin Plots

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Scatter Plots

Scatter Plot Examples

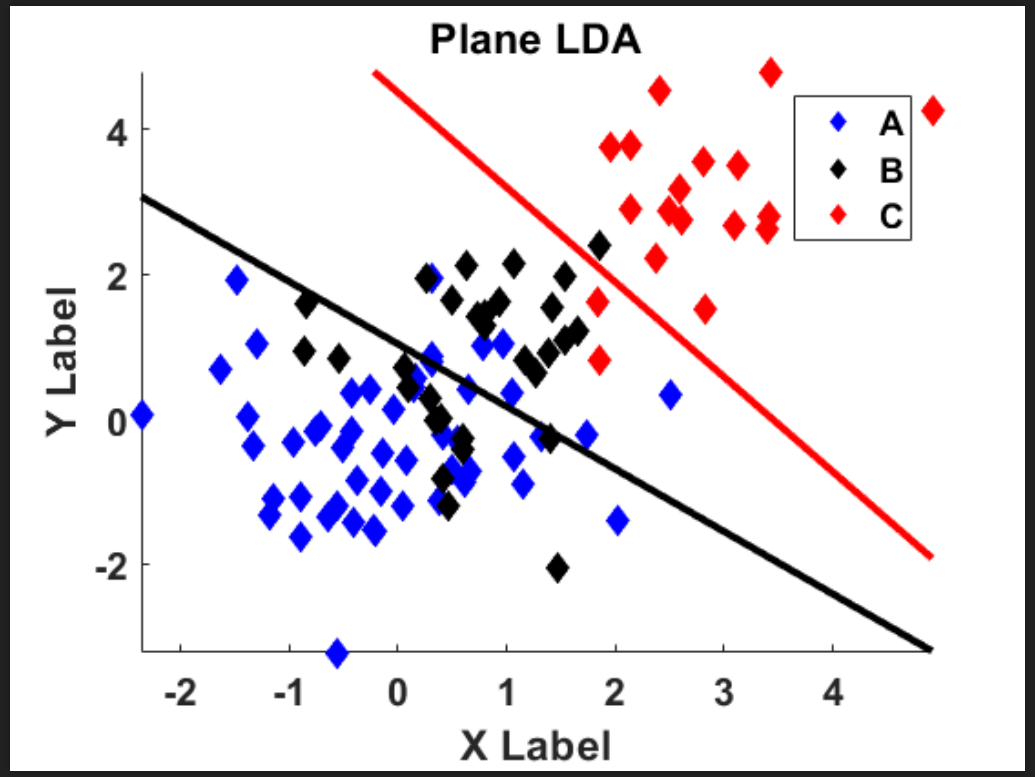


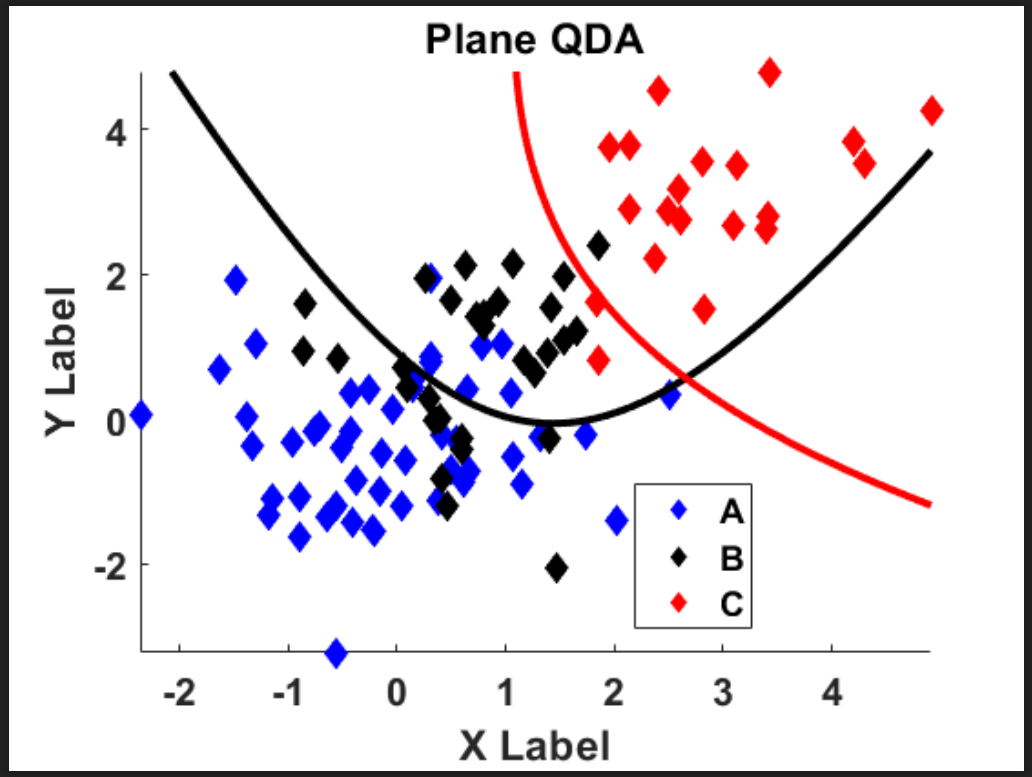


Scatter Plots

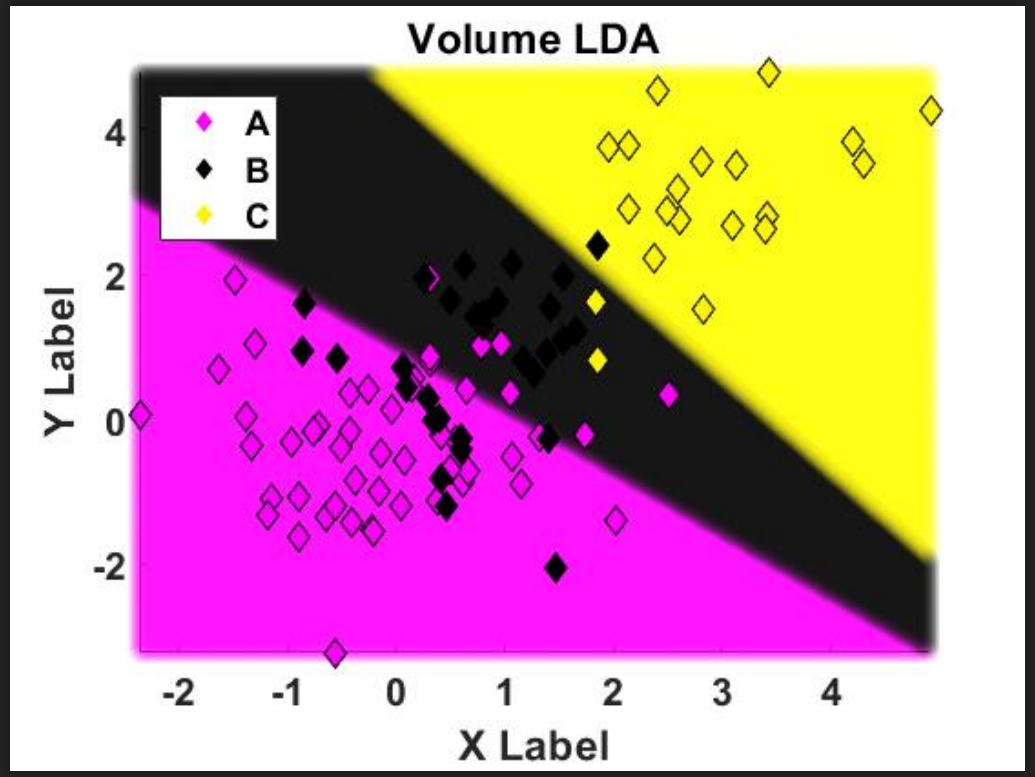
- Scatter plots in 2D (X,Y) or in 3D (X,Y,Z)
  - Up to 3 classes can be plotted on the same figure
- Optionally fit a classifier/decision boundary to separate the classes:
  - 2 classifiers available: linear (LDA) or quadratic (QDA)
- Styling options available
  - Decision Boundary: Plane, Volume or Shading (see next slides)
  - Colors: No Color, Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Symbols: Circles, Diamonds, Squares, Varied

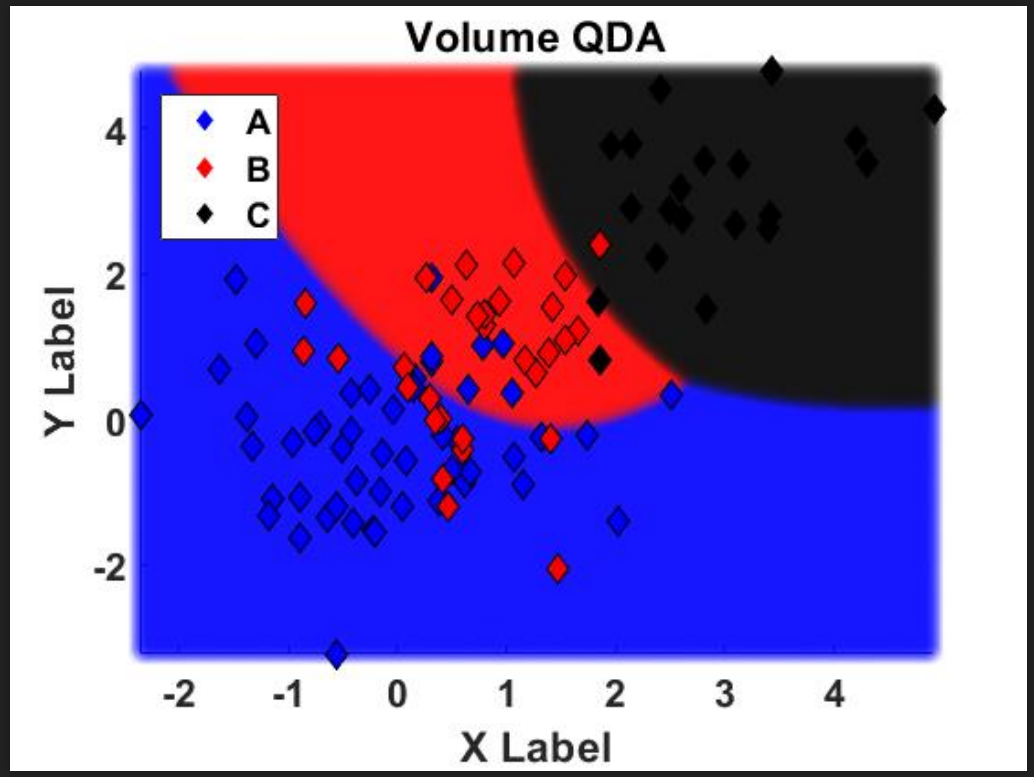
Available Decision Boundary Options (2D)



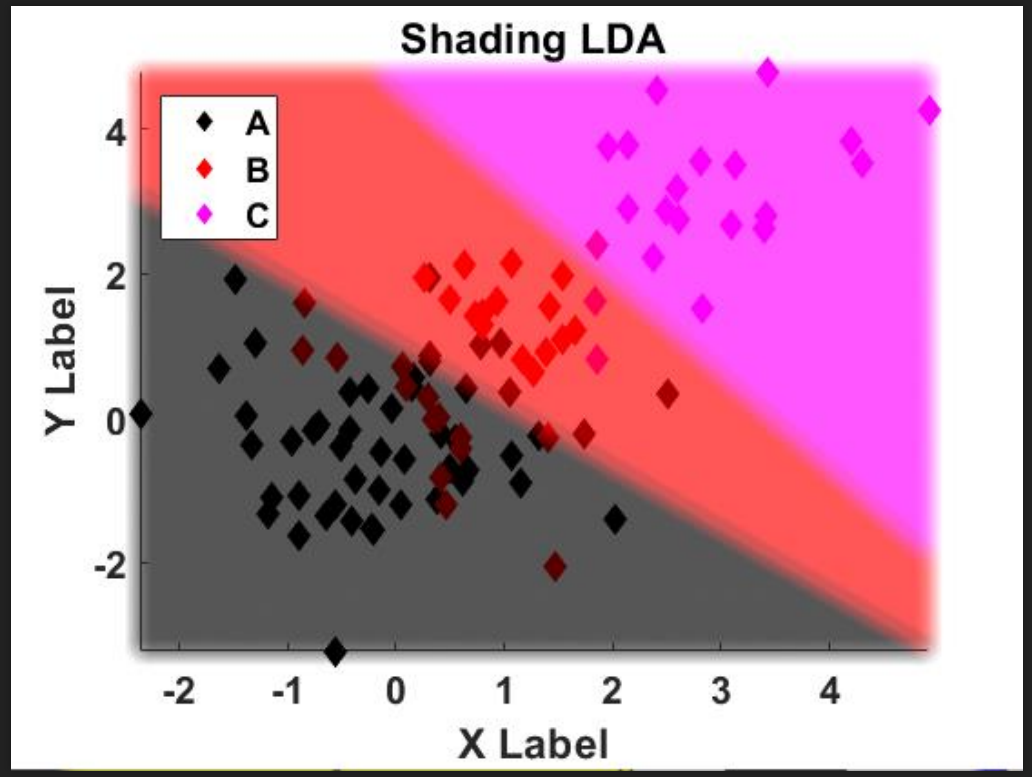


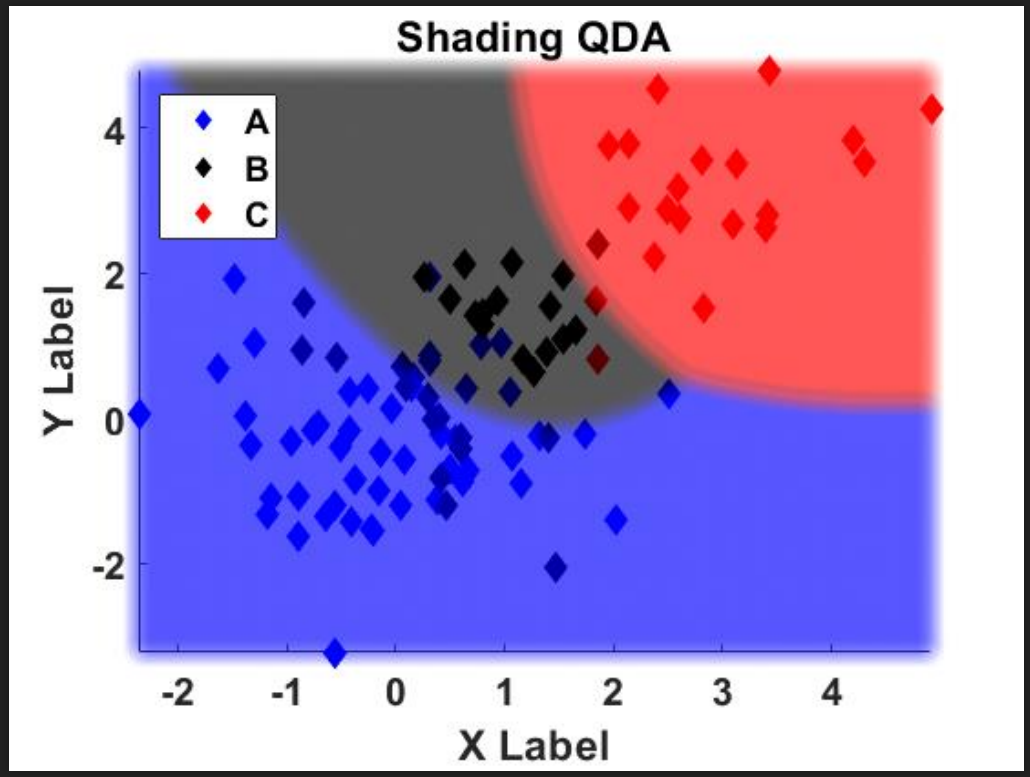
Available Decision Boundary Options (2D)



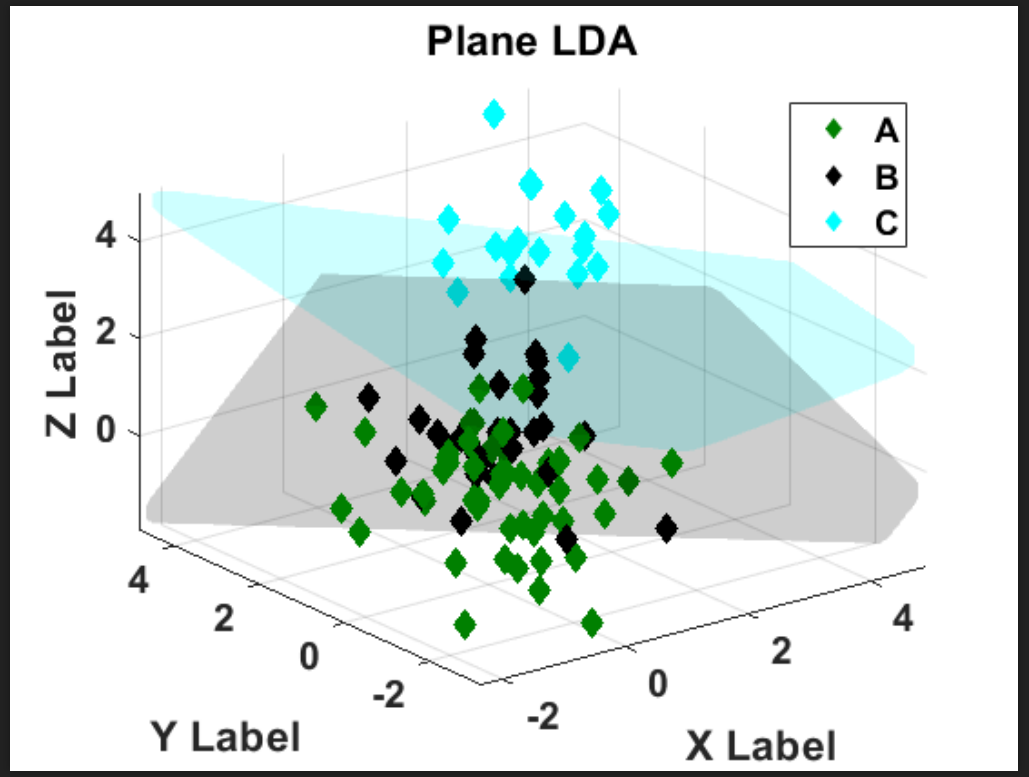


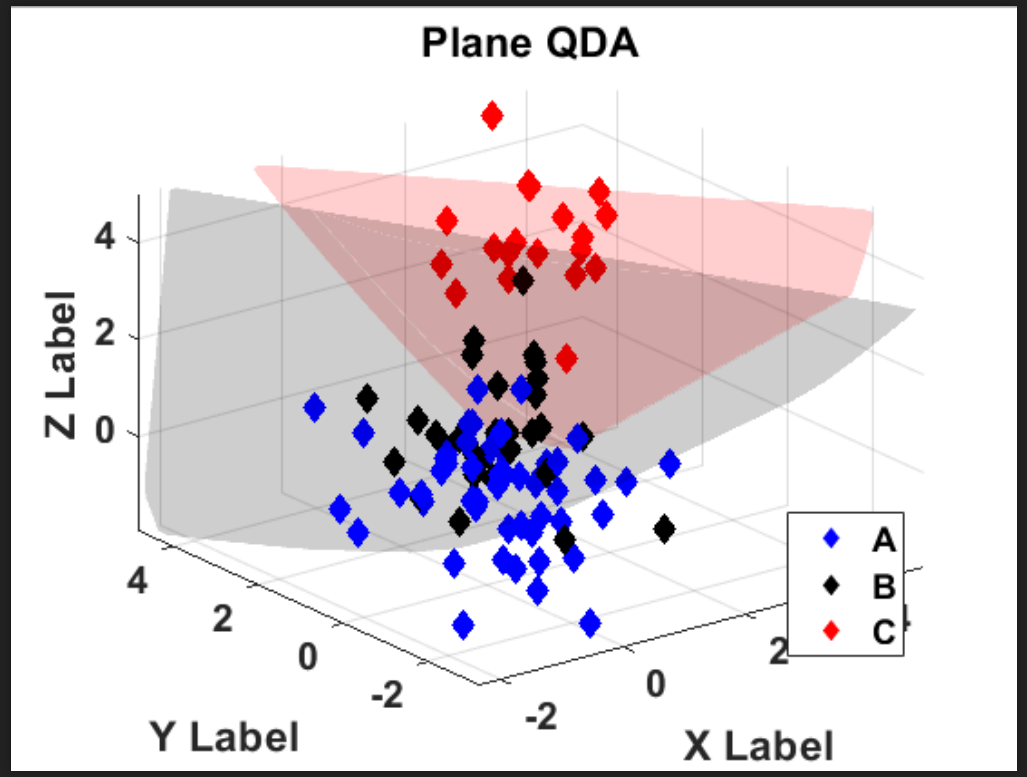
Available Decision Boundary Options (2D)



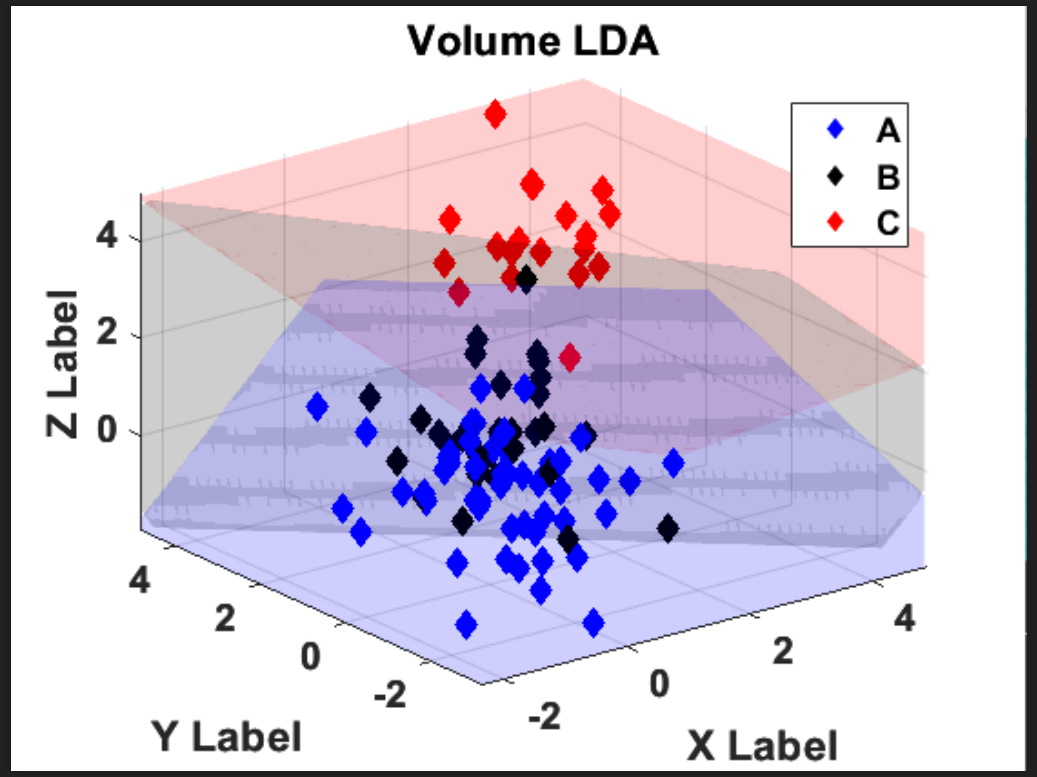


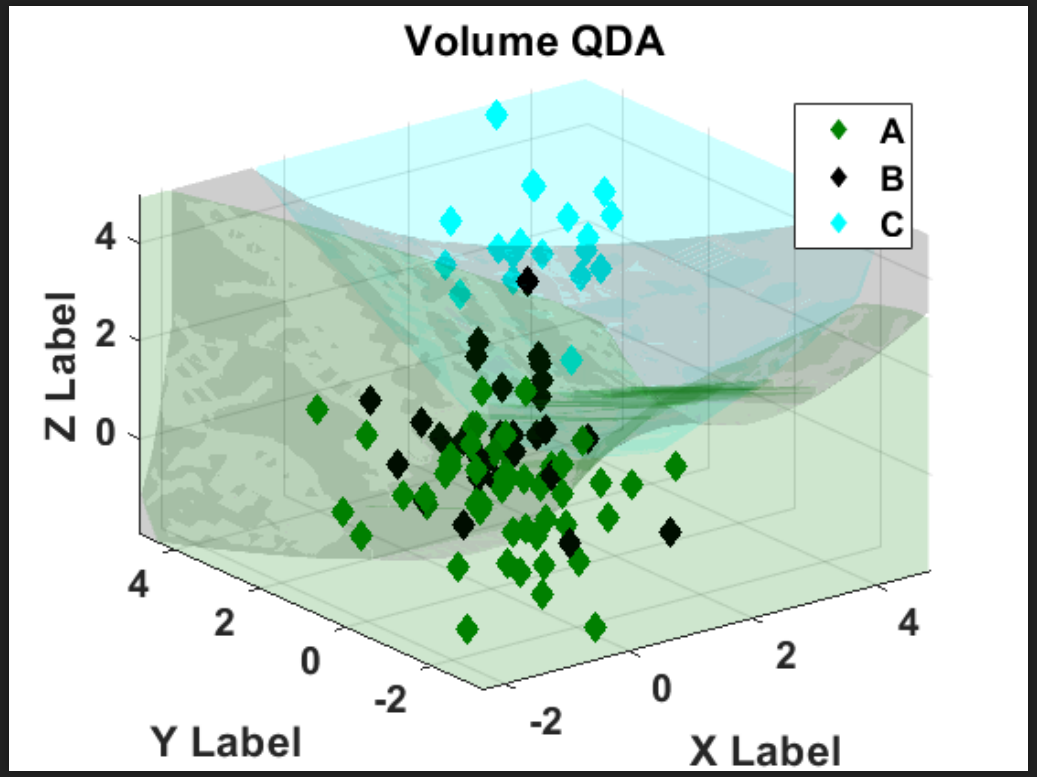
Available Decision Boundary Options (3D)



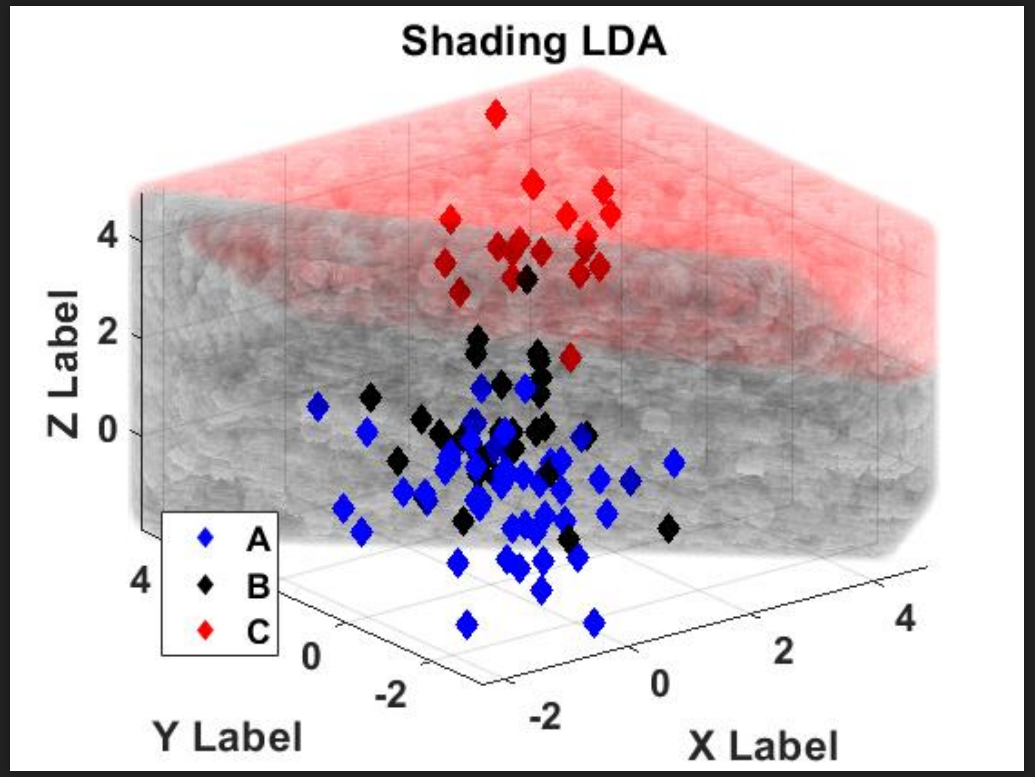


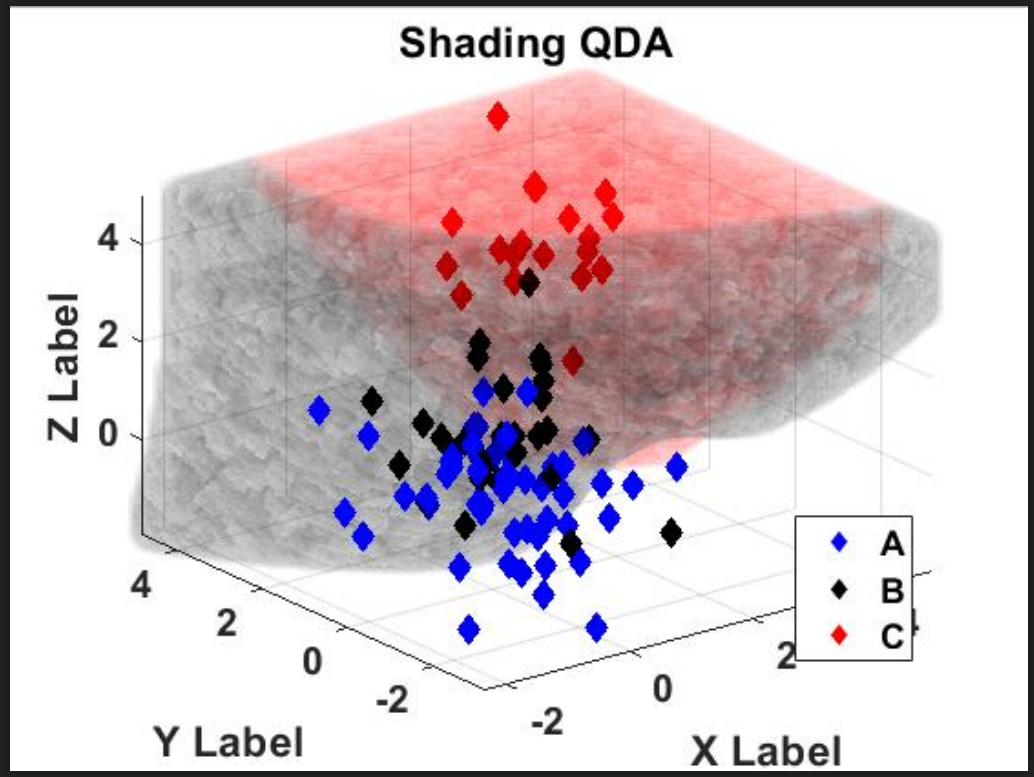
Available Decision Boundary Options (3D)





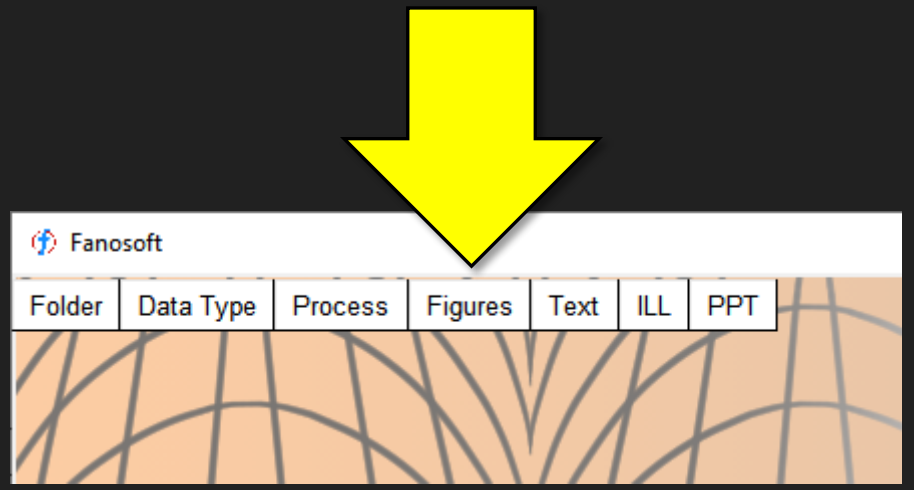
Available Decision Boundary Options (3D)





Scatter Plots

- Click on Figures

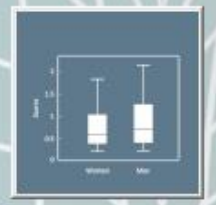
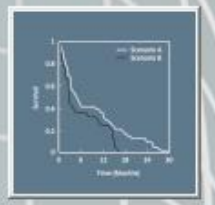


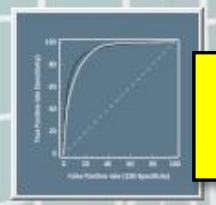
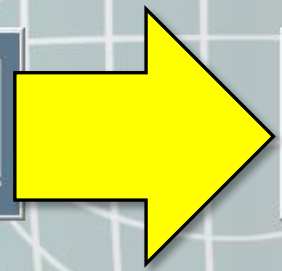
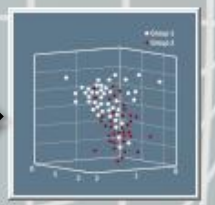
Fanosoft

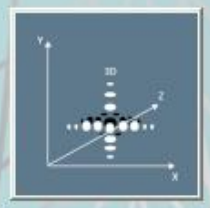
Folder | Data Type | Process | Figures | Text | ILL | PPT

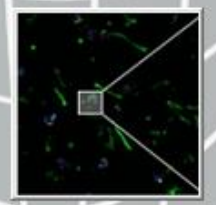
Figures

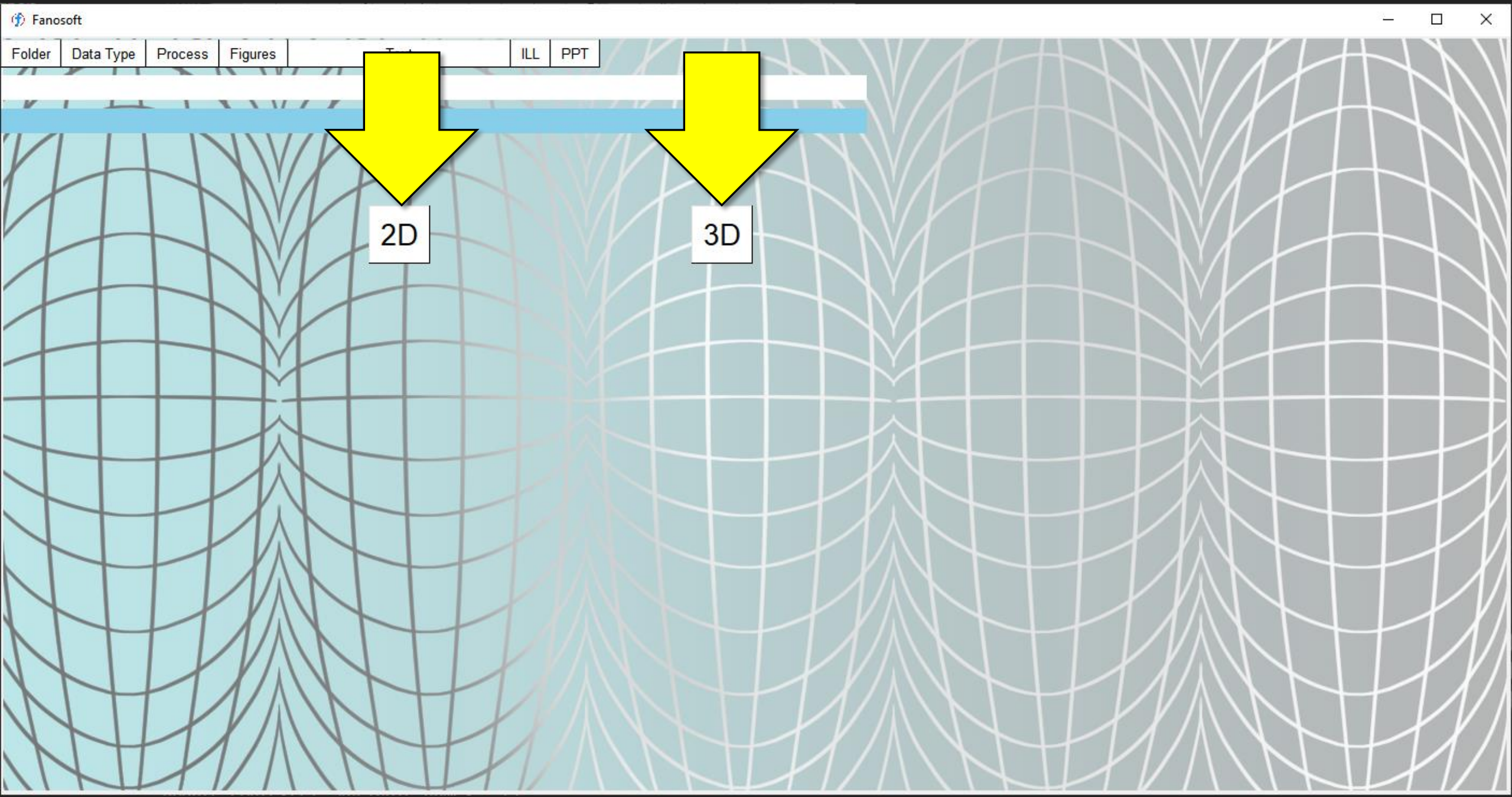





Fanosoft
Folder
Data Type
Process
Figures
ILL
PPT
2D
3D

Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

2D Scatter Plot

X vector1	ax	Y vector1	ay	Legend	A
X vector2	bx	Y vector2	by	Legend	B
X vector3	cx	Y vector3	cy	Legend	C
X Label	X Label	Y Label	Y Label	Title	Scatter 2D

Color | Symbols | Decision Boundary

Figure Name: Scatter 2D

SUBMIT

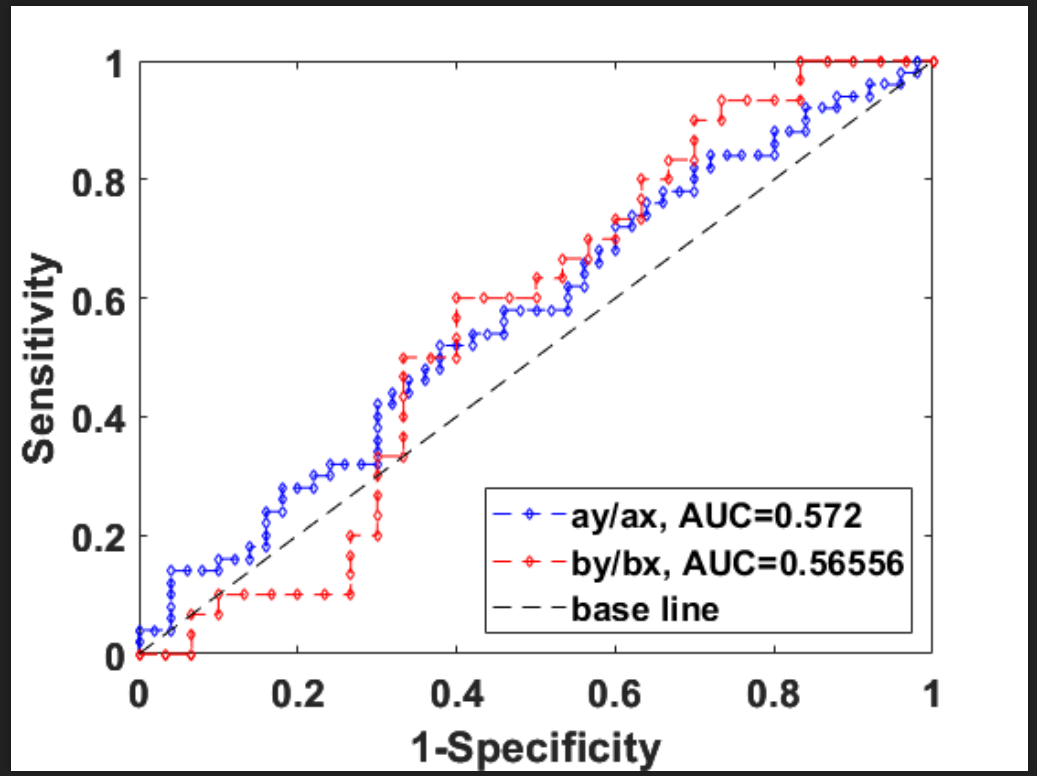
Preview

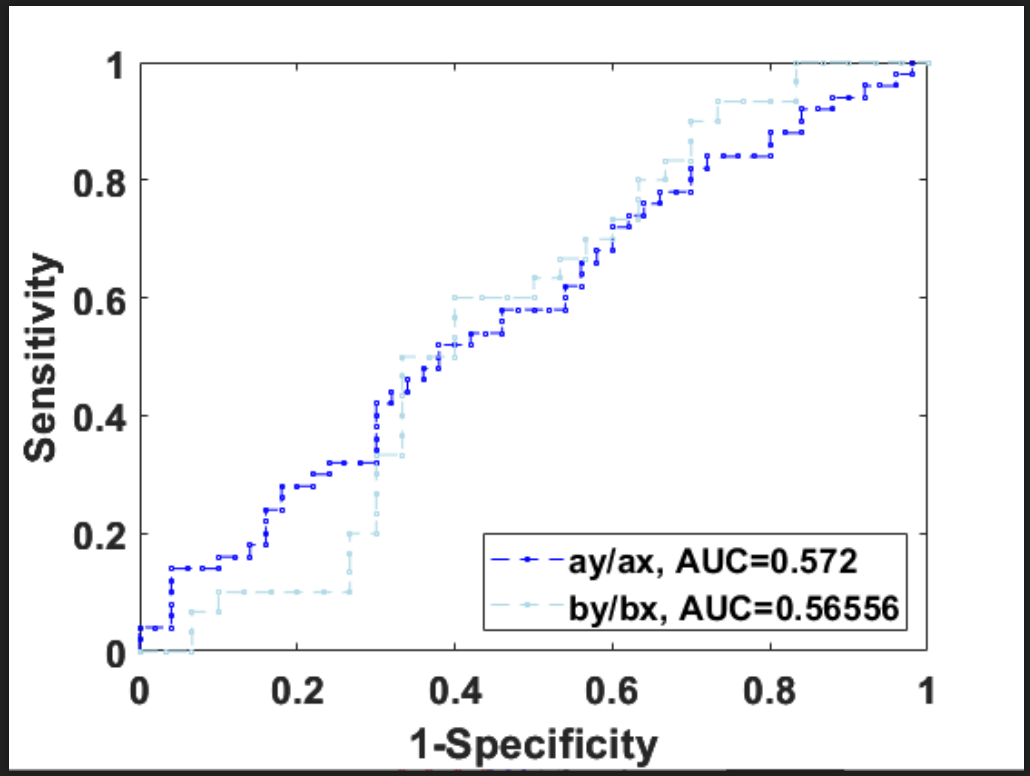
Scatter Plots

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

ROC Curves

ROC Curves Examples





ROC Curves

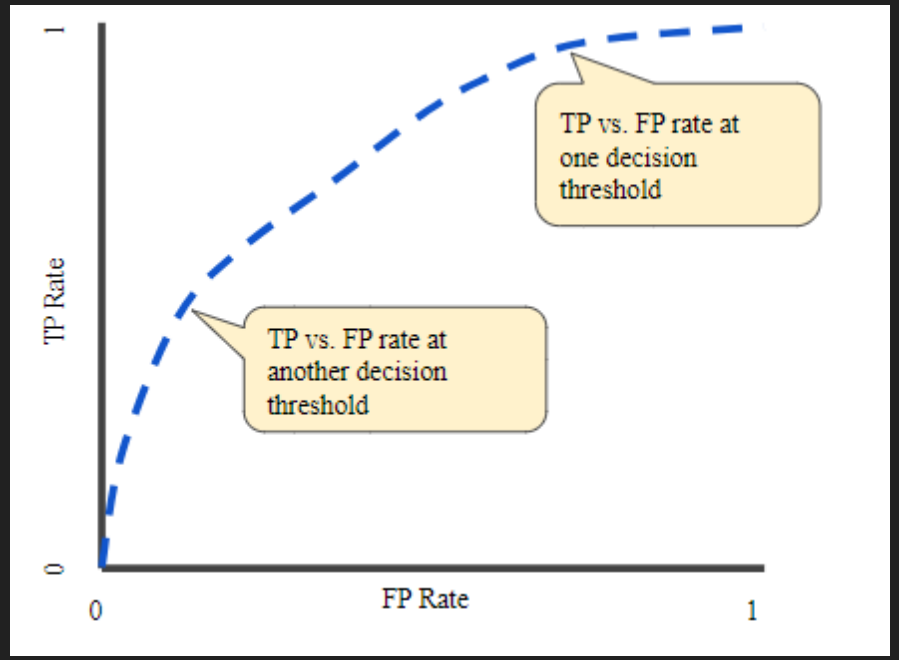
- Given one explanatory variable (e.g. Hours spent studying) and 2 groups (e.g. "Pass exam" or "Failed exam")
- Try to predict whether the data belongs to group 1 or group 2
- Prediction performed by fitting a logistic classifier/model:

$$\text{Logit}(\text{pass exam}) = a \times \text{Hours spent studying} + b$$

where $\text{Logit}(p) = \ln(p/(1-p))$ = logarithm of the odds

ROC Curves

- Plot the ROC curve (receiver operating characteristic)
- The ROC curve (receiver operating characteristic) plots True Positive Rate vs. False Positive Rate at different classification thresholds

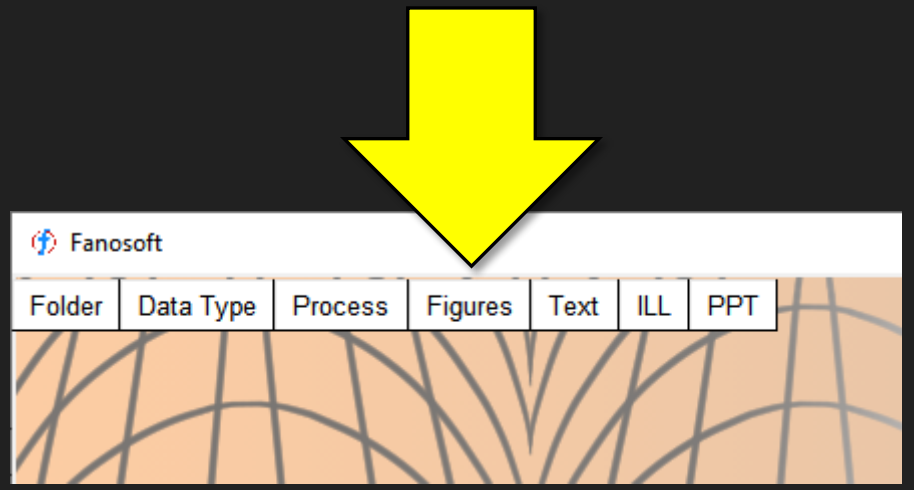


AUC: Area Under the ROC Curve

- AUC is the Area Under the ROC Curve
- AUC provides an aggregate measure of classifier performance across all possible classification thresholds
- AUC ranges in value from 0 (100%wrong predictions) to 1 (100% correct predictions)

ROC Curves

- Click on Figures

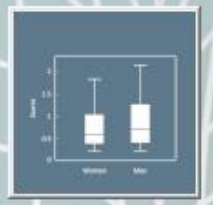
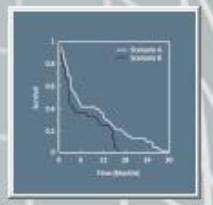


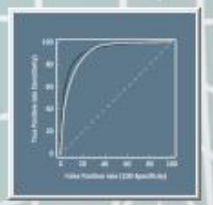
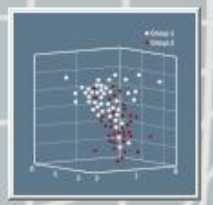
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

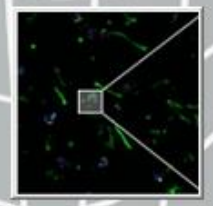
Figures

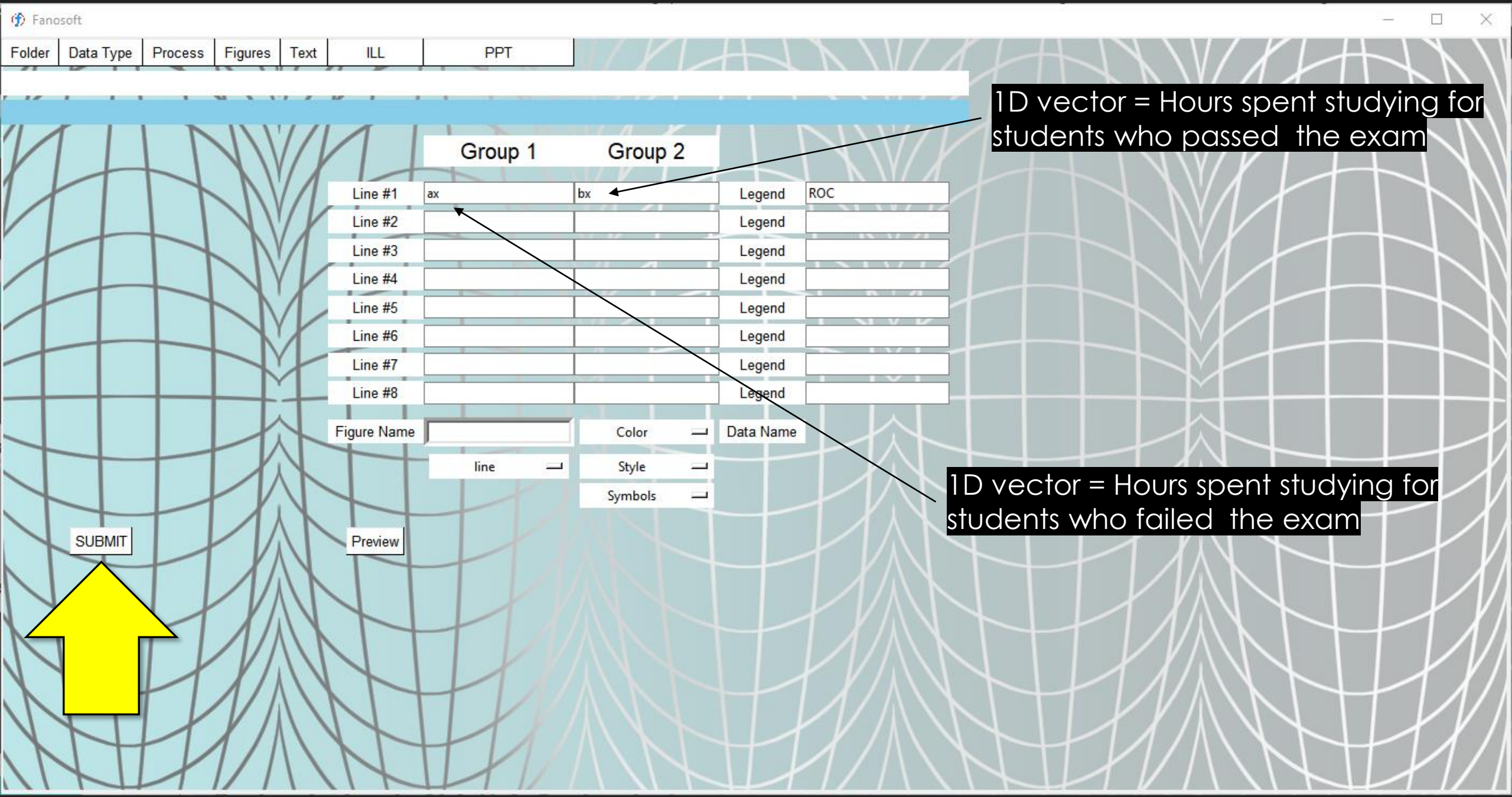





Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
Group 1
Group 2
Line #1
ax
bx
Legend
ROC
Line #2
Legend
Line #3
Legend
Line #4
Legend
Line #5
Legend
Line #6
Legend
Line #7
Legend
Line #8
Legend
Figure Name
Color
Data Name
line
Style
Symbols
SUBMIT
Preview
1D vector = Hours spent studying for students who passed the exam
1D vector = Hours spent studying for students who failed the exam

ROC Curves Options

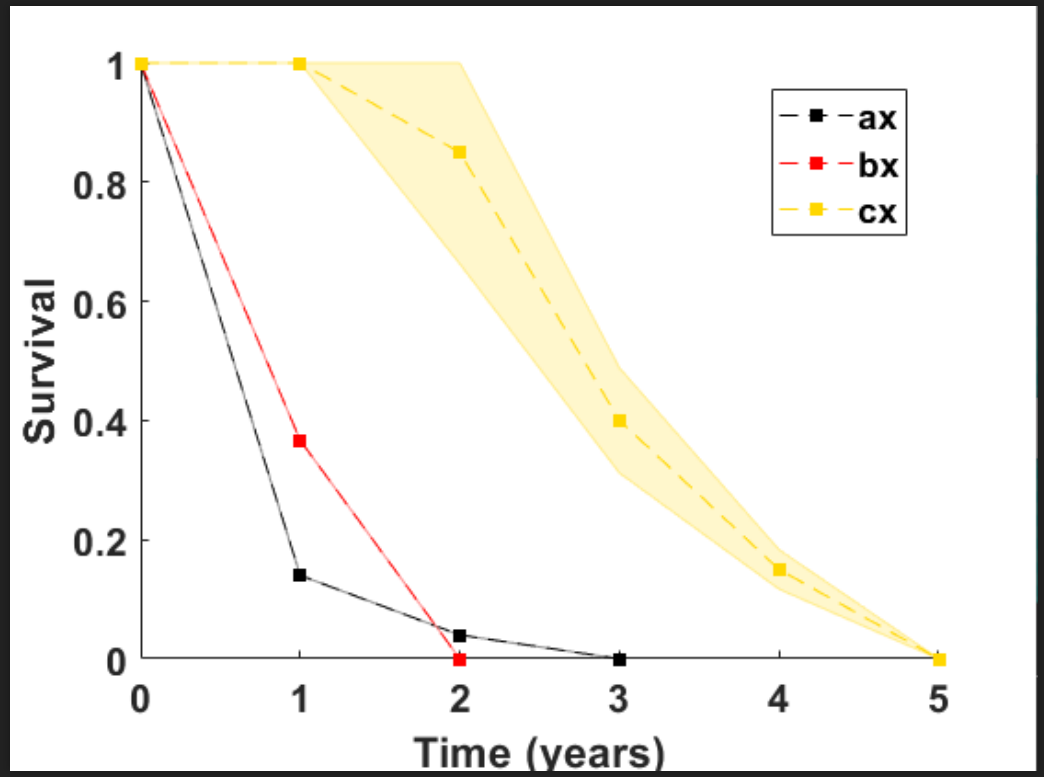
- Up to 8 ROC curves can be plotted on the same figure
- Styling options available
  - Colors: No Color, Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Symbols: Circles, Diamonds, Squares, Varied
  - Line style: solid or dashed
  - Base line: no line, line or dashed line

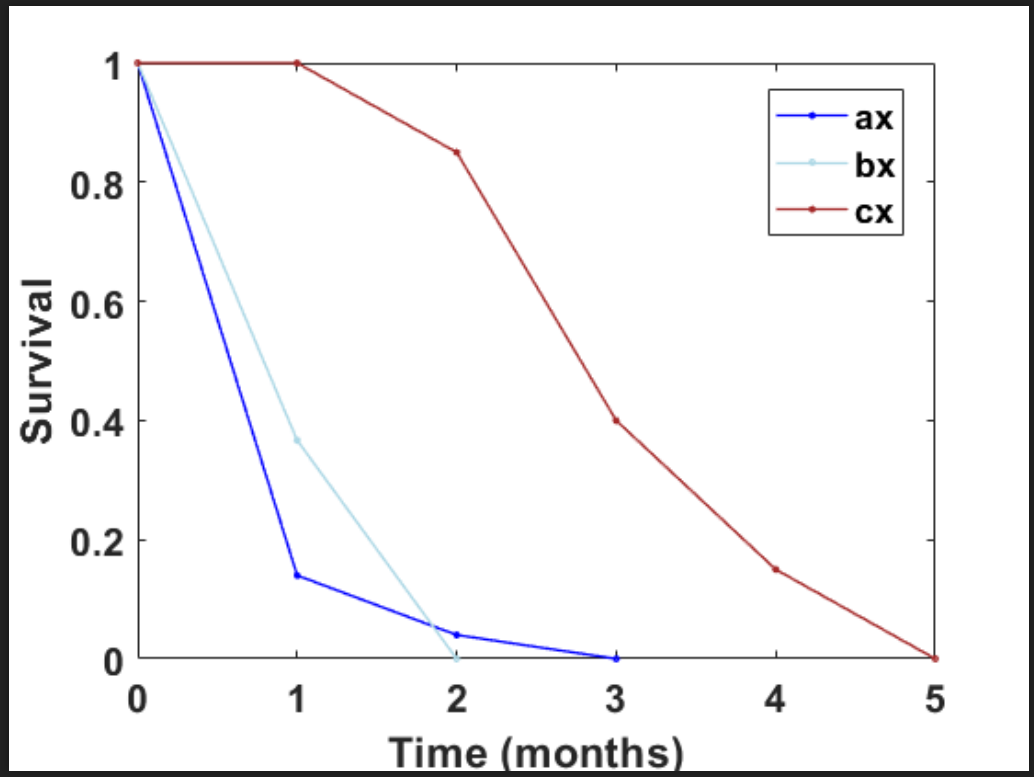
ROC Curves

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"

Kaplan-Meier Curves

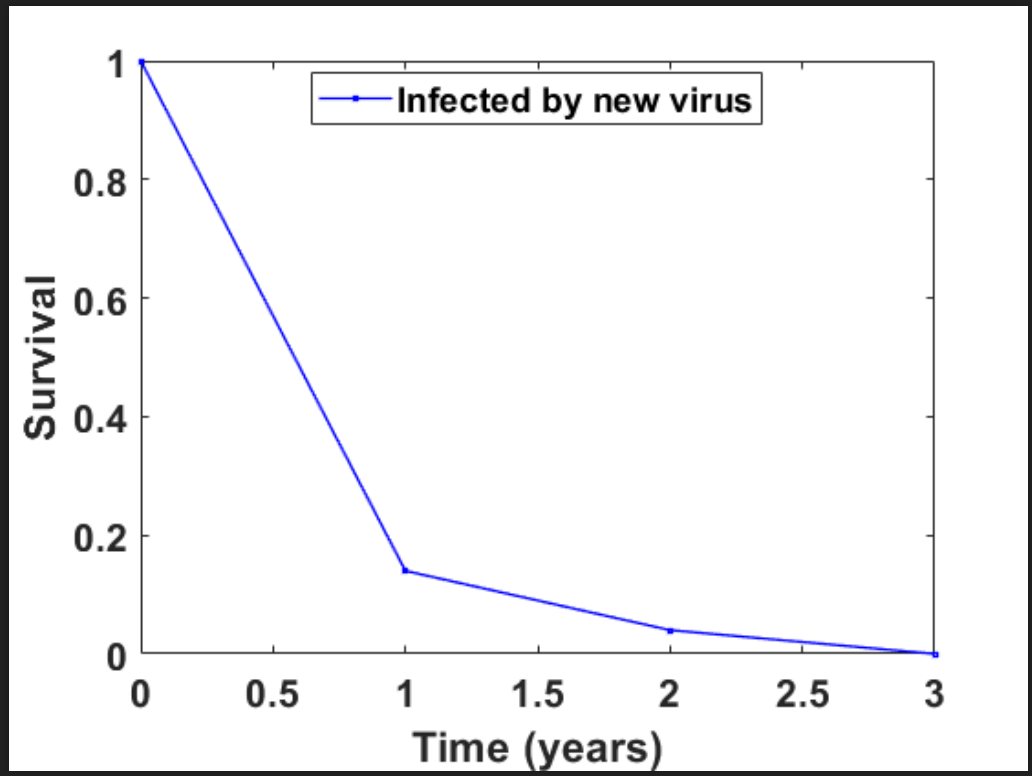
Kaplan-Meier Curves Examples





Kaplan-Meier Curves

- The Kaplan-Meier curve shows the cumulative survival probabilities
  - X axis = time (days, weeks, months or years)
  - Y axis = survival probability (btw. 0 and 1)
- A steeper slope indicates a higher death rate => lower survival probability

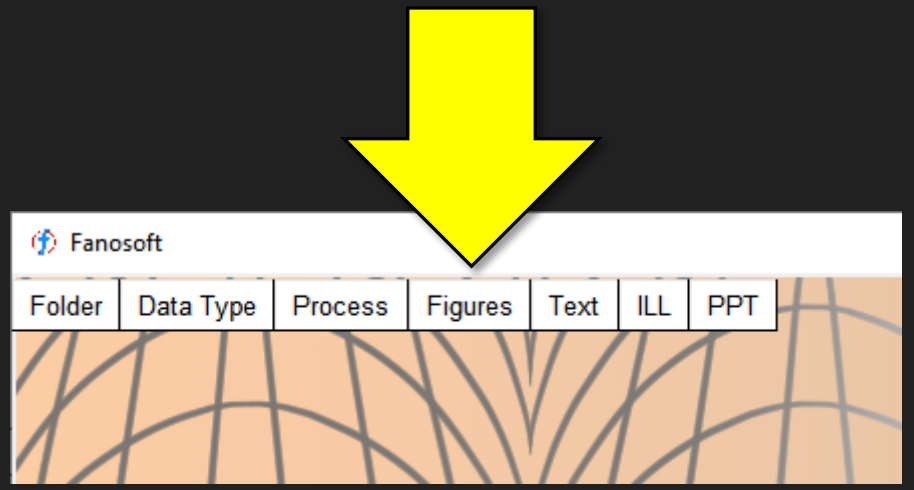


Kaplan-Meier Curves

- The input of the Kaplan-Meier processing is a column vector
- Each row of the vector is equal to the number of events (“deaths”) as function of time
  - First row = number of “deaths” the first day
  - 2nd row = number of “deaths” the 2nd day
  - etc.

Kaplan-Meier Curves

- Click on Figures

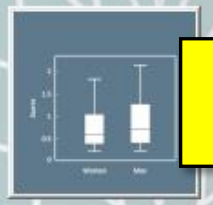
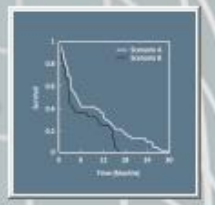


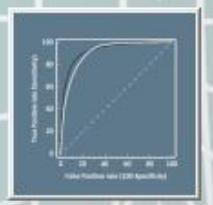
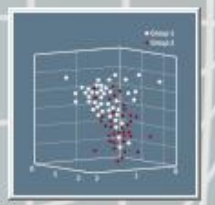
Fanosoft

Folder | Data Type | Process | Figures | Text | ILL | PPT

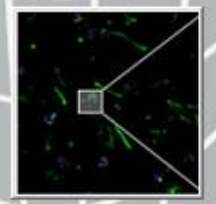
Figures

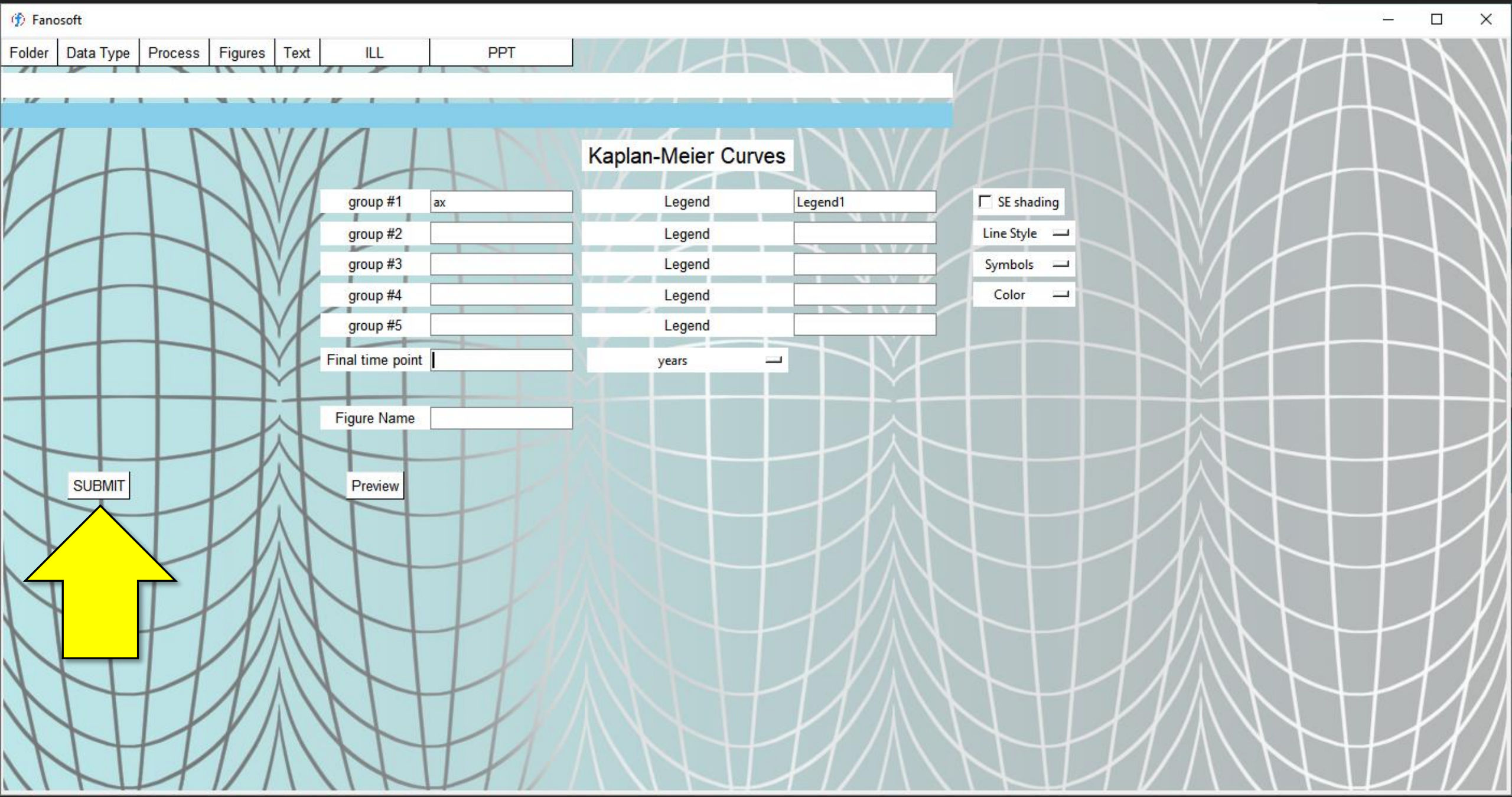





Fanosoft
Folder
Data Type
Process
Figures
Text
ILL
PPT
Kaplan-Meier Curves
group #1
ax
Legend
Legend1
SE shading
group #2
Legend
Line Style
group #3
Legend
Symbols
group #4
Legend
Color
group #5
Legend
Final time point
years
Figure Name
SUBMIT
Preview

Kaplan-Meier Curves Options

- Up to 5 Kaplan-Meier curves on the same figure
- Time axis: days, weeks, months or years
- Final Time point allows to zoom-in the time axis from 0 to the specified time
- Styling options available
  - SE shading: displays the uncertainty (+/- Standard Error): On or Off
  - Colors: No Color, Navy, Jungle, Bellagio, Lesotho, Colonial, Egypt or Eighties
  - Symbols: Circles, Diamonds, Squares, Varied
  - Line style: solid or dashed
  - Legend

Kaplan-Meier Curves

- Preview only displays the figure on the screen.
- Submit generates a .jpeg image and a PowerPoint slide in the user's directory
  - The filename is given by the field "Figure Name"