Bio Image Operation script operations (v1.7.2 / 2021-03-27)

Set (Path, Width, Height, Fps, PixelSize, WindowSize)

Set parameters

- Path: File path ("path")
- Width: Width (numeric value)
- Height: Height (numeric value)
- Fps: Frames per second (numeric value)
- PixelSize: Size of a pixel in arbitrary unit (numeric value)
- WindowSize: Window size for moving average calculations [s] (numeric value)

SetPath (**Path**)

Set path for relative file paths (by default path of current script file)

- Path: File path ("path")

Source (**Path**)

Open sources for individual processing

- Path: File path ("path")

CreateImage (Width, Height, ColorMode, Red, Green, Blue)

Create a new image

- Width: Width (numeric value)
- Height: Height (numeric value)
- ColorMode: Color mode (GrayScale, Color, ColorAlpha)
- Red: Red color component (numeric value between 0 and 1)
- Green: Green color component (numeric value between 0 and 1)
- Blue: Blue color component (numeric value between 0 and 1)

OpenImage (**Path**, Start, Length, Interval, Total)

Open image file(s) for processing, accepts file name pattern

- Path: File path ("path")
- Start: Start (time reference as (hours:)minutes:seconds, or frame number)
- Length: Length (time reference as (hours:)minutes:seconds, or frame number)
- Interval: Interval in number of frames (numeric value)
- Total: Total number of frames at regular interval (numeric value)

OpenVideo (**Path**, API, Start, Length, Interval, Total)

Open video file(s) and process frames, accepts file name pattern (ffmpeg formats supported)

- Path: File path ("path")
- API: OpenCV API code (See OpenCV API codes) (numeric value)
- Start: Start (time reference as (hours:)minutes:seconds, or frame number)
- Length: Length (time reference as (hours:)minutes:seconds, or frame number)
- Interval: Interval in number of frames (numeric value)
- Total: Total number of frames at regular interval (numeric value)

OpenCapture (API, Path, Source, Fps, Length, Interval, Total)

Open capturing from video (IP) path or camera source

- API: OpenCV API code (See OpenCV API codes) (numeric value)
- Path: File path ("path")
- Source: Camera source (#) (numeric value)
- Fps: Frames per second (numeric value)
- Length: Length (time reference as (hours:)minutes:seconds, or frame number)
- Interval: Interval in number of frames (numeric value)
- Total: Total number of frames at regular interval (numeric value)

SaveImage (**Path**, Label, Start, Length)

Save image to file

- Path: File path ("path")
- Label: Label id (string)
- Start: Start (time reference as (hours:)minutes:seconds, or frame number)
- Length: Length (time reference as (hours:)minutes:seconds, or frame number)

SaveVideo (**Path**, Label, Start, Length, Fps, Codec)

Create video file and save image to video file (supports installed encoders)

- Path: File path ("path")
- Label: Label id (string)
- Start: Start (time reference as (hours:)minutes:seconds, or frame number)
- Length: Length (time reference as (hours:)minutes:seconds, or frame number)
- Fps: Frames per second (numeric value)
- Codec: Video encoding codec (4 character codec reference (FOURCC))

ShowImage (Label, Display)

Show image on screen (low priority screen updates)

- Label: Label id (string)
- Display: Display id (number 1 - 4)

StoreImage (**Label**)

Store current image in memory

- Label: Label id (string)

GetImage (**Label**)

Get specified stored image from memory

- Label: Label id (string)

Grayscale (Label)

Convert image to gray scale

- Label: Label id (string)

Color (Label)

Convert image to color

- Label: Label id (string)

ColorAlpha (Label)

Convert image to color with alpha channel

- Label: Label id (string)

GetSaturation (Label)

Extract saturation from image

- Label: Label id (string)

GetHsValue (Label)

Extract (HSV) Value from image

- Label: Label id (string)

GetHsLightness (Label)

Extract (HSL) Lightness from image

- Label: Label id (string)

Scale (Width, Height, Label)

Scale image (in pixels, or values between 0 and 1)

- Width: Width (numeric value)
- Height: Height (numeric value)
- Label: Label id (string)

Crop (X, Y, Width, Height, Label)

Crop image (in pixels, or values between 0 and 1)

- X: X position (numeric value)
- Y: Y position (numeric value)
- Width: Width (numeric value)
- Height: Height (numeric value)
- Label: Label id (string)

Mask (**Label**)

Perform mask on current image

- Label: Label id (string)

Threshold (Label, Level)

Convert image to binary using threshold level, or in case not provided using automatic Otsu method

- Label: Label id (string)
- Level: Threshold value (numeric value between 0 and 1)

Erode (Label, Radius)

Apply erode filter (default 3x3 pixels)

- Label: Label id (string)
- Radius: Radius in pixels (numeric value)

Dilate (Label, Radius)

Apply dilate filter (default 3x3 pixels)

- Label: Label id (string)
- Radius: Radius in pixels (numeric value)

Difference (**Label**)

Perform difference of current image and specified image

- Label: Label id (string)

DifferenceAbs (**Label**)

Perform absolute difference of current image and specified image

- Label: Label id (string)

Add (**Label**)

Adds specified image to current image

- Label: Label id (string)

Multiply (**Factor**)

Perform multiplication of all color channels by specified factor

- Factor: Multiplication factor (numeric value)

Invert (Label)

Invert image

- Label: Label id (string)

SetBackground (Label)

Initialise adaptive background buffer with image

- Label: Label id (string)

UpdateBackground (Label, Weight)

Add image to the adaptive background buffer

- Label: Label id (string)
- Weight: Weight value (numeric value between 0 and 1)

UpdateWeight (Label, Weight)

Add image using weight to simple image buffer

- Label: Label id (string)
- Weight: Weight value (numeric value between 0 and 1)

UpdateMin (Label)

Add image and perform minimum on simple image buffer

- Label: Label id (string)

UpdateMax (Label)

Add image and perform maximum on simple image buffer

- Label: Label id (string)

ClearSeries ()

Clear image series buffer

AddSeries (Label, Maximum)

Add image to image series buffer

- Label: Label id (string)
- Maximum: Maximum number of images to keep (numeric value)

GetSeriesMedian ()

Obtain image median of image series buffer

GetSeriesMean ()

Obtain image mean of image series buffer

AddAccum (Label, AccumMode)

Add image to the accumulative buffer

- Label: Label id (string)
- AccumMode: Accumulation mode (Age, Usage)

GetAccum (Power, Palette)

Retrieve the accumulative buffer and convert to image

- Power: Exponential power of value range (1E-[power] ... 1) (numeric value)
- Palette: Palette (GrayScale, Heat, Rainbow)

CreateClusters (Tracker, MinArea, MaxArea, Debug)

Create clusters; auto calibrate using initial images if no parameters specified

- Tracker: Tracker id (string)
- MinArea: Minimum area in number of pixels (numeric value)
- MaxArea: Maximum area in number of pixels (numeric value)
- Debug: Debug mode (true / false)

CreateTracks (Tracker, MaxMove, MinActive, MaxInactive, Debug)

Create cluster tracking; auto calibrate using initial images if no parameters specified

- Tracker: Tracker id (string)
- MaxMove: Maximum movement distance (single frame) (numeric value)
- MinActive: Minimum number of frames being active before state is active (numeric value)
- MaxInactive: Maximum number of frames being inactive before state is inactive (numeric value)
- Debug: Debug mode (true / false)

CreatePaths (Tracker, Distance, Debug)

Create common path usage

- Tracker: Tracker id (string)

- Distance: Maximum path distance (numeric value)
- Debug: Debug mode (true / false)

DrawClusters (Label, Tracker, DrawMode)

Draw clusters

- Label: Label id (string)
- Tracker: Tracker id (string)
- DrawMode: Draw mode(s) (combine using | character) (None, Point, Circle, Box, Angle, Label, LabelArea, LabelLength, LabelAngle, Track, Tracks, Fill, ClusterDefault, TracksDefault)

DrawTracks (Label, Tracker, DrawMode)

Draw tracked clusters

- Label: Label id (string)
- Tracker: Tracker id (string)
- DrawMode: Draw mode(s) (combine using | character) (None, Point, Circle, Box, Angle, Label, LabelArea, LabelLength, LabelAngle, Track, Tracks, Fill, ClusterDefault, TracksDefault)

DrawPaths (Label, Tracker, PathDrawMode, Power, Palette)

Draw common paths

- Label: Label id (string)
- Tracker: Tracker id (string)
- PathDrawMode: Path draw mode (Age, Usage, Usage2, Links, LinksMove)
- Power: Exponential power of value range (1E-[power] ... 1) (numeric value)
- Palette: Palette (GrayScale, Heat, Rainbow)

DrawTrackCount (Label, Tracker)

Draw tracking count on image

- Label: Label id (string)
- Tracker: Tracker id (string)

SaveClusters (**Path**, Tracker, Format, Contour)

Save clusters to CSV file

- Path: File path ("path")
- Tracker: Tracker id (string)
- Format: Output format (ByTime, ByLabel, Split)
- Contour: Extract contours (true / false)

SaveTracks (**Path**, Tracker, Format, Contour)

Save cluster tracking to CSV file

- Path: File path ("path")
- Tracker: Tracker id (string)
- Format: Output format (ByTime, ByLabel, Split)
- Contour: Extract contours (true / false)

SavePaths (**Path**, Tracker)

Save paths to CSV file

- Path: File path ("path")
- Tracker: Tracker id (string)

ShowTrackInfo (Tracker, Display)

Show tracking information on screen

- Tracker: Tracker id (string)
- Display: Display id (number 1 - 4)

SaveTrackInfo (**Path**, Tracker)

Save tracking information to CSV file

- Path: File path ("path")
- Tracker: Tracker id (string)

DrawLegend (Label, Display, Position)

Draw legend

- Label: Label id (string)
- Display: Display id (number 1 - 4)
- Position: Draw position (Full, TopLeft, BottomLeft, TopRight, BottomRight)

Wait (MS)

Pause execution for a period (1000 ms default)

- MS: Time in milliseconds (numeric value)

Pause ()

Pause processing

Benchmark ()

For benchmarking/debugging

(**Arguments:** [**required**] [optional])