CodeEngine Library Reference

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1 Class Documentation

1.1 se::code::CodeEngine Class Reference

The main CodeEngine class containing all configuration and resources of the Smart Code Engine product.

`#include <code_engine.h>`

Public Member Functions

- virtual ~**CodeEngine** ()=default

  Default dtor.
- virtual CodeEngineSessionSettings * GetDefaultSessionSettings ()=0

  Creates a minimal valid SessionSettings object with default session processing settings.
- virtual CodeEngineSession * SpawnSession (const CodeEngineSessionSettings &settings, const char *signature, CodeEngineWorkflowFeedback *workflow_reporter=nullptr, CodeEngineVisualizationFeedback *visualization_reporter=nullptr) const =0

  Spawns a new code object recognition session.
- virtual bool IsEngineAvailable (CodeEngineType engine_type) const =0

  Checks if the selected engine is available for user.

Static Public Member Functions

- static CodeEngine * Create (const char *config_path, bool lazy_configuration=true)

  The factory method for creating the CodeEngine object with a configuration bundle file.
- static CodeEngine * Create (const unsigned char *config_data, int config_data_length, bool lazy_↩ configuration=true)

  The factory method for creating the CodeEngine object with a configuration bundle buffer.
- static CodeEngine * **CreateFromEmbeddedBundle** (bool lazy_configuration=true)

  The factory method for creating the CodeEngine object with an embedded bundle configuration.
- static const char * **GetVersion** ()

  Returns the CodeEngine version number.

1.1.1 Detailed Description

The main CodeEngine class containing all configuration and resources of the Smart Code Engine product.

Definition at line 78 of file code_engine.h.

1.1.2 Member Function Documentation

Create() [1/2]

```
static CodeEngine * se::code::CodeEngine::Create (
            const char * config_path,
            bool lazy_configuration = true)  [static]
```

The factory method for creating the CodeEngine object with a configuration bundle file.

Parameters

config_path	filesystem path to a engine configuration bundle.

Create() [2/2]

```
static CodeEngine * se::code::CodeEngine::Create (
            const unsigned char * config_data,
            int config_data_length,
            bool lazy_configuration = true)  [static]
```

The factory method for creating the CodeEngine object with a configuration bundle buffer.

Parameters

config_data	pointer to the configuration bundle file buffer.
config_data_length	size of the configuration buffer in bytes.

GetDefaultSessionSettings()

```
virtual CodeEngineSessionSettings * se::code::CodeEngine::GetDefaultSessionSettings ()  [pure
virtual]
```

Creates a minimal valid SessionSettings object with default session processing settings.

Returns

A newly created CodeSessionSettings object. The object is allocated, the caller is responsible for deleting it.

SpawnSession()

```
virtual CodeEngineSession * se::code::CodeEngine::SpawnSession (
            const CodeEngineSessionSettings & settings,
            const char * signature,
            CodeEngineWorkflowFeedback * workflow_reporter = nullptr,
            CodeEngineVisualizationFeedback * visualization_reporter = nullptr) const  [pure
virtual]
```

Spawns a new code object recognition session.

Parameters

object_type	which object types should be recognized in the spawned session.
settings	a settings object which is used to spawn a session.
signature	a unique caller signature to unlock the internal library calls (provided with your SDK package).
workflow_reporter	an optional pointer to the implementation of workflow feedback callbacks class.
visualization_reporter	an optional pointer to the implementation of visualization feedback callbacks class.

Returns

A newly created session object. The object is allocated, the caller is responsible for deleting it.

IsEngineAvailable()

```
virtual bool se::code::CodeEngine::IsEngineAvailable (
            CodeEngineType engine_type) const  [pure virtual]
```

Checks if the selected engine is available for user.

Returns

Bool value if engine is available.

1.2 se::code::CodeEngineFeedbackContainer Class Reference

The class representing the visual feedback container - a collection of named quadrangles in an image.

`#include <code_engine_feedback.h>`

Public Member Functions

- ~**CodeEngineFeedbackContainer** ()
  Non-trivial dtor.
- **CodeEngineFeedbackContainer** ()
  Default ctor - creates an empty container.
- **CodeEngineFeedbackContainer** (const CodeEngineFeedbackContainer &copy)
  Copy ctor.
- CodeEngineFeedbackContainer & **operator=** (const CodeEngineFeedbackContainer &other)
  Assignment operator.
- int **GetQuadranglesCount** () const
  Returns the number of quadrangles in the container.
- bool **HasQuadrangle** (const char *quad_name) const
  Returns true iff there exists a quadrangle with a given name.
- const se::common::Quadrangle & **GetQuadrangle** (const char *quad_name) const
  Returns the quadrangle with a given name.
- void **SetQuadrangle** (const char *quad_name, const se::common::Quadrangle &quad)
  Sets the quadrangle for a given name.
- void **RemoveQuadrangle** (const char *quad_name)
  Removes the quadrangle with a given name from the collection.
- se::common::QuadranglesMapIterator **QuadranglesBegin** () const
  Returns the 'begin' map iterator to the quadrangles collection.
- se::common::QuadranglesMapIterator **QuadranglesEnd** () const
  Returns the 'end' map iterator to the quadrangles collection.

Private Attributes

- class CodeEngineFeedbackContainerImpl * pimpl_
  Internal container implementation.

1.2.1 Detailed Description

The class representing the visual feedback container - a collection of named quadrangles in an image.

Definition at line 25 of file code_engine_feedback.h.

1.2.2 Member Data Documentation

pimpl_

```
class CodeEngineFeedbackContainerImpl* se::code::CodeEngineFeedbackContainer::pimpl_  [private]
```

Internal container implementation.

Definition at line 65 of file code_engine_feedback.h.

1.3 se::code::CodeEngineResult Class Reference

The class representing the Smart Code Engine recognition result.

```
#include <code_engine_result.h>
```

Public Member Functions

- **CodeEngineResult** (bool is_terminal=false)
  Main ctor for the result object.
- **CodeEngineResult** (const CodeEngineResult &other)
  Copy ctor.
- CodeEngineResult & **operator=** (const CodeEngineResult &other)
  Assignment operator.
- ~**CodeEngineResult** ()
  Non-trivial dtor.
- bool **operator==** (const CodeEngineResult &other) const
  Comparison operator.
- bool **operator!=** (const CodeEngineResult &other) const
  Comparison operator.
- int **GetObjectCount** () const
  Get the number of processed objects.
- bool **HasObject** (const char *object_name) const
  Returns true iff there exists a code field with a provided name.
- const CodeObject & **GetCodeObject** (const char *object_name) const
  Returns the code object.
- void **SetCodeObject** (const char *object_name, const CodeObject &code_object)
  Sets the code object with a given name.
- CodeObjectsMapIterator **ObjectsBegin** () const
  Returns the 'begin' map-like iterator to the processed code objects.
- CodeObjectsMapIterator **ObjectsEnd** () const
  Returns the 'end' map-like iterator to the processed code objects.
- bool **IsTerminal** () const
  Check if the result is terminal.
- void **SetTerminal** (bool terminal=true)
  Sets the terminality flag for the whole result.
- void **Reset** ()
  Reset result.

Private Attributes

- struct CodeEngineResultImpl * pimpl_
  internal implementation

1.3.1 Detailed Description

The class representing the Smart Code Engine recognition result.

Definition at line 24 of file code_engine_result.h.

1.3.2 Member Data Documentation

pimpl_

```
struct CodeEngineResultImpl* se::code::CodeEngineResult::pimpl_  [private]
```

internal implementation

Definition at line 62 of file code_engine_result.h.

1.4 se::code::CodeEngineSession Class Reference

The main processing class for the Smart Code Engine recognition functionality.

```
#include <code_engine_session.h>
```

Public Member Functions

- virtual ~**CodeEngineSession** ()=default
  Default dtor.
- virtual const char * GetActivationRequest ()=0
  Get an activation request for this session (valid for SDK built with dynamic activation feature)
- virtual void Activate (const char *activation_response)=0
  Activate current session (valid for SDK built with dynamic activation feature)
- virtual bool IsActivated () const =0
  Check if current session was activated (valid for SDK built with dynamic activation feature)
- virtual const CodeEngineResult & Process (const common::Image &image)=0
  Processes the input image (or frame).
- virtual const CodeEngineResult & **GetCurrentResult** () const =0
  Returns the current recognition result.
- virtual bool **IsResultTerminal** () const =0
  Returns true iff the current recognition result is terminal.
- virtual void **Reset** ()=0
  Resets the session state.

1.4.1 Detailed Description

The main processing class for the Smart Code Engine recognition functionality.

Definition at line 27 of file code_engine_session.h.

1.4.2 Member Function Documentation

GetActivationRequest()

```
virtual const char * se::code::CodeEngineSession::GetActivationRequest ()  [pure virtual]
```

Get an activation request for this session (valid for SDK built with dynamic activation feature)

Returns

A string with activation request.

Activate()

```
virtual void se::code::CodeEngineSession::Activate (
            const char * activation_response)  [pure virtual]
```

Activate current session (valid for SDK built with dynamic activation feature)

Parameters

activation_response	the response from activation server.

IsActivated()

```
virtual bool se::code::CodeEngineSession::IsActivated () const  [pure virtual]
```

Check if current session was activated (valid for SDK built with dynamic activation feature)

Returns

Boolean check (true/false).

Process()

```
virtual const CodeEngineResult & se::code::CodeEngineSession::Process (
            const common::Image & image)  [pure virtual]
```

Processes the input image (or frame).

Parameters

image	the input image (or a frame of a video sequence)

Returns

The updated recognition result.

1.5 se::code::CodeEngineSessionSettings Class Reference

The class representing the session settings for the Smart ID Engine document recognition functionality.

`#include <code_engine_session_settings.h>`

Public Member Functions

- virtual CodeEngineSessionSettings * Clone () const =0
  Clones the session settings object.
- virtual const char * **GetOption** (const char *option_name) const =0
  Returns the value of an option by name.
- virtual se::common::StringsMapIterator **SettingsBegin** () const =0
  Returns 'begin' like iterator for all session settings.
- virtual se::common::StringsMapIterator **SettingsEnd** () const =0
  Returns 'end' like iterator for all session settings.
- virtual bool **HasOption** (const char *option_name) const =0
  Return true iff there is an option with the given name.
- virtual void **SetOption** (const char *option_name, const char *option_value)=0
  Sets the key:value session option pair.

1.5.1 Detailed Description

The class representing the session settings for the Smart ID Engine document recognition functionality.

Definition at line 25 of file code_engine_session_settings.h.

1.5.2 Member Function Documentation

Clone()

```
virtual CodeEngineSessionSettings * se::code::CodeEngineSessionSettings::Clone () const  [pure virtual]
```

Clones the session settings object.

Returns

A new object of session settings with an identical state. A newly created object is allocated, the caller is responsible for deleting it

1.6 se::code::CodeEngineVisualizationFeedback Class Reference

Abstract interface for receiving Smart Code Engine callbacks for visualization purposes. All callbacks must be implemented.

`#include <code_engine_feedback.h>`

Public Member Functions

- virtual ~**CodeEngineVisualizationFeedback** ()=default

  Virtual dtor.
- virtual void **FeedbackReceived** (const CodeEngineFeedbackContainer &feedback_container)=0

  A container with a set of quadrangles for visualization.

1.6.1 Detailed Description

Abstract interface for receiving Smart Code Engine callbacks for visualization purposes. All callbacks must be implemented.

Definition at line 72 of file code_engine_feedback.h.

1.7 se::code::CodeEngineWorkflowFeedback Class Reference

Abstract interface for receiving Smart Code Engine workflow callbacks. All callbacks must be implemented.

`#include <code_engine_feedback.h>`

Public Member Functions

- virtual ~**CodeEngineWorkflowFeedback** ()

  Virtual dtor.
- virtual void **ResultReceived** (const CodeEngineResult &result_received)=0

  This method is called when the input frame is processed by all the internal engines.
- virtual void **SessionEnded** ()=0

  This method is called when the result becomes terminal.

1.7.1 Detailed Description

Abstract interface for receiving Smart Code Engine workflow callbacks. All callbacks must be implemented.

Definition at line 87 of file code_engine_feedback.h.

1.8 se::code::CodeField Class Reference

The class representing a value-holding field of a codified object.

`#include <code_object_field.h>`

Public Member Functions

- **CodeField** ()

  Default ctor.
- CodeField (const char *name, const common::ByteString &byte_string, bool is_accepted=false, float confidence=0.F)

  Ctor from byte string.
- CodeField (const char *name, const common::OcrString &ocr_string, bool is_accepted=false, float confidence=0.F)

  Ctor from OCR string.
- ~**CodeField** ()

  Non-trivial dtor.
- **CodeField** (const CodeField &copy)

  Copy ctor.
- CodeField & **operator=** (const CodeField &other)

  Assignment operator.
- bool **operator==** (const CodeField &other) const

  Comporasion operator.
- const char * **Name** () const

  Returns code field name.
- void **SetName** (const char *name)

  Sets code field name.
- bool **IsAccepted** () const

  Returns true iff the system is confident with the field processing result.
- void **SetIsAccepted** (const bool is_accepted)

  Sets the field's accept flag.
- double **GetConfidence** () const

  Returns system's confidence in the field processing (in range [0.0, 1.0])
- void **SetConfidence** (const float confidence)

  Sets the value of the system' confidence in the field processing (in range [0.0, 1.0]).
- bool **IsTerminal** () const

  Returns true iff the system considers this the final result of the field.
- void **SetIsTerminal** (const bool is_terminal)

  Sets the field's is terminal flag.
- bool **HasBinaryRepresentation** () const

  Returns true iff the code field has a representation as a binary string.
- const common::ByteString & **GetBinaryRepresentation** () const

  Returns the binary representation of the code field.
- void **SetBinaryRepresentation** (const common::ByteString &byte_string)

  Sets the binary representation of the code field.
- bool **HasOcrStringRepresentation** () const

  Returns true iff the code field has an OcrString representation.
- const common::OcrString & **GetOcrString** () const

  Returns the OcrString representation of the code field.
- void **SetOcrStringRepresentation** (const common::OcrString &ocr_string)

  Sets the OcrString representation of the code field.

Private Attributes

- class CodeFieldImpl * pimpl_

  internal implementation

1.8.1 Detailed Description

The class representing a value-holding field of a codified object.

Definition at line 23 of file code_object_field.h.

1.8.2 Constructor & Destructor Documentation

CodeField() [1/2]

```
se::code::CodeField::CodeField (
            const char * name,
            const common::ByteString & byte_string,
            bool is_accepted = false,
            float confidence = 0.F)
```

Ctor from byte string.

Parameters

name	name of code field.
byte_string	value of processed byte string.
is_accepted	the field's accept flag.
confidence	the field's confidence (float in range [0.0, 1.0]).

CodeField() [2/2]

```
se::code::CodeField::CodeField (
            const char * name,
            const common::OcrString & ocr_string,
            bool is_accepted = false,
            float confidence = 0.F)
```

Ctor from OCR string.

Parameters

name	name of code field.
ocr_string	value of processed OCR string.
is_accepted	the field's accept flag.
confidence	the field's confidence (float in range [0.0, 1.0]).

1.8.3 Member Data Documentation

pimpl_

```
class CodeFieldImpl* se::code::CodeField::pimpl_  [private]
```

internal implementation

Definition at line 109 of file code_object_field.h.

1.9 se::code::CodeFieldsMapIterator Class Reference

A class representing the iterator for string->code field maps.

`#include <code_object_field.h>`

Public Member Functions

- ~**CodeFieldsMapIterator** ()
  Non-trivial dtor.
- **CodeFieldsMapIterator** (const CodeFieldsMapIterator &other)
  Copy ctor.
- CodeFieldsMapIterator & **operator=** (const CodeFieldsMapIterator &other)
  Assignment operator.
- const char * **GetKey** () const
  Returns the key.
- const CodeField & **GetValue** () const
  Returns the value (the text field object)
- bool **Equals** (const CodeFieldsMapIterator &rvalue) const
  Returns true iff the current instance and other point to the same object.
- bool **operator==** (const CodeFieldsMapIterator &other) const
  Returns true iff the current instance and other point to the same object.
- bool **operator!=** (const CodeFieldsMapIterator &other) const
  Returns true iff the instance and rvalue other to different objects.
- void **Advance** ()
  Advances the iterator to the next object in the collection.
- void **operator++** ()
  Advances the iterator to the next object in the collection.

Static Public Member Functions

- static CodeFieldsMapIterator **ConstructFromImpl** (CodeFieldsMapIteratorImpl pimpl)
  Factory method for creating the iterator from the internal implementation.

Private Member Functions

- **CodeFieldsMapIterator** (CodeFieldsMapIteratorImpl pimpl)
  Private ctor from the internal implementation.

Private Attributes

- CodeFieldsMapIteratorImpl * pimpl_
  internal implementation

1.9.1 Detailed Description

A class representing the iterator for string->code field maps.

Definition at line 118 of file code_object_field.h.

1.9.2 Member Data Documentation

pimpl_

```
CodeFieldsMapIteratorImpl* se::code::CodeFieldsMapIterator::pimpl_  [private]
```

internal implementation

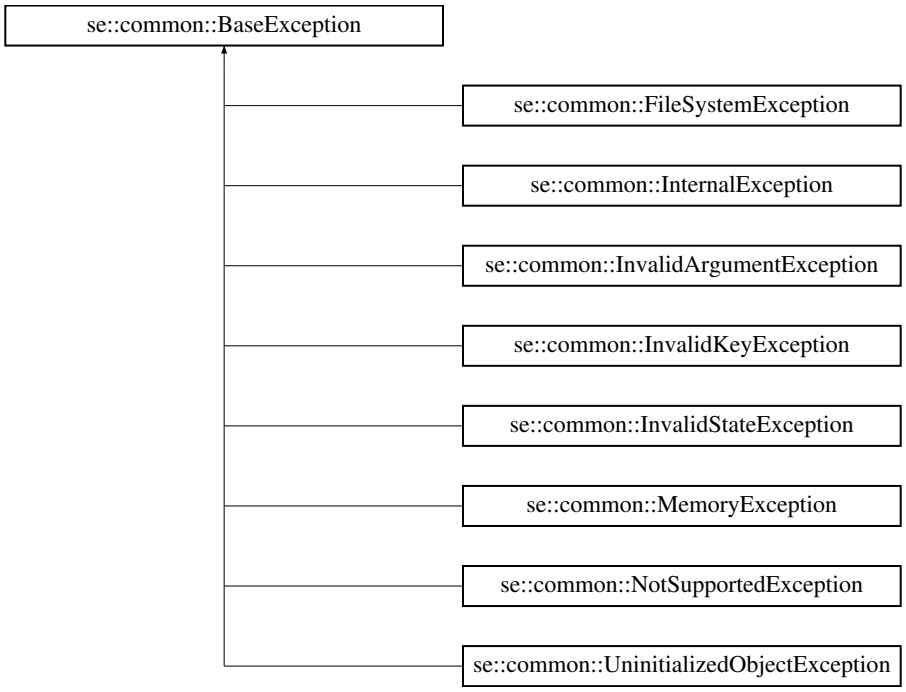
Definition at line 160 of file code_object_field.h.

1.10 se::common::BaseException Class Reference

BaseException class - base class for all SE exeptions. Cannot be created directly.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::BaseException:



Public Member Functions

- virtual ~**BaseException** ()

  Non-trivial dtor.
- **BaseException** (const BaseException &copy)

  Copy ctor.
- virtual const char * ExceptionName () const

  Returns exception class name.
- virtual const char * **what** () const

  Returns exception message.

Protected Member Functions

- **BaseException** (const char *msg)

  Protected ctor.

Private Attributes

- char * msg_

  stored exception message

1.10.1 Detailed Description

BaseException class - base class for all SE exeptions. Cannot be created directly.

Definition at line 22 of file se_exception.h.

1.10.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::BaseException::ExceptionName () const  [virtual]
```

Returns exception class name.

Reimplemented in se::common::FileSystemException, se::common::InternalException, se::common::InvalidArgumentException, se::common::InvalidKeyException, se::common::InvalidStateException, se::common::MemoryException, se::common::NotSupportedE and se::common::UninitializedObjectException.

1.10.3 Member Data Documentation

msg_

```
char* se::common::BaseException::msg_  [private]
```

stored exception message

Definition at line 41 of file se_exception.h.

1.11 se::common::ByteString Class Reference

Class representing byte string.

```
#include <se_string.h>
```

Public Member Functions

- **ByteString** ()
  Default ctor, creates an empty string.
- ~**ByteString** ()
  Non-trivial dtor.
- **ByteString** (const unsigned char *bytes, size_t n)
  Ctor from a given sequence of bytes and length.
- **ByteString** (const ByteString &other)
  Copy ctor.
- ByteString & **operator=** (const ByteString &other)
  Assignment operator.
- void **swap** (ByteString &other) noexcept
  Swap.
- int **GetLength** () const noexcept
  Returns the number of bytes.
- int **GetRequiredBase64BufferLength** () const
  Returns length of base64 formated buffer.
- int **CopyBase64ToBuffer** (char *out_buffer, int buffer_length) const
  Format buffer to base64.
- MutableString **GetBase64String** () const
  Get base64 string from buffer.
- int **GetRequiredHexBufferLength** () const
  Returns length of hex formated buffer.
- int **CopyHexToBuffer** (char *out_buffer, int buffer_length) const
  Format buffer to hex.
- MutableString **GetHexString** () const
  Get hex string from buffer.

Private Attributes

- size_t len_
  length of the internal buffer in bytes
- uint8_t * buf_
  internal buffer

1.11.1 Detailed Description

Class representing byte string.

Definition at line 322 of file se_string.h.

1.11.2 Member Data Documentation

len_

```
size_t se::common::ByteString::len_  [private]
```

length of the internal buffer in bytes

Definition at line 364 of file se_string.h.

buf_

```
uint8_t* se::common::ByteString::buf_  [private]
```

internal buffer

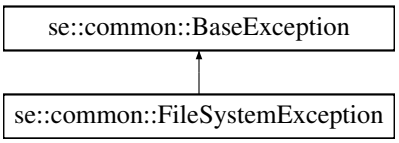
Definition at line 365 of file se_string.h.

1.12 se::common::FileSystemException Class Reference

FileSystemException: thrown if an attempt is made to read from a non-existent file, or other file-system related IO error.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::FileSystemException:



Public Member Functions

- **FileSystemException** (const char *msg)
  Ctor with an exception message.
- **FileSystemException** (const FileSystemException &copy)
  Copy ctor.
- virtual ~**FileSystemException** () override=default
  Default dtor.
- virtual const char * ExceptionName () const override
  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()
  Non-trivial dtor.
- **BaseException** (const BaseException &copy)
  Copy ctor.
- virtual const char * **what** () const
  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char *msg)
  Protected ctor.

1.12.1 Detailed Description

FileSystemException: thrown if an attempt is made to read from a non-existent file, or other file-system related IO error.

Definition at line 92 of file se_exception.h.

1.12.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::FileSystemException::ExceptionName () const  [override], [virtual]
```

Returns exception class name.

Reimplemented from se::common::BaseException.

1.13 se::common::Image Class Reference

Class representing bitmap image.

```
#include <se_image.h>
```

Public Member Functions

- virtual ~**Image** ()=default

  Default dtor.
- virtual int GetNumberOfLayers () const =0

  Gets the number of additional layers.
- virtual const Image & GetLayer (const char *name) const =0

  Gets the additional layer by the specified name.
- virtual const Image * GetLayerPtr (const char *name) const =0

  Gets the additional layer by the specified name.
- virtual ImagesMapIterator LayersBegin () const =0

  Gets the 'begin' map iterator to the internal layers collection.
- virtual ImagesMapIterator LayersEnd () const =0

  Gets the 'end' map iterator to the internal layers collection.
- virtual bool HasLayer (const char *name) const =0

  Checks whether the Image contains the layer with the specified name.
- virtual bool HasLayers () const =0

  Checks whether the Image contains the layers.
- virtual void RemoveLayer (const char *name)=0

  Removes the layer with the specified name.
- virtual void **RemoveLayers** ()=0

  Clears the internal layers collection.
- virtual void SetLayer (const char *name, const Image &image)=0

  Add the image with the specified name to the internal layers collection with copying of the pixels of the given image.
- virtual void SetLayerWithOwnership (const char *name, Image *image)=0

Add the image with the specified name to the internal layers collection by transfering the given image to the internal layers collection. The caller has to release the ownership of the set image.

- virtual Image * CloneDeep () const =0

  Clones an image with copying of all pixels.
- virtual Image * CloneShallow () const =0

  Clones an image without copying the pixels. The cloned image will be a separate object without memory ownership, the operations with it will be invalid if the source is deallocated.
- virtual void **Clear** ()=0

  Clears the internal image structure.
- virtual int GetRequiredBufferLength () const =0

  Gets the required buffer length for copying the image pixels into an external pixels buffer.
- virtual int CopyToBuffer (unsigned char *buffer, int buffer_length) const =0

  Copies the image pixels.
- virtual void Save (const char *image_filename) const =0

  Saves the image to an external file (png, jpg, tif). Format is deduced from the filename extension.
- virtual int GetRequiredBase64BufferLength () const =0

  Returns required buffer size for Base64 JPEG representation of an image. WARNING: will perform one extra JPEG encoding of an image.
- virtual int CopyBase64ToBuffer (char *out_buffer, int buffer_length) const =0

  Copies the Base64 JPEG representation of an image to an external buffer.
- virtual MutableString GetBase64String () const =0

  Returns Base64 JPEG representation of an image.
- virtual double EstimateFocusScore (double quantile=0.95) const =0

  Estimates focus score of an image.
- virtual void Resize (const Size &new_size)=0

  Scale the image to a new size.
- virtual Image * CloneResized (const Size &new_size) const =0

  Clones the image scaled to a new size.
- virtual void Crop (const Quadrangle &quad)=0

  Projectively crops a region of image, with approximate selection of the cropped image size.
- virtual Image * CloneCropped (const Quadrangle &quad) const =0

  Clones the image projectively cropped with approximate selection of the target image size.
- virtual void Crop (const Quadrangle &quad, const Size &size)=0

  Projectively crops a region of image, with a given target size.
- virtual Image * CloneCropped (const Quadrangle &quad, const Size &size) const =0

  Clones the image projectively cropped with a given target size.
- virtual void Crop (const Rectangle &rect)=0

  Crops an image to a rectangular image region.
- virtual Image * CloneCropped (const Rectangle &rect) const =0

  Clones the image cropped to a selected rectangular region (with copying of pixels)
- virtual Image * CloneCroppedShallow (const Rectangle &rect) const =0

  Clones the image cropped to a selected rectangular region, without copying of pixels. The cloned image will be a separate object without memory ownership, the operations with it will be invalid if the source is deallocated.
- virtual void Mask (const Rectangle &rect, int pixel_expand=0, double pixel_density=0)=0

  Masks image region specified by rectangle.
- virtual Image * CloneMasked (const Rectangle &rect, int pixel_expand=0) const =0

  Clone the image with masked region specified by rectangle.
- virtual void Mask (const Quadrangle &quad, int pixel_expand=0, double pixel_density=0)=0

  Mask image region specified by quadrangle.
- virtual Image * CloneMasked (const Quadrangle &quad, int pixel_expand=0) const =0

  Clone the image with masked region specified by quadrangle.

- virtual void Fill (const Rectangle &rect, int ch1, int ch2=0, int ch3=0, int ch4=0, int pixel_expand=0)=0

  Fills image region specified by rectangle and color. The method will use the first as many channel values as there are channels in the image.
- virtual Image * CloneFilled (const Rectangle &rect, int ch1, int ch2=0, int ch3=0, int ch4=0, int pixel_↩ expand=0) const =0

  Clone the image with filled region specified by rectangle and color. The method will use the first as many channel values as there are channels in the image.
- virtual void Fill (const Quadrangle &quad, int ch1, int ch2=0, int ch3=0, int ch4=0, int pixel_expand=0)=0

  Fill image region specified by quadrangle and color. The method will use the first as many channel values as there are channels in the image.
- virtual Image * CloneFilled (const Quadrangle &quad, int ch1, int ch2=0, int ch3=0, int ch4=0, int pixel_↩ expand=0) const =0

  Clone the image with filled region specified by quadrangle and color. The method will use the first as many channel values as there are channels in the image.
- virtual void **FlipVertical** ()=0

  Flips an image around the vertical axis.
- virtual Image * CloneFlippedVertical () const =0

  Clones the image flipped around the vertical axis.
- virtual void **FlipHorizontal** ()=0

  Flips an image around the horizontal axis.
- virtual Image * CloneFlippedHorizontal () const =0

  Clones the image flipped around the horizontal axis.
- virtual void Rotate90 (int times)=0

  Rotates the image clockwise by a multiple of 90 degrees.
- virtual Image * CloneRotated90 (int times) const =0

  Clones the image rotated clockwise by a multiple of 90 degrees.
- virtual void **AverageChannels** ()=0

  Makes a single-channel image with averaged intensity values.
- virtual Image * CloneAveragedChannels () const =0

  Clones the image with averaged channel intensity values.
- virtual void **Invert** ()=0

  Inverts the colors of the image.
- virtual Image * CloneInverted () const =0

  Clones the image with inverted colos.
- virtual int **GetWidth** () const =0

  Gets the image width in pixels.
- virtual int **GetHeight** () const =0

  Gets the image height in pixels.
- virtual Size **GetSize** () const =0

  Gets the image size in pixels.
- virtual int **GetStride** () const =0

  Gets the number of image row in bytes, including alignment.
- virtual int **GetChannels** () const =0

  Gets the number of channels per pixel.
- virtual void * **GetUnsafeBufferPtr** () const =0

  Gets the pointer to the pixels buffer.
- virtual bool **IsMemoryOwner** () const =0

  Returns whether this instance owns and will release pixel data.
- virtual void **ForceMemoryOwner** ()=0

  Forces memory ownership - allocates new image data and copies the pixels.
- virtual void **Serialize** (Serializer &serializer) const =0

  Serializes the image given the serializer object.

Static Public Member Functions

- static int GetNumberOfPages (const char *image_filename)

  Returns the number of pages in an image.
- static MutableString GetImagePageName (const char *image_filename, int page_number)

  Returns the name of the specified page.
- static Image * CreateEmpty ()

  Factory method for creating an empty image.
- static Image * FromFile (const char *image_filename, const int page_number=0, const Size &max_size=Size(25000, 25000))

  Factory method for loading an image from file. Will be treated as IPF_G or IPF_RGB.
- static Image * FromFileBuffer (unsigned char *data, int data_length, const int page_number=0, const Size &max_size=Size(25000, 25000))

  Factory method for loading an image from file pre-loaded in a buffer Will be treated as IPF_G or IPF_RGB.
- static Image * FromBuffer (unsigned char *raw_data, int raw_data_length, int width, int height, int stride, int channels)

  Factory method for loading an image from uncompressed pixels buffer, with UINT8 channel container. Copies the buffer internally. Buffers with types IPF_G, IPF_RGB, and IPF_BGRA are assumed.
- static Image * FromBufferExtended (unsigned char *raw_data, int raw_data_length, int width, int height, int stride, ImagePixelFormat pixel_format, int bytes_per_channel)

  Factory method for loading an image from an uncompressed pixel buffer with extended settings. Copies the buffer internally.
- static Image * FromYUVBuffer (unsigned char *yuv_data, int yuv_data_length, int width, int height)

  Factory method for loading an image from YUV NV21 buffer.
- static Image * FromYUV (unsigned char *y_plane, int y_plane_length, unsigned char *u_plane, int u_plane_length, unsigned char *v_plane, int v_plane_length, const YUVDimensions &dimensions)

  Factory method for loading an image from a universal YUV buffer.
- static Image * FromBase64Buffer (const char *base64_buffer, const int page_number=0, const Size &max_size=Size(25000, 25000))

  Factory method for loading an image from file pre-loaded in a buffer encoded as a Base64 string. Will be treated as IPF_G or IPF_RGB.

1.13.1 Detailed Description

Class representing bitmap image.

Definition at line 79 of file se_image.h.

1.13.2 Member Function Documentation

GetNumberOfPages()

```
static int se::common::Image::GetNumberOfPages (
            const char * image_filename)  [static]
```

Returns the number of pages in an image.

Parameters

image_filename	path to an imag file

Returns

the number of pages in an image

GetImagePageName()

```
static MutableString se::common::Image::GetImagePageName (
            const char * image_filename,
            int page_number)  [static]
```

Returns the name of the specified page.

Parameters

image_filename	The filename of the image to process.
page_number	0-based page number.

Returns

Separate page filename.

CreateEmpty()

```
static Image * se::common::Image::CreateEmpty ()  [static]
```

Factory method for creating an empty image.

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromFile()

```
static Image * se::common::Image::FromFile (
            const char * image_filename,
            const int page_number = 0,
            const Size & max_size = Size(25000, 25000))  [static]
```

Factory method for loading an image from file. Will be treated as IPF_G or IPF_RGB.

Parameters

image_filename	path to an image file (png, jpg, tif)
page_number	page number (0 by default)
max_size	maximum image size in pixels (0 for unrestricted)

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromFileBuffer()

```
static Image * se::common::Image::FromFileBuffer (
            unsigned char * data,
            int data_length,
            const int page_number = 0,
            const Size & max_size = Size(25000, 25000))  [static]
```

Factory method for loading an image from file pre-loaded in a buffer Will be treated as IPF_G or IPF_RGB.

Parameters

data	pointer to a loaded file buffer
data_length	size of the loaded file buffer
page_number	page number (0 by default)
max_size	maximum image size in pixels (0 for unrestricted)

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromBuffer()

```
static Image * se::common::Image::FromBuffer (
            unsigned char * raw_data,
            int raw_data_length,
            int width,
            int height,
            int stride,
            int channels)  [static]
```

Factory method for loading an image from uncompressed pixels buffer, with UINT8 channel container. Copies the buffer internally. Buffers with types IPF_G, IPF_RGB, and IPF_BGRA are assumed.

Parameters

raw_data	- pointer to a pixels buffer
raw_data_length	size of the pixels buffer
width	width of the image in pixels
height	height of the image in pixels
stride	size of an image row in bytes (including alignment)
channels	number of channels per-pixel

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromBufferExtended()

```
static Image * se::common::Image::FromBufferExtended (
            unsigned char * raw_data,
            int raw_data_length,
            int width,
            int height,
            int stride,
            ImagePixelFormat pixel_format,
            int bytes_per_channel)  [static]
```

Factory method for loading an image from an uncompressed pixel buffer with extended settings. Copies the buffer internally.

Parameters

raw_data	pointer to a pixels buffer
raw_data_length	size of the pixels buffer
width	width of the image in pixels
height	height of the image in pixels
stride	size of an image row in bytes (including alignment)
pixel_format	pixel format
bytes_per_channel	size of a pixel component in bytes

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromYUVBuffer()

```
static Image * se::common::Image::FromYUVBuffer (
            unsigned char * yuv_data,
            int yuv_data_length,
            int width,
            int height)  [static]
```

Factory method for loading an image from YUV NV21 buffer.

Parameters

yuv_data	pointer to YUV NV21 buffer
yuv_data_length	size of the YUV NV21 buffer
width	width of the image in pixels
height	height of the image in pixels

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromYUV()

```
static Image * se::common::Image::FromYUV (
            unsigned char * y_plane,
            int y_plane_length,
            unsigned char * u_plane,
            int u_plane_length,
            unsigned char * v_plane,
            int v_plane_length,
            const YUVDimensions & dimensions)  [static]
```

Factory method for loading an image from a universal YUV buffer.

Parameters

y_plane	pointer to Y plane buffer
y_plane_length	Y plane buffer length
u_plane	pointer to U plane buffer
u_plane_length	U plane buffer length
v_plane	pointer to V plane buffer
v_plane_length	V plane buffer length
dimensions	YUV parameters and dimensions

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

FromBase64Buffer()

```
static Image * se::common::Image::FromBase64Buffer (
            const char * base64_buffer,
            const int page_number = 0,
            const Size & max_size = Size(25000, 25000))  [static]
```

Factory method for loading an image from file pre-loaded in a buffer encoded as a Base64 string. Will be treated as IPF_G or IPF_RGB.

Parameters

base64_buffer	pointer to a base64 file buffer
page_number	page number (0 by default)
max_size	maximum image size in pixels (0 for unrestricted)

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

GetNumberOfLayers()

```
virtual int se::common::Image::GetNumberOfLayers () const  [pure virtual]
```

Gets the number of additional layers.

Returns

The number of layers

GetLayer()

```
virtual const Image & se::common::Image::GetLayer (
            const char * name) const  [pure virtual]
```

Gets the additional layer by the specified name.

Parameters

name	the name of the required layer

Returns

The layer

GetLayerPtr()

```
virtual const Image * se::common::Image::GetLayerPtr (
            const char * name) const  [pure virtual]
```

Gets the additional layer by the specified name.

Parameters

name	the name of the required layer

Returns

The pointer to the layer

LayersBegin()

```
virtual ImagesMapIterator se::common::Image::LayersBegin () const  [pure virtual]
```

Gets the 'begin' map iterator to the internal layers collection.

Returns

The 'begin' map iterator to the internal layers collection

LayersEnd()

```
virtual ImagesMapIterator se::common::Image::LayersEnd () const  [pure virtual]
```

Gets the 'end' map iterator to the internal layers collection.

Returns

The 'end' map iterator to the internal layers collection

HasLayer()

```
virtual bool se::common::Image::HasLayer (
            const char * name) const  [pure virtual]
```

Checks whether the Image contains the layer with the specified name.

Parameters

name	the name of the required layer

Returns

whether the Image contains the layer with the specified name

HasLayers()

```
virtual bool se::common::Image::HasLayers () const  [pure virtual]
```

Checks whether the Image contains the layers.

Returns

whether the Image contains the layers

RemoveLayer()

```
virtual void se::common::Image::RemoveLayer (
            const char * name)  [pure virtual]
```

Removes the layer with the specified name.

Parameters

name	the name of the removable layer

SetLayer()

```
virtual void se::common::Image::SetLayer (
            const char * name,
            const Image & image)  [pure virtual]
```

Add the image with the specified name to the internal layers collection with copying of the pixels of the given image.

Parameters

name	the name of the new layer
image	the value of the new layer

SetLayerWithOwnership()

```
virtual void se::common::Image::SetLayerWithOwnership (
            const char * name,
            Image * image)  [pure virtual]
```

Add the image with the specified name to the internal layers collection by transfering the given image to the internal layers collection. The caller has to release the ownership of the set image.

Parameters

name	the name of the new layer
image	the pointer to the value of the new layer

CloneDeep()

```
virtual Image * se::common::Image::CloneDeep () const  [pure virtual]
```

Clones an image with copying of all pixels.

Returns

Pointer to a cloned image. New object is allocated, the caller is responsible for deleting it.

CloneShallow()

```
virtual Image * se::common::Image::CloneShallow () const  [pure virtual]
```

Clones an image without copying the pixels. The cloned image will be a separate object without memory ownership, the operations with it will be invalid if the source is deallocated.

Returns

Pointer to a cloned image. New object is allocated, the caller is responsible for deleting it.

GetRequiredBufferLength()

```
virtual int se::common::Image::GetRequiredBufferLength () const  [pure virtual]
```

Gets the required buffer length for copying the image pixels into an external pixels buffer.

Returns

Number of required bytes

CopyToBuffer()

```
virtual int se::common::Image::CopyToBuffer (
            unsigned char * buffer,
            int buffer_length) const  [pure virtual]
```

Copies the image pixels.

Parameters

buffer	pointer to an output pixels buffer
buffer_length	available buffer size. Must be at least the size returned by the GetRequiredBufferLength() method.

Returns

The number of written bytes

Save()

```
virtual void se::common::Image::Save (
            const char * image_filename) const  [pure virtual]
```

Saves the image to an external file (png, jpg, tif). Format is deduced from the filename extension.

Parameters

image_filename	filename to save the image

GetRequiredBase64BufferLength()

```
virtual int se::common::Image::GetRequiredBase64BufferLength () const  [pure virtual]
```

Returns required buffer size for Base64 JPEG representation of an image. WARNING: will perform one extra JPEG encoding of an image.

Returns

Buffer size in bytes.

CopyBase64ToBuffer()

```
virtual int se::common::Image::CopyBase64ToBuffer (
            char * out_buffer,
            int buffer_length) const  [pure virtual]
```

Copies the Base64 JPEG representation of an image to an external buffer.

Parameters

out_buffer	output buffer for Base64 JPEG representation
buffer_length	available buffer size. Must be at least the size return by the GetRequiredBase64BufferLength() method.

Returns

The number of written bytes.

GetBase64String()

```
virtual MutableString se::common::Image::GetBase64String () const  [pure virtual]
```

Returns Base64 JPEG representation of an image.

Returns

Base64 JPEG representation in a MutableString form

EstimateFocusScore()

```
virtual double se::common::Image::EstimateFocusScore (
            double quantile = 0.95) const  [pure virtual]
```

Estimates focus score of an image.

Parameters

quantile	the derivatives quantile used to estimate focus score

Returns

Focus score of an image

Resize()

```
virtual void se::common::Image::Resize (
            const Size & new_size)  [pure virtual]
```

Scale the image to a new size.

Parameters

new_size	new size of the image

CloneResized()

```
virtual Image * se::common::Image::CloneResized (
            const Size & new_size) const  [pure virtual]
```

Clones the image scaled to a new size.

Parameters

new_size	new size of the image

Returns

Pointer to a scaled image. New object is allocated, the caller is responsible for deleting it.

Crop() [1/3]

```
virtual void se::common::Image::Crop (
            const Quadrangle & quad)  [pure virtual]
```

Projectively crops a region of image, with approximate selection of the cropped image size.

Parameters

quad	quadrangle in the image for cropping.

CloneCropped() [1/3]

```
virtual Image * se::common::Image::CloneCropped (
            const Quadrangle & quad) const  [pure virtual]
```

Clones the image projectively cropped with approximate selection of the target image size.

Parameters

quad	quadrangle in the image for cropping

Returns

Pointer to a cropped image. New object is allocated, the caller is responsible for deleting it.

Crop() [2/3]

```
virtual void se::common::Image::Crop (
            const Quadrangle & quad,
            const Size & size)  [pure virtual]
```

Projectively crops a region of image, with a given target size.

Parameters

quad	quadrangle in the image for cropping
size	target cropped image size

CloneCropped() [2/3]

```
virtual Image * se::common::Image::CloneCropped (
            const Quadrangle & quad,
            const Size & size) const  [pure virtual]
```

Clones the image projectively cropped with a given target size.

Parameters

quad	quadrangle in the image for cropping
size	target cropped image size

Returns

Pointer to a cropped image. New object is allocated, the caller is responsible for deleting it.

Crop() [3/3]

```
virtual void se::common::Image::Crop (
            const Rectangle & rect)  [pure virtual]
```

Crops an image to a rectangular image region.

Parameters

rect	rectangular region to crop

CloneCropped() [3/3]

```
virtual Image * se::common::Image::CloneCropped (
            const Rectangle & rect) const  [pure virtual]
```

Clones the image cropped to a selected rectangular region (with copying of pixels)

Parameters

rect	rectangular region to crop

Returns

Pointer to a cropped image. New object is allocated, the caller is responsible for deleting it.

CloneCroppedShallow()

```
virtual Image * se::common::Image::CloneCroppedShallow (
            const Rectangle & rect) const  [pure virtual]
```

Clones the image cropped to a selected rectangular region, without copying of pixels. The cloned image will be a separate object without memory ownership, the operations with it will be invalid if the source is deallocated.

Parameters

rect	rectangular region to crop

Returns

Pointer to a cropped image. New object is allocated, the caller is responsible for deleting it.

Mask() [1/2]

```
virtual void se::common::Image::Mask (
            const Rectangle & rect,
            int pixel_expand = 0,
            double pixel_density = 0)  [pure virtual]
```

Masks image region specified by rectangle.

Parameters

rect	rectangle region to mask
pixel_expand	expand offset in pixels for each point (0 by default)
pixel_density	reduce dencity of pixels (0 by default)

CloneMasked() [1/2]

```
virtual Image * se::common::Image::CloneMasked (
            const Rectangle & rect,
            int pixel_expand = 0) const  [pure virtual]
```

Clone the image with masked region specified by rectangle.

Parameters

rect	rectangle region to mask
pixel_expand	expand offset in pixels for each point (0 by default)

Returns

Pointer to a masked image. New object is allocated, the caller is responsible for deleting it.

Mask() [2/2]

```
virtual void se::common::Image::Mask (
            const Quadrangle & quad,
            int pixel_expand = 0,
            double pixel_density = 0)  [pure virtual]
```

Mask image region specified by quadrangle.

Parameters

quad	quadrangle region to mask
pixel_expand	expand offset in pixels for each point (0 by default)

CloneMasked() [2/2]

```
virtual Image * se::common::Image::CloneMasked (
            const Quadrangle & quad,
            int pixel_expand = 0) const  [pure virtual]
```

Clone the image with masked region specified by quadrangle.

Parameters

quad	quadrangle region to mask
pixel_expand	expand offset in pixels for each point (0 by default)
pixel_density	reduce dencity of pixels (0 by default)

Returns

Pointer to a masked image. New object is allocated, the caller is responsible for deleting it.

Fill() [1/2]

```
virtual void se::common::Image::Fill (
            const Rectangle & rect,
            int ch1,
            int ch2 = 0,
            int ch3 = 0,
            int ch4 = 0,
            int pixel_expand = 0)  [pure virtual]
```

Fills image region specified by rectangle and color. The method will use the first as many channel values as there are channels in the image.

Parameters

rect	rectangle region to fill
ch1	1-st channel value
ch2	2-nd channel value
ch3	3-rd channel value
ch4	4-th channel value
pixel_expand	expand offset in pixels for each point (0 by default)

CloneFilled() [1/2]

```
virtual Image * se::common::Image::CloneFilled (
            const Rectangle & rect,
            int ch1,
            int ch2 = 0,
            int ch3 = 0,
            int ch4 = 0,
            int pixel_expand = 0) const  [pure virtual]
```

Clone the image with filled region specified by rectangle and color. The method will use the first as many channel values as there are channels in the image.

Parameters

rect	rectangle region to fill
ch1	1-st channel value
ch2	2-nd channel value
ch3	3-rd channel value
ch4	4-th channel value
pixel_expand	expand offset in pixels for each point (0 by default)

Returns

Pointer to a filled image. New object is allocated, the caller is responsible for deleting it.

Fill() [2/2]

```
virtual void se::common::Image::Fill (
            const Quadrangle & quad,
            int ch1,
            int ch2 = 0,
            int ch3 = 0,
            int ch4 = 0,
            int pixel_expand = 0)  [pure virtual]
```

Fill image region specified by quadrangle and color. The method will use the first as many channel values as there are channels in the image.

Parameters

quad	quadrangle region to fill
ch1	1-st channel value
ch2	2-nd channel value
ch3	3-rd channel value
ch4	4-th channel value
pixel_expand	expand offset in pixels for each point (0 by default)

CloneFilled() [2/2]

```
virtual Image * se::common::Image::CloneFilled (
            const Quadrangle & quad,
            int ch1,
            int ch2 = 0,
            int ch3 = 0,
            int ch4 = 0,
            int pixel_expand = 0) const  [pure virtual]
```

Clone the image with filled region specified by quadrangle and color. The method will use the first as many channel values as there are channels in the image.

Parameters

quad	quadrangle region to fill
ch1	1-st channel value
ch2	2-nd channel value
ch3	3-rd channel value
ch4	4-th channel value
pixel_expand	expand offset in pixels for each point (0 by default)

Returns

Pointer to a filled image. New object is allocated, the caller is responsible for deleting it.

CloneFlippedVertical()

```
virtual Image * se::common::Image::CloneFlippedVertical () const  [pure virtual]
```

Clones the image flipped around the vertical axis.

Returns

Pointer to a flipped image. New object is allocated, the caller is responsible for deleting it.

CloneFlippedHorizontal()

```
virtual Image * se::common::Image::CloneFlippedHorizontal () const  [pure virtual]
```

Clones the image flipped around the horizontal axis.

Returns

Pointer to a flipped image. New object is allocated, the caller is responsible for deleting it.

Rotate90()

```
virtual void se::common::Image::Rotate90 (
            int times)  [pure virtual]
```

Rotates the image clockwise by a multiple of 90 degrees.

Parameters

times	the number of times to rotate

CloneRotated90()

```
virtual Image * se::common::Image::CloneRotated90 (
            int times) const  [pure virtual]
```

Clones the image rotated clockwise by a multiple of 90 degrees.

Parameters

times	the number of times to rotate

Returns

Pointer to a rotated image. New object is allocated, the caller is responsible for deleting it.

CloneAveragedChannels()

```
virtual Image * se::common::Image::CloneAveragedChannels () const  [pure virtual]
```

Clones the image with averaged channel intensity values.

Returns

Pointer to a created image. New object is allocated, the caller is responsible for deleting it.

CloneInverted()

```
virtual Image * se::common::Image::CloneInverted () const  [pure virtual]
```

Clones the image with inverted colos.

Returns

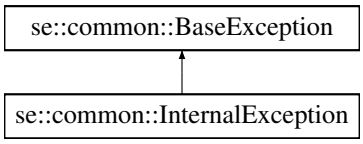
Pointer to a created image. New object is allocated, the caller is responsible for deleting it

1.14 se::common::InternalException Class Reference

InternalException: thrown if an unknown error occurs or if the error occurs within internal system components.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::InternalException:



Public Member Functions

- **InternalException** (const char *msg)
  Ctor with an exception message.
- **InternalException** (const InternalException &copy)
  Copy ctor.
- virtual ~**InternalException** () override=default
  Default dtor.
- virtual const char * ExceptionName () const override
  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()
  Non-trivial dtor.
- **BaseException** (const BaseException &copy)
  Copy ctor.
- virtual const char * **what** () const
  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char *msg)
  Protected ctor.

1.14.1 Detailed Description

InternalException: thrown if an unknown error occurs or if the error occurs within internal system components.

Definition at line 192 of file se_exception.h.

1.14.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::InternalException::ExceptionName () const  [override], [virtual]
```

Returns exception class name.

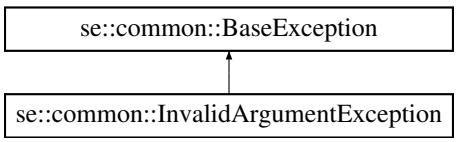
Reimplemented from se::common::BaseException.

1.15 se::common::InvalidArgumentException Class Reference

InvalidArgumentException: thrown if a method is called with invalid input parameters.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::InvalidArgumentException:



Public Member Functions

- **InvalidArgumentException** (const char *msg)
  Ctor with an exception message.
- **InvalidArgumentException** (const InvalidArgumentException &copy)
  Copy ctor.
- virtual ~**InvalidArgumentException** () override=default
  Default dtor.
- virtual const char * ExceptionName () const override
  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()
  Non-trivial dtor.
- **BaseException** (const BaseException &copy)
  Copy ctor.
- virtual const char * **what** () const
  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char ∗msg)

  Protected ctor.

1.15.1 Detailed Description

InvalidArgumentException: thrown if a method is called with invalid input parameters.

Definition at line 132 of file se_exception.h.

1.15.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::InvalidArgumentException::ExceptionName () const  [override],
[virtual]
```

Returns exception class name.

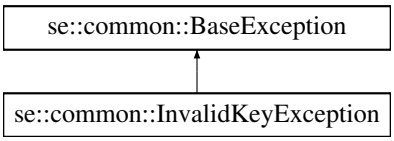
Reimplemented from se::common::BaseException.

1.16 se::common::InvalidKeyException Class Reference

InvalidKeyException: thrown if to an associative container the access is performed with an invalid or a non-existent key, or if the access to a list is performed with an invalid or out-of-range index.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::InvalidKeyException:



Public Member Functions

- **InvalidKeyException** (const char ∗msg)

  Ctor with an exception message.
- **InvalidKeyException** (const InvalidKeyException &copy)

  Copy ctor.
- virtual ∼**InvalidKeyException** () override=default

  Default dtor.
- virtual const char ∗ ExceptionName () const override

  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()

  Non-trivial dtor.
- **BaseException** (const BaseException &copy)

  Copy ctor.
- virtual const char * **what** () const

  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char *msg)

  Protected ctor.

1.16.1 Detailed Description

InvalidKeyException: thrown if to an associative container the access is performed with an invalid or a non-existent key, or if the access to a list is performed with an invalid or out-of-range index.

Definition at line 50 of file se_exception.h.

1.16.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::InvalidKeyException::ExceptionName () const  [override], [virtual]
```

Returns exception class name.

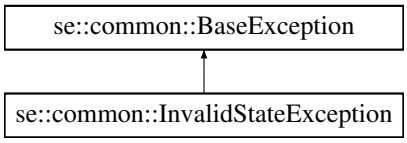
Reimplemented from se::common::BaseException.

1.17 se::common::InvalidStateException Class Reference

InvalidStateException: thrown if an error occurs within the system in relation to an incorrect internal state of the system objects.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::InvalidStateException:



Public Member Functions

- **InvalidStateException** (const char ∗msg)

  Ctor with an exception message.
- **InvalidStateException** (const InvalidStateException &copy)

  Copy ctor.
- virtual ∼**InvalidStateException** () override=default

  Default dtor.
- virtual const char ∗ ExceptionName () const override

  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ∼**BaseException** ()

  Non-trivial dtor.
- **BaseException** (const BaseException &copy)

  Copy ctor.
- virtual const char ∗ **what** () const

  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char ∗msg)

  Protected ctor.

1.17.1 Detailed Description

InvalidStateException: thrown if an error occurs within the system in relation to an incorrect internal state of the system objects.

Definition at line 172 of file se_exception.h.

1.17.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::InvalidStateException::ExceptionName () const  [override],
[virtual]
```

Returns exception class name.

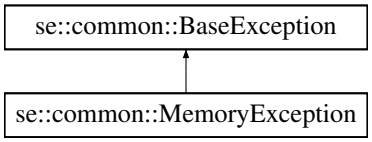
Reimplemented from se::common::BaseException.

1.18 se::common::MemoryException Class Reference

MemoryException: thrown if an allocation is attempted with insufficient RAM.

`#include <se_exception.h>`

Inheritance diagram for se::common::MemoryException:



Public Member Functions

- **MemoryException** (const char *msg)
  Ctor with an exception message.
- **MemoryException** (const MemoryException &copy)
  Copy ctor.
- virtual ~**MemoryException** () override=default
  Default dtor.
- virtual const char * ExceptionName () const override
  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()
  Non-trivial dtor.
- **BaseException** (const BaseException &copy)
  Copy ctor.
- virtual const char * **what** () const
  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char *msg)
  Protected ctor.

1.18.1 Detailed Description

MemoryException: thrown if an allocation is attempted with insufficient RAM.

Definition at line 152 of file se_exception.h.

1.18.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::MemoryException::ExceptionName () const  [override], [virtual]
```

Returns exception class name.

Reimplemented from se::common::BaseException.

1.19 se::common::MutableString Class Reference

Class representing a mutable, memory-owner string.

```
#include <se_string.h>
```

Public Member Functions

- **MutableString** ()
  Default ctor, creates an empty string.
- **MutableString** (const char *c_str)
  Ctor from a C-string.
- **MutableString** (const MutableString &other)
  Copy ctor.
- MutableString & **operator=** (const MutableString &other)
  Assignment operator.
- ~**MutableString** ()
  Non-trivial dtor.
- MutableString & **operator+=** (const MutableString &other)
  Appends a string to this instance.
- MutableString **operator+** (const MutableString &other) const
  Creates a concatenation of this instance and the other string.
- const char * **GetCStr** () const
  Returns an internal C-string.
- int **GetLength** () const
  Returns the length of the string. WARNING: returns the number of bytes, not the number of UTF-8 characters.
- void **Serialize** (Serializer &serializer) const
  Serializes the string given a serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const
  Internal serialization implementation.

Private Attributes

- int len_
  length of the internal string in bytes
- char * buf_
  internal C-string

1.19.1 Detailed Description

Class representing a mutable, memory-owner string.

Definition at line 25 of file se_string.h.

1.19.2 Member Data Documentation

len_

```
int se::common::MutableString::len_  [private]
```

length of the internal string in bytes

Definition at line 62 of file se_string.h.

buf_

```
char* se::common::MutableString::buf_  [private]
```

internal C-string

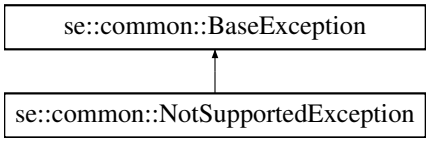
Definition at line 63 of file se_string.h.

1.20 se::common::NotSupportedException Class Reference

NotSupportedException: thrown when trying to access a method which given the current state or given the passed arguments is not supported in the current version of the library or is not supported at all by design.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::NotSupportedException:



Public Member Functions

- **NotSupportedException** (const char *msg)
  Ctor with an exception message.
- **NotSupportedException** (const NotSupportedException &copy)
  Copy ctor.
- virtual ~**NotSupportedException** () override=default
  Default dtor.
- virtual const char * ExceptionName () const override
  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ~**BaseException** ()

  Non-trivial dtor.
- **BaseException** (const BaseException &copy)

  Copy ctor.
- virtual const char * **what** () const

  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char *msg)

  Protected ctor.

1.20.1 Detailed Description

NotSupportedException: thrown when trying to access a method which given the current state or given the passed arguments is not supported in the current version of the library or is not supported at all by design.

Definition at line 72 of file se_exception.h.

1.20.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::NotSupportedException::ExceptionName () const  [override],
[virtual]
```

Returns exception class name.

Reimplemented from se::common::BaseException.

1.21 se::common::OcrChar Class Reference

Class representing an OCR information for a given recognized character.

```
#include <se_string.h>
```

Public Member Functions

- **OcrChar** ()

  Default ctor, creates an empty recognized character.
- OcrChar (const OcrCharVariant *variants, int variants_count, bool is_highlighted, const Quadrangle &quad)

  Main ctor from an array of variants.
- **OcrChar** (const OcrChar &other)

  Copy ctor.
- OcrChar & **operator=** (const OcrChar &other)

  Assignment operator.
- ~**OcrChar** ()

  Non-trivial dtor.
- int **GetVariantsCount** () const

  Gets the number of variants.
- const OcrCharVariant * **GetVariants** () const

  Gets the pointer to the variants array.
- OcrCharVariant & **operator[ ]** (int index)

  Returns the variant by its index (mutable ref)
- const OcrCharVariant & **operator[ ]** (int index) const

  Returns the variant by its index (const ref)
- const OcrCharVariant & **GetVariant** (int index) const

  Returns the variant by its index (const ref)
- OcrCharVariant & **GetMutableVariant** (int index)

  Returns the variant by its index (mutable ref)
- void **SetVariant** (int index, const OcrCharVariant &v)

  Sets the variant to an array with a given index.
- void **Resize** (int size)

  Resizes the variants array to a given size.
- bool **GetIsHighlighted** () const

  Returns the value of the highlight flag.
- void **SetIsHighlighted** (bool is_highlighted)

  Sets the value of the highlight flag.
- const Quadrangle & **GetQuadrangle** () const

  Returns the quadrangle of the OcrChar (const ref)
- Quadrangle & **GetMutableQuadrangle** ()

  Returns the quadrangle of the OcrChar (mutable ref)
- void **SetQuadrangle** (const Quadrangle &quad)

  Sets the quadrangle of the OcrChar.
- void **SortVariants** ()

  Sorts the variants array in the descending order of confidence values.
- const OcrCharVariant & **GetFirstVariant** () const

  Gets the first variant of the array (const ref)
- void **Serialize** (Serializer &serializer) const

  Serializes the object given serializer.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const

  Internal serialization implementation.

Private Attributes

- int vars_cnt_
  number of variants
- OcrCharVariant * vars_
  variants array
- bool is_highlighted_
  highlight flag
- Quadrangle quad_
  OcrChar quadrangle.

1.21.1 Detailed Description

Class representing an OCR information for a given recognized character.

Definition at line 129 of file se_string.h.

1.21.2 Constructor & Destructor Documentation

OcrChar()

```
se::common::OcrChar::OcrChar (
            const OcrCharVariant * variants,
            int variants_count,
            bool is_highlighted,
            const Quadrangle & quad)
```

Main ctor from an array of variants.

Parameters

variants	pointer to an array of variants
variants_count	the number of variants in the array
is_highlighted	highlight flag for the OcrChar
quad	quadrangle of the OcrChar

1.21.3 Member Data Documentation

vars_cnt_

```
int se::common::OcrChar::vars_cnt_  [private]
```

number of variants

Definition at line 207 of file se_string.h.

vars_

```
OcrCharVariant* se::common::OcrChar::vars_  [private]
```

variants array

Definition at line 208 of file se_string.h.

is_highlighted_

```
bool se::common::OcrChar::is_highlighted_  [private]
```

highlight flag

Definition at line 209 of file se_string.h.

quad_

```
Quadrangle se::common::OcrChar::quad_  [private]
```

OcrChar quadrangle.

Definition at line 210 of file se_string.h.

1.22 se::common::OcrCharVariant Class Reference

Class representing a possible character recognition result.

```
#include <se_string.h>
```

Public Member Functions

- **OcrCharVariant** ()
  Default ctor, creates an empty variant with zero confidence.
- OcrCharVariant (const MutableString &utf8_char, float confidence)
  Ctor from utf8-char represented as a mutable string.
- OcrCharVariant (const char *utf8_char, float confidence)
  Ctor from utf8-char represented as a C-string.
- ~**OcrCharVariant** ()=default
  Default dtor.
- const char * **GetCharacter** () const
  Gets the character as a C-string.
- void **SetCharacter** (const MutableString &utf8_char)
  Sets a character given a MutableString.
- void **SetCharacter** (const char *utf8_char)
  Sets a character given a C-string.
- float **GetConfidence** () const
  Gets the confidence value.
- void **SetConfidence** (float confidence)
  Sets the confidence value (must be in range [0, 1])
- float **GetInternalScore** () const
  Returns the internal score of the OcrCharVariant.
- void **SetInternalScore** (float internal_score)
  Sets the internal score of the OcrCharVariant.
- void **Serialize** (Serializer &serializer) const
  Serializes the object given a serializer.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const
  Internal serialization implementation.

Private Attributes

- MutableString char_
  character recognition result representation
- float conf_
  confidence value
- float internal_score_
  internal score

1.22.1 Detailed Description

Class representing a possible character recognition result.

Definition at line 70 of file se_string.h.

1.22.2 Constructor & Destructor Documentation

OcrCharVariant() [1/2]

```
se::common::OcrCharVariant::OcrCharVariant (
            const MutableString & utf8_char,
            float confidence)
```

Ctor from utf8-char represented as a mutable string.

Parameters

utf8_char	utf8-character represented as a mutable string
confidence	float confidence in range [0, 1]

OcrCharVariant() [2/2]

```
se::common::OcrCharVariant::OcrCharVariant (
            const char * utf8_char,
            float confidence)
```

Ctor from utf8-char represented as a C-string.

Parameters

utf8_char	utf8-character represented as a C-string
confidence	float confidence in range [0, 1]

1.22.3 Member Data Documentation

char_

```
MutableString se::common::OcrCharVariant::char_  [private]
```

character recognition result representation

Definition at line 120 of file se_string.h.

conf_

```
float se::common::OcrCharVariant::conf_  [private]
```

confidence value

Definition at line 121 of file se_string.h.

internal_score_

```
float se::common::OcrCharVariant::internal_score_  [private]
```

internal score

Definition at line 122 of file se_string.h.

1.23 se::common::OcrString Class Reference

Class representing text string recognition result.

```
#include <se_string.h>
```

Public Member Functions

- **OcrString** ()
  Default ctor.
- OcrString (const char *utf8_str)
  Ctor from utf8 C-string. Splits the utf8-string into utf8-characters and creates an OcrChar for each one.
- OcrString (const OcrChar *chars, int chars_count)
  Ctor from an array of characters.
- **OcrString** (const OcrString &other)
  Copy ctor.
- OcrString & **operator=** (const OcrString &other)
  Assignment operator.
- ~**OcrString** ()
  Non-trivial destructor.
- const class OcrStringImpl * **GetOcrStringImplPtr** () const
  Gets the ptr to the OcrStringImpl class (const ptr)
- int **GetCharsCount** () const

Gets the number of characters.

- const OcrChar * **GetChars** () const

  Gets the pointer to the characters array.

- OcrChar & **operator[ ]** (int index)

  Gets a character by index (mutable ref)

- const OcrChar & **operator[ ]** (int index) const

  Gets a character by index (const ref)

- const OcrChar & **GetChar** (int index) const

  Gets a character by index (const ref)

- OcrChar & **GetMutableChar** (int index)

  Gets a character by index (mutable ref)

- void **SetChar** (int index, const OcrChar &chr)

  Sets a character by index.

- void **AppendChar** (const OcrChar &chr)

  Appends a character.

- void **AppendString** (const OcrString &str)

  Appends a string.

- void **Resize** (int size)

  Resizes the internal array of characters.

- const Quadrangle **GetQuadrangleByIndex** (int idx) const

  Returns the quadrangle of the OcrChar.

- float **GetBestVariantConfidenceByIndex** (int idx) const

  Returns the confidence of the best OcrCharVariant.

- void **SortVariants** ()

  Sorts the variants in each character by the descending order of confidence.

- MutableString **GetFirstString** () const

  Returns a string composed of the best variants from each OcrChar.

- void **UnpackChars** ()

  Unpack se::common::OcrChars from se::common::OcrString.

- void **RepackChars** ()

  Repack se::common::OcrChars to se::common::OcrString.

- void **Serialize** (Serializer &serializer) const

  Serializes the object given serializer.

- void **SerializeImpl** (SerializerImplBase &serializer_impl) const

  Internal serialization implementation.

Static Public Member Functions

- static OcrString ConstructFromImpl (const class OcrStringImpl &ocr_string_impl)

  Ctor from a ptr to OcrStringImpl class.

Private Member Functions

- **OcrString** (const OcrStringImpl &ocr_string_impl)

  Private ctor from an internal implementation structure.

Private Attributes

- OcrStringImpl * ocr_string_impl_

1.23.1 Detailed Description

Class representing text string recognition result.

Definition at line 220 of file se_string.h.

1.23.2 Constructor & Destructor Documentation

OcrString() [1/2]

```
se::common::OcrString::OcrString (
            const char * utf8_str)
```

Ctor from utf8 C-string. Splits the utf8-string into utf8-characters and creates an OcrChar for each one.

Parameters

utf8_str	input utf8 C-string

OcrString() [2/2]

```
se::common::OcrString::OcrString (
            const OcrChar * chars,
            int chars_count)
```

Ctor from an array of characters.

Parameters

chars	array of OcrChars
chars_count	the number of characters

1.23.3 Member Function Documentation

ConstructFromImpl()

```
static OcrString se::common::OcrString::ConstructFromImpl (
            const class OcrStringImpl & ocr_string_impl)  [static]
```

Ctor from a ptr to OcrStringImpl class.

Parameters

ocr_string_impl	ptr to OcrStringImpl class

1.23.4 Member Data Documentation

ocr_string_impl_

```
OcrStringImpl* se::common::OcrString::ocr_string_impl_  [private]
```

Definition at line 316 of file se_string.h.

1.24 se::common::Point Class Reference

Class representing a point in an image.

```
#include <se_geometry.h>
```

Public Member Functions

- **Point** ()
  Default ctor - initializes a point with zero-valued coordinates.
- **Point** (double x, double y)
  Main ctor - initializes both coordinates.
- void **Serialize** (Serializer &serializer) const
  Serialize point given serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const
  Internal serialization implementation.

Public Attributes

- double x
  X-coordinate of the point (in pixels)
- double y
  Y-coordinate of the point (in pixels)

1.24.1 Detailed Description

Class representing a point in an image.

Definition at line 47 of file se_geometry.h.

1.24.2 Member Data Documentation

x

```
double se::common::Point::x
```

X-coordinate of the point (in pixels)

Definition at line 62 of file se_geometry.h.

y

```
double se::common::Point::y
```

Y-coordinate of the point (in pixels)

Definition at line 63 of file se_geometry.h.

1.25 se::common::Polygon Class Reference

Class representing a polygon in an image.

```
#include <se_geometry.h>
```

Public Member Functions

- **Polygon** ()
  Default ctor - initializes a polygon with no points.
- **Polygon** (const Point *points, int points_count)
  Main ctor - initializes a polygon with points array (points are copied)
- **Polygon** (const Polygon &other)
  Copy ctor - copies all points of the other polygon.
- Polygon & **operator=** (const Polygon &other)
  Assignment operator - copies all points of the other polygon.
- ~**Polygon** ()
  Dtor (non-trivial)
- int **GetPointsCount** () const
  Returns the number of points in the polygon.
- const Point * **GetPoints** () const
  Returns a pointer to the first point in the polygon.
- Point & **operator[ ]** (int index)
  Mutable subscript getter for a point by an index.
- const Point & **operator[ ]** (int index) const
  Subscript getter for a point by an index.
- const Point & **GetPoint** (int index) const
  Getter for a point by an index.
- Point & **GetMutablePoint** (int index)
  Mutable getter for a point by an index.
- void **SetPoint** (int index, const Point &p)
  Setter for a point by an index.
- void **Resize** (int size)
  Resizes in internal array of points. If size is different from the current size, the new array is allocated. Old points are copied, new points are initialized with zero coordinates (if upsized)
- Rectangle **GetBoundingRectangle** () const
  Calculates, creates, and returns a bounding rectangle for the polygon.
- void **Serialize** (Serializer &serializer) const
  Serialize quadrangle given serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const
  Internal serialization implementation.

Private Attributes

- int pts_cnt_
  Number of points.
- Point * pts_
  Points array.

1.25.1 Detailed Description

Class representing a polygon in an image.

Definition at line 225 of file se_geometry.h.

1.25.2 Member Data Documentation

pts_cnt_

```
int se::common::Polygon::pts_cnt_  [private]
```

Number of points.

Definition at line 278 of file se_geometry.h.

pts_

```
Point* se::common::Polygon::pts_  [private]
```

Points array.

Definition at line 279 of file se_geometry.h.

1.26 se::common::ProjectiveTransform Class Reference

Class representing projective transformation of a plane.

```
#include <se_geometry.h>
```

Public Types

- using Raw2dArrayType = double[3][3]
  type declaration for internal matrix

Public Member Functions

- virtual ~**ProjectiveTransform** ()=default

  Default dtor.
- virtual ProjectiveTransform * **Clone** () const =0

  Copies transform object.
- virtual Point **TransformPoint** (const Point &p) const =0

  Transforms an input point.
- virtual Quadrangle **TransformQuad** (const Quadrangle &q) const =0

  Transforms an input quadrangle.
- virtual Polygon **TransformPolygon** (const Polygon &poly) const =0

  Transforms an input polygon.
- virtual bool **IsInvertable** () const =0

  Returns true iff the transformation is invertable.
- virtual void **Invert** ()=0

  Inverts the projective transformation.
- virtual ProjectiveTransform * **CloneInverted** () const =0

  Creates a new object with an inverted transformation.
- virtual const Raw2dArrayType & **GetRawCoeffs** () const =0

  Returns internal transformation matrix (constant)
- virtual Raw2dArrayType & **GetMutableRawCoeffs** ()=0

  Returns internal transformation matrix (mutable)
- virtual void **Serialize** (Serializer &serializer) const =0

  Serializes the projective transformation given serializer object.

Static Public Member Functions

- static bool CanCreate (const Quadrangle &src_quad, const Quadrangle &dst_quad)

  Returns true, iff the projective transform can be defined which transforms the quad 'src_quad' to the quad 'dst_quad'.
- static bool CanCreate (const Quadrangle &src_quad, const Size &dst_size)

  Returns true, iff the projective transform can be defined which transforms the quad 'src_quad' to an orthotropic rectangle with size 'dst_size'.
- static ProjectiveTransform * Create ()

  Creates a unit transformation.
- static ProjectiveTransform * Create (const Quadrangle &src_quad, const Quadrangle &dst_quad)

  Creates a transformation which transforms the quad 'src_quad' to the quad 'dst_quad'.
- static ProjectiveTransform * Create (const Quadrangle &src_quad, const Size &dst_size)

  Create a transformation which transforms the quad 'src_quad' to an orthotropic rectangle with size 'dst_size'.
- static ProjectiveTransform * Create (const Raw2dArrayType &coeffs)

  Creates a transformation given raw matrix.

1.26.1 Detailed Description

Class representing projective transformation of a plane.

Definition at line 286 of file se_geometry.h.

1.26.2 Member Typedef Documentation

Raw2dArrayType

```
using se::common::ProjectiveTransform::Raw2dArrayType = double[3][3]
```

type declaration for internal matrix

Definition at line 288 of file se_geometry.h.

1.26.3 Member Function Documentation

CanCreate() [1/2]

```
static bool se::common::ProjectiveTransform::CanCreate (
            const Quadrangle & src_quad,
            const Quadrangle & dst_quad)  [static]
```

Returns true, iff the projective transform can be defined which transforms the quad 'src_quad' to the quad 'dst_quad'.

Parameters

src_quad	transformation source
dst_quad	transformation destination

Returns

true iff such transform can be defined and constructed

CanCreate() [2/2]

```
static bool se::common::ProjectiveTransform::CanCreate (
            const Quadrangle & src_quad,
            const Size & dst_size)  [static]
```

Returns true, iff the projective transform can be defined which transforms the quad 'src_quad' to an orthotropic rectangle with size 'dst_size'.

Parameters

src_quad	transformation source
dst_size	linear sizes of the transformation destionation

Returns

true iff such transform can be defined and constructed

Create() [1/4]

```
static ProjectiveTransform * se::common::ProjectiveTransform::Create ()  [static]
```

Creates a unit transformation.

Returns

Unit transformation object

Create() [2/4]

```
static ProjectiveTransform * se::common::ProjectiveTransform::Create (
            const Quadrangle & src_quad,
            const Quadrangle & dst_quad)  [static]
```

Creates a transformation which transforms the quad 'src_quad' to the quad 'dst_quad'.

Parameters

src_quad	transformation source
dst_quad	transformation destination

Returns

Created transform

Create() [3/4]

```
static ProjectiveTransform * se::common::ProjectiveTransform::Create (
            const Quadrangle & src_quad,
            const Size & dst_size)  [static]
```

Create a transformation which transforms the quad 'src_quad' to an orthotropic rectangle with size 'dst_size'.

Parameters

src_quad	transformation source
dst_size	linear sizes of the transformation destination

Returns

Created transform

Create() [4/4]

```
static ProjectiveTransform * se::common::ProjectiveTransform::Create (
            const Raw2dArrayType & coeffs)  [static]
```

Creates a transformation given raw matrix.

Parameters

coeffs	transformation matrix

Returns

Created transform

1.27 se::common::Quadrangle Class Reference

Class representing a quadrangle in an image.

`#include <se_geometry.h>`

Public Member Functions

- **Quadrangle** ()
  Default ctor - initializes quadrangle with all points pointing to zero.
- **Quadrangle** (const Point &a, const Point &b, const Point &c, const Point &d)
  Main ctor - initializes all four points of the quadrangle.
- Point & **operator[ ]** (int index)
  Mutable subscript getter for a point (indices from 0 to 3)
- const Point & **operator[ ]** (int index) const
  Subscript getter for a point (indices from 0 to 3)
- const Point & **GetPoint** (int index) const
  Getter for a point (indices from 0 to 3)
- Point & **GetMutablePoint** (int index)
  Mutable getter for a point (indices from 0 to 3)
- void **SetPoint** (int index, const Point &p)
  Setter for a point (indices from 0 to 3)
- Rectangle **GetBoundingRectangle** () const
  Calculates, creates, and returns a bounding rectangle for the quadrangle.
- void **Serialize** (Serializer &serializer) const
  Serialize rectangle given serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const
  Internal serialization implementation.

Private Attributes

- Point pts_ [4]
  Constituent points.

1.27.1 Detailed Description

Class representing a quadrangle in an image.

Definition at line 93 of file se_geometry.h.

1.27.2 Member Data Documentation

pts_

```
Point se::common::Quadrangle::pts_[4]  [private]
```

Constituent points.

Definition at line 126 of file se_geometry.h.

1.28 se::common::QuadranglesMapIterator Class Reference

QuadranglesMapIterator: iterator object for maps of named quadrangles.

```
#include <se_geometry.h>
```

Public Member Functions

- **QuadranglesMapIterator** (const QuadranglesMapIterator &other)
  Copy ctor.
- QuadranglesMapIterator & **operator=** (const QuadranglesMapIterator &other)
  Assignment operator.
- ∼**QuadranglesMapIterator** ()
  Non-trivial dtor.
- const char ∗ **GetKey** () const
  Returns the name of the quadrangle.
- const Quadrangle & **GetValue** () const
  Returns the target quadrangle.
- bool **Equals** (const QuadranglesMapIterator &rvalue) const
  Returns true iff the rvalue iterator points to the same object.
- bool **operator==** (const QuadranglesMapIterator &rvalue) const
  Returns true iff the rvalue iterator points to the same object.
- bool **operator!=** (const QuadranglesMapIterator &rvalue) const
  Returns true iff the rvalue iterator points to a different object.
- void **Advance** ()
  Points an iterator to the next object a the collection.
- void **operator++** ()
  Points an iterator to the next object a the collection.

Static Public Member Functions

- static QuadranglesMapIterator **ConstructFromImpl** (const QuadranglesMapIteratorImpl &pimpl)
  Construction of the iterator object from internal implementation.

Private Member Functions

- **QuadranglesMapIterator** (const QuadranglesMapIteratorImpl &pimpl)
  Private ctor from internal implementation.

Private Attributes

- class QuadranglesMapIteratorImpl * pimpl_

  Internal implementation.

1.28.1 Detailed Description

QuadranglesMapIterator: iterator object for maps of named quadrangles.

Definition at line 135 of file se_geometry.h.

1.28.2 Member Data Documentation

pimpl_

```
class QuadranglesMapIteratorImpl* se::common::QuadranglesMapIterator::pimpl_  [private]
```

Internal implementation.

Definition at line 176 of file se_geometry.h.

1.29 se::common::Rectangle Class Reference

Class representing a rectangle in an image.

```
#include <se_geometry.h>
```

Public Member Functions

- **Rectangle** ()

  Default ctor - initializes rectangle with zero-valued fields.
- **Rectangle** (int x, int y, int width, int height)

  Main ctor - initializes all fields of a rectangle.
- void **Serialize** (Serializer &serializer) const

  Serialize rectangle given serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const

  Internal serialization implementation.

Public Attributes

- int x

  X-coordinate of the top-left corner (in pixels)
- int y

  Y-coordinate of the top-left corner (in pixels)
- int width

  Width of the rectangle (in pixels)
- int height

  Height of the rectangle (in pixels)

1.29.1 Detailed Description

Class representing a rectangle in an image.

Definition at line 22 of file se_geometry.h.

1.29.2 Member Data Documentation

x

```
int se::common::Rectangle::x
```

X-coordinate of the top-left corner (in pixels)

Definition at line 37 of file se_geometry.h.

y

```
int se::common::Rectangle::y
```

Y-coordinate of the top-left corner (in pixels)

Definition at line 38 of file se_geometry.h.

width

```
int se::common::Rectangle::width
```

Width of the rectangle (in pixels)

Definition at line 39 of file se_geometry.h.

height

```
int se::common::Rectangle::height
```

Height of the rectangle (in pixels)

Definition at line 40 of file se_geometry.h.

1.30 se::common::RectanglesVectorIterator Class Reference

Public Member Functions

- **RectanglesVectorIterator** (const RectanglesVectorIterator &other)

  Copy ctor.
- RectanglesVectorIterator & **operator=** (const RectanglesVectorIterator &other)

  Assignment operator.
- ∼**RectanglesVectorIterator** ()

  Non-trivial dtor.
- const Rectangle & **GetValue** () const

  Returns the target quadrangle.
- bool **Equals** (const RectanglesVectorIterator &rvalue) const

  Returns true iff the rvalue iterator points to the same object.
- bool **operator==** (const RectanglesVectorIterator &rvalue) const

  Returns true iff the rvalue iterator points to the same object.
- bool **operator!=** (const RectanglesVectorIterator &rvalue) const

  Returns true iff the rvalue iterator points to a different object.
- void **Advance** ()

  Points an iterator to the next object a the collection.
- void **operator++** ()

  Points an iterator to the next object a the collection.

Static Public Member Functions

- static RectanglesVectorIterator **ConstructFromImpl** (const RectanglesVectorIteratorImpl &pimpl)

  Construction of the iterator object from internal implementation.

Private Member Functions

- **RectanglesVectorIterator** (const RectanglesVectorIteratorImpl &pimpl)

  Private ctor from internal implementation.

Private Attributes

- class RectanglesVectorIteratorImpl ∗ pimpl_

  Internal implementation.

1.30.1 Detailed Description

Definition at line 181 of file se_geometry.h.

1.30.2 Member Data Documentation

pimpl_

```
class RectanglesVectorIteratorImpl* se::common::RectanglesVectorIterator::pimpl_  [private]
```

Internal implementation.

Definition at line 219 of file se_geometry.h.

1.31 se::common::SerializationParameters Class Reference

Class representing serialization parameters.

`#include <se_serialization.h>`

Public Member Functions

- **SerializationParameters** ()
  Default ctor.
- ~**SerializationParameters** ()
  Default dtor.
- **SerializationParameters** (const SerializationParameters &copy)
  Copy ctor.
- SerializationParameters & **operator=** (const SerializationParameters &other)
  Assignment operator.
- bool HasIgnoredObjectType (const char *object_type) const
  Checks whether the serialization parameters have an ignored object type.
- void AddIgnoredObjectType (const char *object_type)
  Adds an object type to the set of ignored.
- void RemoveIgnoredObjectType (const char *object_type)
  Removes an object type from the set of ignored.
- se::common::StringsSetIterator **IgnoredObjectTypesBegin** () const
  Returns a begin iterator to the set of ignored object types.
- se::common::StringsSetIterator **IgnoredObjectTypesEnd** () const
  Returns an end iterator to the set of ignored object types.
- bool HasIgnoredKey (const char *key) const
  Checks whether the serialization parameters have an ignored key.
- void AddIgnoredKey (const char *key)
  Adds a key to the set of ignored keys.
- void RemoveIgnoredKey (const char *key)
  Removes a key from the set of ignored keys.
- se::common::StringsSetIterator **IgnoredKeysBegin** () const
  Returns a begin iterator to the set of ignored keys.
- se::common::StringsSetIterator **IgnoredKeysEnd** () const
  Returns an end iterator to the set of ignored keys.
- const SerializationParametersImpl & **GetImpl** () const
  Returns an internal implementation structure.

Private Attributes

- SerializationParametersImpl * pimpl_
  pointer to internal implementation

1.31.1 Detailed Description

Class representing serialization parameters.

Definition at line 25 of file se_serialization.h.

1.31.2 Member Function Documentation

HasIgnoredObjectType()

```
bool se::common::SerializationParameters::HasIgnoredObjectType (
            const char * object_type) const
```

Checks whether the serialization parameters have an ignored object type.

Parameters

object_type	the name of the object type to check

Returns

true iff the object type 'object_type' is ignored

AddIgnoredObjectType()

```
void se::common::SerializationParameters::AddIgnoredObjectType (
            const char * object_type)
```

Adds an object type to the set of ignored.

Parameters

object_type	the name of the object type to add

RemoveIgnoredObjectType()

```
void se::common::SerializationParameters::RemoveIgnoredObjectType (
            const char * object_type)
```

Removes an object type from the set of ignored.

Parameters

object_type	the name of the object type to remove

HasIgnoredKey()

```
bool se::common::SerializationParameters::HasIgnoredKey (
            const char * key) const
```

Checks whether the serialization parameters have an ignored key.

Parameters

key	the name of the key to check

Returns

true iff the key 'key' is ignored

AddIgnoredKey()

```
void se::common::SerializationParameters::AddIgnoredKey (
            const char * key)
```

Adds a key to the set of ignored keys.

Parameters

key	the name of the key to add

RemoveIgnoredKey()

```
void se::common::SerializationParameters::RemoveIgnoredKey (
            const char * key)
```

Removes a key from the set of ignored keys.

Parameters

key	the name of the key to remove

1.31.3 Member Data Documentation

pimpl_

```
SerializationParametersImpl* se::common::SerializationParameters::pimpl_  [private]
```

pointer to internal implementation

Definition at line 94 of file se_serialization.h.

1.32 se::common::Serializer Class Reference

Class representing the serializer object.

```
#include <se_serialization.h>
```

Public Member Functions

- virtual ~**Serializer** ()=default

  Default dtor.
- virtual void **Reset** ()=0

  Resets the serializer state.
- virtual const char * **GetCStr** () const =0

  Returns the serialized string.
- virtual const char * **SerializerType** () const =0

  Returns the name of the serializer type.

Static Public Member Functions

- static Serializer * CreateJSONSerializer (const SerializationParameters &params)

  Factory method for creating a JSON serializer object.

1.32.1 Detailed Description

Class representing the serializer object.

Definition at line 104 of file se_serialization.h.

1.32.2 Member Function Documentation

CreateJSONSerializer()

```
static Serializer * se::common::Serializer::CreateJSONSerializer (
            const SerializationParameters & params)  [static]
```

Factory method for creating a JSON serializer object.

Parameters

params	serialization parameters

Returns

Pointer to a constructed serializer object. New object is created, the caller is responsible for deleting it.

1.33 se::common::Size Class Reference

Class representing a size of the (rectangular) object.

```
#include <se_geometry.h>
```

Public Member Functions

- **Size** ()

  Default ctor - initializes size with zero-valued fields.
- **Size** (int width, int height)

  Main ctor - initializes all fields.
- void **Serialize** (Serializer &serializer) const

  Serialize size given serializer object.
- void **SerializeImpl** (SerializerImplBase &serializer_impl) const

  Internal serialization implementation.

Public Attributes

- int width

  Width.
- int height

  Height.

1.33.1 Detailed Description

Class representing a size of the (rectangular) object.

Definition at line 70 of file se_geometry.h.

1.33.2 Member Data Documentation

width

```
int se::common::Size::width
```

Width.

Definition at line 85 of file se_geometry.h.

height

```
int se::common::Size::height
```

Height.

Definition at line 86 of file se_geometry.h.

1.34 se::common::StringsMapIterator Class Reference

Iterator to a map from strings to strings.

```
#include <se_strings_iterator.h>
```

Public Member Functions

- **StringsMapIterator** (const StringsMapIterator &other)
  Copy ctor.
- StringsMapIterator & **operator=** (const StringsMapIterator &other)
  Assignment operator.
- ~**StringsMapIterator** ()
  Non-trivial dtor.
- const char * **GetKey** () const
  Gets the string key.
- const char * **GetValue** () const
  Gets the string value.
- bool **Equals** (const StringsMapIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator==** (const StringsMapIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator!=** (const StringsMapIterator &rvalue) const
  Returns true iff this instance and rvalue point to the different objects.
- void **Advance** ()
  Shifts the iterator to the next object.
- void **operator++** ()
  Shifts the iterator to the next object.

Static Public Member Functions

- static StringsMapIterator **ConstructFromImpl** (const StringsMapIteratorImpl &pimpl)
  Constructs the iterator from an internal implementation structure.

Private Member Functions

- **StringsMapIterator** (const StringsMapIteratorImpl &pimpl)
  Private ctor from an internal implementation structure.

Private Attributes

- class StringsMapIteratorImpl * pimpl_
  internal implementation

1.34.1 Detailed Description

Iterator to a map from strings to strings.

Definition at line 124 of file se_strings_iterator.h.

1.34.2 Member Data Documentation

pimpl_

```
class StringsMapIteratorImpl* se::common::StringsMapIterator::pimpl_  [private]
```

internal implementation

Definition at line 165 of file se_strings_iterator.h.

1.35 se::common::StringsSetIterator Class Reference

Iterator to a set-like collection of strings.

```
#include <se_strings_iterator.h>
```

Public Member Functions

- **StringsSetIterator** (const StringsSetIterator &other)
  Copy ctor.
- StringsSetIterator & **operator=** (const StringsSetIterator &other)
  Assignment operator.
- ~**StringsSetIterator** ()
  Non-trivial dtor.
- const char * **GetValue** () const
  Gets the string value.
- bool **Equals** (const StringsSetIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator==** (const StringsSetIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator!=** (const StringsSetIterator &rvalue) const
  Returns true iff this instance and rvalue point to the different objects.
- void **Advance** ()
  Shifts the iterator to the next object.
- void **operator++** ()
  Shifts the iterator to the next object.

Static Public Member Functions

- static StringsSetIterator **ConstructFromImpl** (const StringsSetIteratorImpl &pimpl)
  Constructs the iterator from an internal implementation structure.

Private Member Functions

- **StringsSetIterator** (const StringsSetIteratorImpl &pimpl)
  Private ctor from an internal implementation structure.

Private Attributes

- class StringsSetIteratorImpl * pimpl_
  internal implementation

1.35.1 Detailed Description

Iterator to a set-like collection of strings.

Definition at line 75 of file se_strings_iterator.h.

1.35.2 Member Data Documentation

pimpl_

```
class StringsSetIteratorImpl* se::common::StringsSetIterator::pimpl_  [private]
```

internal implementation

Definition at line 113 of file se_strings_iterator.h.

1.36 se::common::StringsVectorIterator Class Reference

Iterator to a vector-like collection of strings.

```
#include <se_strings_iterator.h>
```

Public Member Functions

- **StringsVectorIterator** (const StringsVectorIterator &other)
  Copy ctor.
- StringsVectorIterator & **operator=** (const StringsVectorIterator &other)
  Assignment operator.
- ~**StringsVectorIterator** ()
  Non-trivial dtor.
- const char * **GetValue** () const
  Gets the string value.
- bool **Equals** (const StringsVectorIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator==** (const StringsVectorIterator &rvalue) const
  Returns true iff this instance and rvalue point to the same object.
- bool **operator!=** (const StringsVectorIterator &rvalue) const
  Returns true iff this instance and rvalue point to the different objects.
- void **Advance** ()
  Shifts the iterator to the next object.
- void **operator++** ()
  Shifts the iterator to the next object.

Static Public Member Functions

- static StringsVectorIterator **ConstructFromImpl** (const StringsVectorIteratorImpl &pimpl)
  Constructs the iterator from an internal implementation structure.

Private Member Functions

- **StringsVectorIterator** (const StringsVectorIteratorImpl &pimpl)
  Private ctor from an internal implementation structure.

Private Attributes

- class StringsVectorIteratorImpl * pimpl_
  internal implementation

1.36.1 Detailed Description

Iterator to a vector-like collection of strings.

Definition at line 26 of file se_strings_iterator.h.

1.36.2 Member Data Documentation

pimpl_

```
class StringsVectorIteratorImpl* se::common::StringsVectorIterator::pimpl_  [private]
```

internal implementation

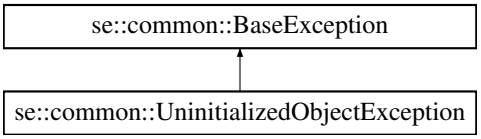
Definition at line 64 of file se_strings_iterator.h.

1.37 se::common::UninitializedObjectException Class Reference

UninitializedObjectException: thrown if an attempt is made to access a non-existent or non-initialized object.

```
#include <se_exception.h>
```

Inheritance diagram for se::common::UninitializedObjectException:



Public Member Functions

- **UninitializedObjectException** (const char ∗msg)

  Ctor with an exception message.
- **UninitializedObjectException** (const UninitializedObjectException &copy)

  Copy ctor.
- virtual ∼**UninitializedObjectException** () override=default

  Default dtor.
- virtual const char ∗ ExceptionName () const override

  Returns exception class name.

Public Member Functions inherited from se::common::BaseException

- virtual ∼**BaseException** ()

  Non-trivial dtor.
- **BaseException** (const BaseException &copy)

  Copy ctor.
- virtual const char ∗ **what** () const

  Returns exception message.

Additional Inherited Members

Protected Member Functions inherited from se::common::BaseException

- **BaseException** (const char ∗msg)

  Protected ctor.

1.37.1 Detailed Description

UninitializedObjectException: thrown if an attempt is made to access a non-existent or non-initialized object.

Definition at line 112 of file se_exception.h.

1.37.2 Member Function Documentation

ExceptionName()

```
virtual const char * se::common::UninitializedObjectException::ExceptionName () const  [override],
[virtual]
```

Returns exception class name.

Reimplemented from se::common::BaseException.

1.38 se::common::YUVDimensions Class Reference

The YUVDimensions struct - extended YUV parameters.

```
#include <se_image.h>
```

Public Member Functions

- **YUVDimensions** ()

  Default ctor.
- **YUVDimensions** (int y_pixel_stride, int y_row_stride, int u_pixel_stride, int u_row_stride, int v_pixel_stride, int v_row_stride, int width, int height, YUVType type)

  Main ctor.

Public Attributes

- int y_plane_pixel_stride

  Y plane pixel stride.
- int y_plane_row_stride

  Y plane row stride.
- int u_plane_pixel_stride

  U plane pixel stride.
- int u_plane_row_stride

  U plane row stride.
- int v_plane_pixel_stride

  V plane pixel stride.
- int v_plane_row_stride

  V plane row stride.
- int width

  image width in pixels
- int height

  image height in pixels
- YUVType type

  YUV format type.

1.38.1 Detailed Description

The YUVDimensions struct - extended YUV parameters.

Definition at line 49 of file se_image.h.

1.38.2 Member Data Documentation

y_plane_pixel_stride

```
int se::common::YUVDimensions::y_plane_pixel_stride
```

Y plane pixel stride.

Definition at line 65 of file se_image.h.

y_plane_row_stride

```
int se::common::YUVDimensions::y_plane_row_stride
```

Y plane row stride.

Definition at line 66 of file se_image.h.

u_plane_pixel_stride

```
int se::common::YUVDimensions::u_plane_pixel_stride
```

U plane pixel stride.

Definition at line 67 of file se_image.h.

u_plane_row_stride

```
int se::common::YUVDimensions::u_plane_row_stride
```

U plane row stride.

Definition at line 68 of file se_image.h.

v_plane_pixel_stride

```
int se::common::YUVDimensions::v_plane_pixel_stride
```

V plane pixel stride.

Definition at line 69 of file se_image.h.

v_plane_row_stride

```
int se::common::YUVDimensions::v_plane_row_stride
```

V plane row stride.

Definition at line 70 of file se_image.h.

width

```
int se::common::YUVDimensions::width
```

image width in pixels

Definition at line 71 of file se_image.h.

height

```
int se::common::YUVDimensions::height
```

image height in pixels

Definition at line 72 of file se_image.h.

type

```
YUVType se::common::YUVDimensions::type
```

YUV format type.

Definition at line 73 of file se_image.h.

2 File Documentation

2.1 code_engine.h File Reference

Smart Code Engine main class declaration.

Classes

- class se::code::CodeEngine
  The main CodeEngine class containing all configuration and resources of the Smart Code Engine product.

Functions

- SE_DLL_EXPORT EngineSettingsGroup **se::code::engineSettingsGroupFromString** (const char ∗group_name)
- SE_DLL_EXPORT const char ∗ **se::code::toString** (EngineSettingsGroup group)
- SE_DLL_EXPORT const char ∗ **se::code::presetToString** (BarcodePreset preset)

Variables

- CodeEngine_Barcode = (1 << 1)

  Barcode engine.
- CodeEngine_CodeTextLine = (1 << 2)

  CodeTextLine engine.
- CodeEngine_MRZ = (1 << 3)

  MRZ engine.
- CodeEngine_BankCard = (1 << 4)

  BankCard engine.
- CodeEngine_PaymentDetails = (1 << 5)

  PaymentDetails engine.
- enum SE_DLL_EXPORT se::code::EngineSettingsGroup
- enum SE_DLL_EXPORT se::code::Barcode = 1 << 2
- enum SE_DLL_EXPORT se::code::Card = 1 << 3
- enum SE_DLL_EXPORT se::code::CodeTextLine = 1 << 4
- enum SE_DLL_EXPORT se::code::Mrz = 1 << 5
- enum SE_DLL_EXPORT se::code::PaymentDetails = 1 << 6
- enum SE_DLL_EXPORT se::code::LicensePlate
- GS1 = 1 << 1
- AAMVA = 1 << 2
- URL = 1 << 3
- VCARD = 1 << 4
- EMAIL = 1 << 5
- ICALENDAR = 1 << 6
- PHONE = 1 << 7
- SMS = 1 << 8
- ISBN = 1 << 9
- WIFI = 1 << 10
- GEO = 1 << 11
- PAYMENT = 1 << 12

2.1.1 Detailed Description

Smart Code Engine main class declaration.

Definition in file code_engine.h.

2.1.2 Variable Documentation

CodeEngine_Barcode

```
CodeEngine_Barcode = (1 << 1)
```

Barcode engine.

Definition at line 29 of file code_engine.h.

CodeEngine_CodeTextLine

```
CodeEngine_CodeTextLine = (1 << 2)
```

CodeTextLine engine.

Definition at line 30 of file code_engine.h.

CodeEngine_MRZ

```
CodeEngine_MRZ = (1 << 3)
```

MRZ engine.

Definition at line 31 of file code_engine.h.

CodeEngine_BankCard

```
CodeEngine_BankCard = (1 << 4)
```

BankCard engine.

Definition at line 32 of file code_engine.h.

CodeEngine_PaymentDetails

```
CodeEngine_PaymentDetails = (1 << 5)
```

PaymentDetails engine.

Definition at line 33 of file code_engine.h.

EngineSettingsGroup

```
enum SE_DLL_EXPORT se::code::EngineSettingsGroup  [strong]
```

Definition at line 37 of file code_engine.h.

Barcode

```
enum SE_DLL_EXPORT se::code::Barcode = 1 << 2
```

Definition at line 40 of file code_engine.h.

Card

```
enum SE_DLL_EXPORT se::code::Card = 1 << 3
```

Definition at line 41 of file code_engine.h.

CodeTextLine

```
enum SE_DLL_EXPORT se::code::CodeTextLine = 1 << 4
```

Definition at line 42 of file code_engine.h.

Mrz

```
enum SE_DLL_EXPORT se::code::Mrz = 1 << 5
```

Definition at line 43 of file code_engine.h.

PaymentDetails

```
enum SE_DLL_EXPORT se::code::PaymentDetails = 1 << 6
```

Definition at line 44 of file code_engine.h.

LicensePlate

```
enum SE_DLL_EXPORT se::code::LicensePlate
```

Initial value:

```
= 1 « 7
}
```

Definition at line 45 of file code_engine.h.

GS1

```
GS1 = 1 << 1
```

Definition at line 50 of file code_engine.h.

AAMVA

```
AAMVA = 1 << 2
```

Definition at line 51 of file code_engine.h.

URL

```
URL = 1 << 3
```

Definition at line 52 of file code_engine.h.

VCARD

```
VCARD = 1 << 4
```

Definition at line 53 of file code_engine.h.

EMAIL

```
EMAIL = 1 << 5
```

Definition at line 54 of file code_engine.h.

ICALENDAR

```
ICALENDAR = 1 << 6
```

Definition at line 55 of file code_engine.h.

PHONE

```
PHONE = 1 << 7
```

Definition at line 56 of file code_engine.h.

SMS

```
SMS = 1 << 8
```

Definition at line 57 of file code_engine.h.

ISBN

```
ISBN = 1 << 9
```

Definition at line 58 of file code_engine.h.

WIFI

```
WIFI = 1 << 10
```

Definition at line 59 of file code_engine.h.

GEO

```
GEO = 1 << 11
```

Definition at line 60 of file code_engine.h.

PAYMENT

```
PAYMENT = 1 << 12
```

Definition at line 61 of file code_engine.h.

2.2 code_engine.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC.
00003   All rights reserved.
00004 */
00005
00011 #ifndef CODEENGINE_CODE_ENGINE_H_INCLUDED
00012 #define CODEENGINE_CODE_ENGINE_H_INCLUDED
00013
00014 #include <codeengine/code_engine_feedback.h>
00015 #include <codeengine/code_engine_session.h>
00016 #include <codeengine/code_engine_session_settings.h>
00017 #include <codeengine/code_object_field.h>
00018 #include <codeengine/code_object.h>
00019
00020 #include <secommon/se_export_defs.h>
00021 #include <secommon/se_geometry.h>
00022 #include <secommon/se_image.h>
00023
00024 namespace se {
00025 namespace code {
00026
00027 enum SE_DLL_EXPORT CodeEngineType
00028 {
00029   CodeEngine_Barcode = (1 « 1),
00030   CodeEngine_CodeTextLine = (1 « 2),
00031   CodeEngine_MRZ = (1 « 3),
00032   CodeEngine_BankCard = (1 « 4),
00033   CodeEngine_PaymentDetails = (1 « 5),
00034   CodeEngine_LicensePlate = (1 « 6)
00035 };
00036
00037 enum class SE_DLL_EXPORT EngineSettingsGroup : unsigned char
00038 {
00039   Global = 1 « 1,
00040   Barcode = 1 « 2,
00041   Card = 1 « 3,
00042   CodeTextLine = 1 « 4,
00043   Mrz = 1 « 5,
00044   PaymentDetails = 1 « 6,
00045   LicensePlate = 1 « 7
00046 };
00047
00048 enum class SE_DLL_EXPORT BarcodePreset
00049 {
00050   GS1 = 1 « 1,
00051   AAMVA = 1 « 2,
00052   URL = 1 « 3,
00053   VCARD = 1 « 4,
00054   EMAIL = 1 « 5,
00055   ICALENDAR = 1 « 6,
00056   PHONE = 1 « 7,
00057   SMS = 1 « 8,
00058   ISBN = 1 « 9,
00059   WIFI = 1 « 10,
00060   GEO = 1 « 11,
00061   PAYMENT = 1 « 12,
00062   NONE = 1 « 13
00063 };
00064
00065 SE_DLL_EXPORT EngineSettingsGroup
00066 engineSettingsGroupFromString(const char* group_name);
00067
00068 SE_DLL_EXPORT const char *
00069 toString(EngineSettingsGroup group);
00070
00071 SE_DLL_EXPORT const char *
00072 presetToString(BarcodePreset preset);
00073
00078 class SE_DLL_EXPORT CodeEngine
00079 {
```

```
00080 public:
00086   static CodeEngine* Create(const char* config_path,
00087                             bool lazy_configuration = true);
00088
00095   static CodeEngine* Create(const unsigned char* config_data,
00096                             int config_data_length,
00097                             bool lazy_configuration = true);
00098
00103   static CodeEngine* CreateFromEmbeddedBundle(bool lazy_configuration = true);
00104
00108   virtual ~CodeEngine() = default;
00109
00113   static const char* GetVersion();
00114
00121   virtual CodeEngineSessionSettings* GetDefaultSessionSettings() = 0;
00122
00137   virtual CodeEngineSession* SpawnSession(
00138     const CodeEngineSessionSettings& settings,
00139     const char* signature,
00140     CodeEngineWorkflowFeedback* workflow_reporter = nullptr,
00141     CodeEngineVisualizationFeedback* visualization_reporter =
00142       nullptr) const = 0;
00143
00148   virtual bool IsEngineAvailable(CodeEngineType engine_type) const = 0;
00149 };
00150
00151 } // namespace code
00152 } // namespace se
00153
00154 #endif // CODEENGINE_CODE_ENGINE_H_INCLUDED
```

2.3 code_engine_feedback.h File Reference

Smart Code Engine main feedback class declaration.

Classes

- class se::code::CodeEngineFeedbackContainer

  The class representing the visual feedback container - a collection of named quadrangles in an image.
- class se::code::CodeEngineVisualizationFeedback

  Abstract interface for receiving Smart Code Engine callbacks for visualization purposes. All callbacks must be implemented.
- class se::code::CodeEngineWorkflowFeedback

  Abstract interface for receiving Smart Code Engine workflow callbacks. All callbacks must be implemented.

2.3.1 Detailed Description

Smart Code Engine main feedback class declaration.

Definition in file code_engine_feedback.h.

2.4 code_engine_feedback.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC.
00003   All rights reserved.
00004 */
00005
00010 #ifndef CODEENGINE_CODE_ENGINE_FEEDBACK_H_INCLUDED
00011 #define CODEENGINE_CODE_ENGINE_FEEDBACK_H_INCLUDED
00012
00013 #include <secommon/se_export_defs.h>
00014 #include <secommon/se_geometry.h>
```

```
00015
00016 #include <codeengine/code_engine_result.h>
00017
00018 namespace se {
00019 namespace code {
00020
00025 class SE_DLL_EXPORT CodeEngineFeedbackContainer
00026 {
00027 public:
00029   ~CodeEngineFeedbackContainer();
00030
00032   CodeEngineFeedbackContainer();
00033
00035   CodeEngineFeedbackContainer(const CodeEngineFeedbackContainer& copy);
00036
00038   CodeEngineFeedbackContainer& operator=(
00039     const CodeEngineFeedbackContainer& other);
00040
00041 public:
00043   int GetQuadranglesCount() const;
00044
00046   bool HasQuadrangle(const char* quad_name) const;
00047
00049   const se::common::Quadrangle& GetQuadrangle(const char* quad_name) const;
00050
00052   void SetQuadrangle(const char* quad_name, const se::common::Quadrangle& quad);
00053
00055   void RemoveQuadrangle(const char* quad_name);
00056
00058   se::common::QuadranglesMapIterator QuadranglesBegin() const;
00059
00061   se::common::QuadranglesMapIterator QuadranglesEnd() const;
00062
00063 private:
00065   class CodeEngineFeedbackContainerImpl* pimpl_;
00066 };
00067
00072 class SE_DLL_EXPORT CodeEngineVisualizationFeedback
00073 {
00074 public:
00076   virtual ~CodeEngineVisualizationFeedback() = default;
00077
00079   virtual void FeedbackReceived(
00080     const CodeEngineFeedbackContainer& feedback_container) = 0;
00081 };
00082
00087 class SE_DLL_EXPORT CodeEngineWorkflowFeedback
00088 {
00089 public:
00091   virtual ~CodeEngineWorkflowFeedback();
00092
00095   virtual void ResultReceived(const CodeEngineResult& result_received) = 0;
00096
00098   virtual void SessionEnded() = 0;
00099 };
00100
00101 } // namespace code
00102 } // namespace se
00103
00104 #endif // CODEENGINE_CODE_ENGINE_FEEDBACK_H_INCLUDED
```

2.5 code_engine_result.h File Reference

Smart Code Engine recognition result class declaration.

Classes

- class se::code::CodeEngineResult

  The class representing the Smart Code Engine recognition result.

2.5.1 Detailed Description

Smart Code Engine recognition result class declaration.

Definition in file code_engine_result.h.

2.6 code_engine_result.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC.
00003   All rights reserved.
00004 */
00005
00011 #ifndef CODEENGINE_CODE_ENGINE_RESULT_H_INCLUDED
00012 #define CODEENGINE_CODE_ENGINE_RESULT_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015
00016 #include <codeengine/code_object.h>
00017
00018 namespace se {
00019 namespace code {
00020
00024 class SE_DLL_EXPORT CodeEngineResult
00025 {
00026 public:
00028   CodeEngineResult(bool is_terminal = false);
00030   CodeEngineResult(const CodeEngineResult& other);
00032   CodeEngineResult& operator=(const CodeEngineResult& other);
00034   ~CodeEngineResult();
00035
00037   bool operator==(const CodeEngineResult& other) const;
00038
00040   bool operator!=(const CodeEngineResult& other) const;
00041
00043   int GetObjectCount() const;
00045   bool HasObject(const char* object_name) const;
00047   const CodeObject& GetCodeObject(const char* object_name) const;
00049   void SetCodeObject(const char* object_name, const CodeObject& code_object);
00051   CodeObjectsMapIterator ObjectsBegin() const;
00053   CodeObjectsMapIterator ObjectsEnd() const;
00055   bool IsTerminal() const;
00057   void SetTerminal(bool terminal = true);
00059   void Reset();
00060
00061 private:
00062   struct CodeEngineResultImpl* pimpl_;
00063 };
00064
00065 } // namespace code
00066 } // namespace se
00067
00068 #endif // CODEENGINE_CODE_ENGINE_RESULT_H_INCLUDED
```

2.7 code_engine_session.h File Reference

Smart Code Engine session object declaration.

Classes

- class se::code::CodeEngineSession

  The main processing class for the Smart Code Engine recognition functionality.

2.7.1 Detailed Description

Smart Code Engine session object declaration.

Definition in file code_engine_session.h.

2.7.2 Macro Definition Documentation

CODEENGINE_CODE_ENGINE_SESSION_H_INCLUDED

```
#define CODEENGINE_CODE_ENGINE_SESSION_H_INCLUDED
```

Definition at line 13 of file code_engine_session.h.

2.8 code_engine_session.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC.
00003   All rights reserved.
00004 */
00005
00011 #pragma once
00012 #ifndef CODEENGINE_CODE_ENGINE_SESSION_H_INCLUDED
00013 #define CODEENGINE_CODE_ENGINE_SESSION_H_INCLUDED
00014
00015 #include <codeengine/code_engine_result.h>
00016 #include <codeengine/code_object.h>
00017
00018 #include <memory>
00019
00020 namespace se {
00021 namespace code {
00022
00027 class SE_DLL_EXPORT CodeEngineSession
00028 {
00029 public:
00031   virtual ~CodeEngineSession() = default;
00032
00038   virtual const char* GetActivationRequest() = 0;
00039
00045   virtual void Activate(const char* activation_response) = 0;
00046
00052   virtual bool IsActivated() const = 0;
00053
00059   virtual const CodeEngineResult& Process(const common::Image& image) = 0;
00060
00062   virtual const CodeEngineResult& GetCurrentResult() const = 0;
00063
00065   virtual bool IsResultTerminal() const = 0;
00066
00068   virtual void Reset() = 0;
00069 };
00070
00071 } // namespace code
00072 } // namespace se
00073
00074 #endif // CODEENGINE_CODE_ENGINE_SESSION_H_INCLUDED
```

2.9 code_engine_session_settings.h File Reference

Smart Code Engine session settings class declaration.

Classes

- class se::code::CodeEngineSessionSettings

  The class representing the session settings for the Smart ID Engine document recognition functionality.

2.9.1 Detailed Description

Smart Code Engine session settings class declaration.

Definition in file code_engine_session_settings.h.

2.10 code_engine_session_settings.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef CODEENGINE_CODE_ENGINE_SESSION_SETTINGS_H_INCLUDE
00012 #define CODEENGINE_CODE_ENGINE_SESSION_SETTINGS_H_INCLUDE
00013
00014 #include <secommon/se_export_defs.h>
00015 #include <secommon/se_strings_iterator.h>
00016 #include <string>
00017
00018 namespace se {
00019 namespace code {
00020
00025 class SE_DLL_EXPORT CodeEngineSessionSettings
00026 {
00027 public:
00028   // CodeEngineSessionSettings();
00029   virtual ~CodeEngineSessionSettings();
00030
00037   virtual CodeEngineSessionSettings* Clone() const = 0;
00038
00040   virtual const char* GetOption(const char* option_name) const = 0;
00041
00043   virtual se::common::StringsMapIterator SettingsBegin() const = 0;
00044
00046   virtual se::common::StringsMapIterator SettingsEnd() const = 0;
00047
00049   virtual bool HasOption(const char* option_name) const = 0;
00050
00052   virtual void SetOption(const char* option_name, const char* option_value) = 0;
00053 };
00054
00055 } // namespace code
00056 } // namespace se
00057
00058 #endif // CODEENGINE_CODE_ENGINE_SESSION_SETTINGS_H_INCLUDE
```

2.11 code_object_field.h File Reference

Smart Code Engine object field class declaration.

Classes

- class se::code::CodeField

  The class representing a value-holding field of a codified object.
- class se::code::CodeFieldsMapIterator

  A class representing the iterator for string->code field maps.

2.11.1 Detailed Description

Smart Code Engine object field class declaration.

Definition in file code_object_field.h.

2.11.2 Macro Definition Documentation

CODEENGINE_CODE_OBJECT_FIELD_H_INCLUDED

```
#define CODEENGINE_CODE_OBJECT_FIELD_H_INCLUDED
```

Definition at line 13 of file code_object_field.h.

2.12 code_object_field.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC.
00003   All rights reserved.
00004 */
00005
00011 #pragma once
00012 #ifndef CODEENGINE_CODE_OBJECT_FIELD_H_INCLUDED
00013 #define CODEENGINE_CODE_OBJECT_FIELD_H_INCLUDED
00014
00015 #include <secommon/se_common.h>
00016
00017 namespace se {
00018 namespace code {
00019
00023 class SE_DLL_EXPORT CodeField
00024 {
00025 public:
00027   CodeField();
00028
00036   CodeField(const char* name,
00037             const common::ByteString& byte_string,
00038             bool is_accepted = false,
00039             float confidence = 0.F);
00040
00048   CodeField(const char* name,
00049             const common::OcrString& ocr_string,
00050             bool is_accepted = false,
00051             float confidence = 0.F);
00052
00054   ~CodeField();
00055
00057   CodeField(const CodeField& copy);
00058
00060   CodeField& operator=(const CodeField& other);
00061
00063   bool operator==(const CodeField& other) const;
00064
00065 public:
00067   const char* Name() const;
00068
00070   void SetName(const char* name);
00071
00073   bool IsAccepted() const;
00074
00076   void SetIsAccepted(const bool is_accepted);
00077
00079   double GetConfidence() const;
00080
00082   void SetConfidence(const float confidence);
00083
00085   bool IsTerminal() const;
00086
00088   void SetIsTerminal(const bool is_terminal);
00089
00091   bool HasBinaryRepresentation() const;
00092
00094   const common::ByteString& GetBinaryRepresentation() const;
00095
00097   void SetBinaryRepresentation(const common::ByteString& byte_string);
00098
00100   bool HasOcrStringRepresentation() const;
00101
00103   const common::OcrString& GetOcrString() const;
00104
00106   void SetOcrStringRepresentation(const common::OcrString& ocr_string);
00107
00108 private:
00109   class CodeFieldImpl* pimpl_;
00110 };
00111
00113 class CodeFieldsMapIteratorImpl;
00114
00118 class SE_DLL_EXPORT CodeFieldsMapIterator
00119 {
00120 private:
00122   CodeFieldsMapIterator(CodeFieldsMapIteratorImpl pimpl);
00123
00124 public:
00126   ~CodeFieldsMapIterator();
00127
00129   CodeFieldsMapIterator(const CodeFieldsMapIterator& other);
00130
00132   CodeFieldsMapIterator& operator=(const CodeFieldsMapIterator& other);
```

```
00133
00135   static CodeFieldsMapIterator ConstructFromImpl(
00136     CodeFieldsMapIteratorImpl pimpl);
00137
00139   const char* GetKey() const;
00140
00142   const CodeField& GetValue() const;
00143
00145   bool Equals(const CodeFieldsMapIterator& rvalue) const;
00146
00148   bool operator==(const CodeFieldsMapIterator& other) const;
00149
00151   bool operator!=(const CodeFieldsMapIterator& other) const;
00152
00154   void Advance();
00155
00157   void operator++();
00158
00159 private:
00160   CodeFieldsMapIteratorImpl* pimpl_;
00161 };
00162
00163 } // namespace code
00164 } // namespace se
00165
00166 #endif // CODEENGINE_CODE_OBJECT_FIELD_H_INCLUDED
```

2.13 se_common.h File Reference

Include all interface headers of secommon library.

2.13.1 Detailed Description

Include all interface headers of secommon library.

Definition in file se_common.h.

2.14 se_common.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00012 #ifndef SECOMMON_SE_COMMON_H_INCLUDED
00013 #define SECOMMON_SE_COMMON_H_INCLUDED
00014
00015 #include <secommon/se_export_defs.h>
00016 #include <secommon/se_serialization.h>
00017 #include <secommon/se_string.h>
00018 #include <secommon/se_strings_iterator.h>
00019 #include <secommon/se_strings_set.h>
00020 #include <secommon/se_exception.h>
00021 #include <secommon/se_geometry.h>
00022 #include <secommon/se_image.h>
00023
00024 #endif // SECOMMON_SE_COMMON_H_INCLUDED
```

2.15 se_exception.h File Reference

Exception classes for secommon library.

Classes

- class se::common::BaseException

  BaseException class - base class for all SE exeptions. Cannot be created directly.
- class se::common::InvalidKeyException

  InvalidKeyException: thrown if to an associative container the access is performed with an invalid or a non-existent key, or if the access to a list is performed with an invalid or out-of-range index.
- class se::common::NotSupportedException

  NotSupportedException: thrown when trying to access a method which given the current state or given the passed arguments is not supported in the current version of the library or is not supported at all by design.
- class se::common::FileSystemException

  FileSystemException: thrown if an attempt is made to read from a non-existent file, or other file-system related IO error.
- class se::common::UninitializedObjectException

  UninitializedObjectException: thrown if an attempt is made to access a non-existent or non-initialized object.
- class se::common::InvalidArgumentException

  InvalidArgumentException: thrown if a method is called with invalid input parameters.
- class se::common::MemoryException

  MemoryException: thrown if an allocation is attempted with insufficient RAM.
- class se::common::InvalidStateException

  InvalidStateException: thrown if an error occurs within the system in relation to an incorrect internal state of the system objects.
- class se::common::InternalException

  InternalException: thrown if an unknown error occurs or if the error occurs within internal system components.

2.15.1 Detailed Description

Exception classes for secommon library.

Definition in file se_exception.h.

2.16 se_exception.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_EXCEPTION_H_INCLUDED
00012 #define SECOMMON_SE_EXCEPTION_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015
00016 namespace se { namespace common {
00017
00022 class SE_DLL_EXPORT BaseException {
00023 public:
00025   virtual ~BaseException();
00026
00028   BaseException(const BaseException& copy);
00029
00031   virtual const char* ExceptionName() const;
00032
00034   virtual const char* what() const;
00035
00036 protected:
00038   BaseException(const char* msg);
00039
00040 private:
00041   char* msg_;
00042 };
```

```
00043
00044
00050 class SE_DLL_EXPORT InvalidKeyException : public BaseException {
00051 public:
00053   InvalidKeyException(const char* msg);
00054
00056   InvalidKeyException(const InvalidKeyException& copy);
00057
00059   virtual ~InvalidKeyException() override = default;
00060
00062   virtual const char* ExceptionName() const override;
00063 };
00064
00065
00072 class SE_DLL_EXPORT NotSupportedException : public BaseException {
00073 public:
00075   NotSupportedException(const char* msg);
00076
00078   NotSupportedException(const NotSupportedException& copy);
00079
00081   virtual ~NotSupportedException() override = default;
00082
00084   virtual const char* ExceptionName() const override;
00085 };
00086
00087
00092 class SE_DLL_EXPORT FileSystemException : public BaseException {
00093 public:
00095   FileSystemException(const char* msg);
00096
00098   FileSystemException(const FileSystemException& copy);
00099
00101   virtual ~FileSystemException() override = default;
00102
00104   virtual const char* ExceptionName() const override;
00105 };
00106
00107
00112 class SE_DLL_EXPORT UninitializedObjectException : public BaseException {
00113 public:
00115   UninitializedObjectException(const char* msg);
00116
00118   UninitializedObjectException(const UninitializedObjectException& copy);
00119
00121   virtual ~UninitializedObjectException() override = default;
00122
00124   virtual const char* ExceptionName() const override;
00125 };
00126
00127
00132 class SE_DLL_EXPORT InvalidArgumentException : public BaseException {
00133 public:
00135   InvalidArgumentException(const char* msg);
00136
00138   InvalidArgumentException(const InvalidArgumentException& copy);
00139
00141   virtual ~InvalidArgumentException() override = default;
00142
00144   virtual const char* ExceptionName() const override;
00145 };
00146
00147
00152 class SE_DLL_EXPORT MemoryException : public BaseException {
00153 public:
00155   MemoryException(const char* msg);
00156
00158   MemoryException(const MemoryException& copy);
00159
00161   virtual ~MemoryException() override = default;
00162
00164   virtual const char* ExceptionName() const override;
00165 };
00166
00167
00172 class SE_DLL_EXPORT InvalidStateException : public BaseException {
00173 public:
00175   InvalidStateException(const char* msg);
00176
00178   InvalidStateException(const InvalidStateException& copy);
00179
00181   virtual ~InvalidStateException() override = default;
00182
00184   virtual const char* ExceptionName() const override;
00185 };
00186
00187
00192 class SE_DLL_EXPORT InternalException : public BaseException {
```

```
00193 public:
00195   InternalException(const char* msg);
00196
00198   InternalException(const InternalException& copy);
00199
00201   virtual ~InternalException() override = default;
00202
00204   virtual const char* ExceptionName() const override;
00205 };
00206
00207
00208 } } // namespace se::common
00209
00210 #endif // SECOMMON_SE_EXCEPTION_H_INCLUDED
```

2.17 se_export_defs.h File Reference

Export-related definitions for secommon library.

2.17.1 Detailed Description

Export-related definitions for secommon library.

Definition in file se_export_defs.h.

2.17.2 Macro Definition Documentation

SE_DLL_EXPORT

```
#define SE_DLL_EXPORT
```

Definition at line 20 of file se_export_defs.h.

2.18 se_export_defs.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_EXPORT_DEFS_H_INCLUDED
00012 #define SECOMMON_SE_EXPORT_DEFS_H_INCLUDED
00013
00014 #if defined _WIN32 && SE_EXPORTS
00015 # define SE_DLL_EXPORT __declspec(dllexport)
00016 #else // defined _WIN32 && SE_EXPORTS
00017 # if defined(__clang__) || defined(__GNUC__)
00018 #  define SE_DLL_EXPORT __attribute__ ((visibility ("default")))
00019 # else // clang of gnuc
00020 #  define SE_DLL_EXPORT
00021 # endif // clang of gnuc
00022 #endif // defined _WIN32 && SE_EXPORTS
00023
00024 #endif // SECOMMON_SE_EXPORT_DEFS_H_INCLUDED
```

2.19 se_geometry.h File Reference

Basic geometric classes and procedures for secommon library.

Classes

- class se::common::Rectangle

  Class representing a rectangle in an image.
- class se::common::Point

  Class representing a point in an image.
- class se::common::Size

  Class representing a size of the (rectangular) object.
- class se::common::Quadrangle

  Class representing a quadrangle in an image.
- class se::common::QuadranglesMapIterator

  QuadranglesMapIterator: iterator object for maps of named quadrangles.
- class se::common::RectanglesVectorIterator
- class se::common::Polygon

  Class representing a polygon in an image.
- class se::common::ProjectiveTransform

  Class representing projective transformation of a plane.

2.19.1 Detailed Description

Basic geometric classes and procedures for secommon library.

Definition in file se_geometry.h.

2.20 se_geometry.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_GEOMETRY_H_INCLUDED
00012 #define SECOMMON_SE_GEOMETRY_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015 #include <secommon/se_serialization.h>
00016
00017 namespace se { namespace common {
00018
00022 class SE_DLL_EXPORT Rectangle {
00023 public:
00025   Rectangle();
00026
00028   Rectangle(int x, int y, int width, int height);
00029
00031   void Serialize(Serializer& serializer) const;
00032
00034   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00035
00036 public:
00037   int x;
00038   int y;
00039   int width;
00040   int height;
00041 };
00042
00043
00047 class SE_DLL_EXPORT Point {
00048 public:
00050   Point();
00051
00053   Point(double x, double y);
00054
00056   void Serialize(Serializer& serializer) const;
00057
```

```
00059   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00060
00061 public:
00062   double x;
00063   double y;
00064 };
00065
00066
00070 class SE_DLL_EXPORT Size {
00071 public:
00073   Size();
00074
00076   Size(int width, int height);
00077
00079   void Serialize(Serializer& serializer) const;
00080
00082   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00083
00084 public:
00085   int width;
00086   int height;
00087 };
00088
00089
00093 class SE_DLL_EXPORT Quadrangle {
00094 public:
00096   Quadrangle();
00097
00099   Quadrangle(const Point& a, const Point& b, const Point& c, const Point& d);
00100
00102   Point& operator[](int index);
00103
00105   const Point& operator[](int index) const;
00106
00108   const Point& GetPoint(int index) const;
00109
00111   Point& GetMutablePoint(int index);
00112
00114   void SetPoint(int index, const Point& p);
00115
00117   Rectangle GetBoundingRectangle() const;
00118
00120   void Serialize(Serializer& serializer) const;
00121
00123   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00124
00125 private:
00126   Point pts_[4];
00127 };
00128
00130 class QuadranglesMapIteratorImpl;
00131
00135 class SE_DLL_EXPORT QuadranglesMapIterator {
00136 private:
00138   QuadranglesMapIterator(const QuadranglesMapIteratorImpl& pimpl);
00139
00140 public:
00142   QuadranglesMapIterator(const QuadranglesMapIterator& other);
00143
00145   QuadranglesMapIterator& operator =(const QuadranglesMapIterator& other);
00146
00148   ~QuadranglesMapIterator();
00149
00151   static QuadranglesMapIterator ConstructFromImpl(
00152       const QuadranglesMapIteratorImpl& pimpl);
00153
00155   const char* GetKey() const;
00156
00158   const Quadrangle& GetValue() const;
00159
00161   bool Equals(const QuadranglesMapIterator& rvalue) const;
00162
00164   bool operator ==(const QuadranglesMapIterator& rvalue) const;
00165
00167   bool operator !=(const QuadranglesMapIterator& rvalue) const;
00168
00170   void Advance();
00171
00173   void operator ++();
00174
00175 private:
00176   class QuadranglesMapIteratorImpl* pimpl_;
00177 };
00178
00179 class RectanglesVectorIteratorImpl;
00180
00181 class SE_DLL_EXPORT RectanglesVectorIterator {
```

```
00182 private:
00184   RectanglesVectorIterator(const RectanglesVectorIteratorImpl& pimpl);
00185
00186 public:
00188   RectanglesVectorIterator(const RectanglesVectorIterator& other);
00189
00191   RectanglesVectorIterator& operator =(const RectanglesVectorIterator& other);
00192
00194   ~RectanglesVectorIterator();
00195
00197   static RectanglesVectorIterator ConstructFromImpl(
00198       const RectanglesVectorIteratorImpl& pimpl);
00199
00201   const Rectangle& GetValue() const;
00202
00204   bool Equals(const RectanglesVectorIterator& rvalue) const;
00205
00207   bool operator ==(const RectanglesVectorIterator& rvalue) const;
00208
00210   bool operator !=(const RectanglesVectorIterator& rvalue) const;
00211
00213   void Advance();
00214
00216   void operator ++();
00217
00218 private:
00219   class RectanglesVectorIteratorImpl* pimpl_;
00220 };
00221
00225 class SE_DLL_EXPORT Polygon {
00226 public:
00228   Polygon();
00229
00231   Polygon(const Point* points, int points_count);
00232
00234   Polygon(const Polygon& other);
00235
00237   Polygon& operator =(const Polygon& other);
00238
00240   ~Polygon();
00241
00243   int GetPointsCount() const;
00244
00246   const Point* GetPoints() const;
00247
00249   Point& operator [](int index);
00250
00252   const Point& operator [](int index) const;
00253
00255   const Point& GetPoint(int index) const;
00256
00258   Point& GetMutablePoint(int index);
00259
00261   void SetPoint(int index, const Point& p);
00262
00266   void Resize(int size);
00267
00269   Rectangle GetBoundingRectangle() const;
00270
00272   void Serialize(Serializer& serializer) const;
00273
00275   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00276
00277 private:
00278   int pts_cnt_;
00279   Point* pts_;
00280 };
00281
00282
00286 class SE_DLL_EXPORT ProjectiveTransform {
00287 public:
00288   using Raw2dArrayType = double[3][3];
00289
00290 public:
00291
00299   static bool CanCreate(const Quadrangle& src_quad, const Quadrangle& dst_quad);
00300
00309   static bool CanCreate(const Quadrangle& src_quad, const Size& dst_size);
00310
00315   static ProjectiveTransform* Create();
00316
00324   static ProjectiveTransform* Create(
00325       const Quadrangle& src_quad,
00326       const Quadrangle& dst_quad);
00327
00335   static ProjectiveTransform* Create(
00336       const Quadrangle& src_quad,
```

```
00337       const Size&       dst_size);
00338
00344   static ProjectiveTransform* Create(const Raw2dArrayType& coeffs);
00345
00346 public:
00348   virtual ~ProjectiveTransform() = default;
00349
00351   virtual ProjectiveTransform* Clone() const = 0;
00352
00354   virtual Point TransformPoint(const Point& p) const = 0;
00355
00357   virtual Quadrangle TransformQuad(const Quadrangle& q) const = 0;
00358
00360   virtual Polygon TransformPolygon(const Polygon& poly) const = 0;
00361
00363   virtual bool IsInvertable() const = 0;
00364
00366   virtual void Invert() = 0;
00367
00369   virtual ProjectiveTransform* CloneInverted() const = 0;
00370
00372   virtual const Raw2dArrayType& GetRawCoeffs() const = 0;
00373
00375   virtual Raw2dArrayType& GetMutableRawCoeffs() = 0;
00376
00378   virtual void Serialize(Serializer& serializer) const = 0;
00379 };
00380
00381
00382 } } // namespace se::common
00383
00384 #endif // SECOMMON_SE_GEOMETRY_H_INCLUDED
```

2.21 se_image.h File Reference

secommon library Image

Classes

- class se::common::YUVDimensions

  The YUVDimensions struct - extended YUV parameters.
- class se::common::Image

  Class representing bitmap image.

Variables

- IPF_G = 0

  Greyscale.
- IPF_GA

  Greyscale + Alpha.
- IPF_AG

  Alpha + Greyscale.
- IPF_RGB

  RGB.
- IPF_BGR

  BGR.
- IPF_BGRA

  BGR + Alpha.
- IPF_ARGB

  Alpha + RGB.
- YUVTYPE_UNDEFINED = 0

  No format.
- YUVTYPE_NV21 = 1

  NV 21.

2.21.1 Detailed Description

secommon library Image

Definition in file se_image.h.

2.21.2 Variable Documentation

IPF_G

```
IPF_G = 0
```

Greyscale.

Definition at line 27 of file se_image.h.

IPF_GA

```
IPF_GA
```

Greyscale + Alpha.

Definition at line 28 of file se_image.h.

IPF_AG

```
IPF_AG
```

Alpha + Greyscale.

Definition at line 29 of file se_image.h.

IPF_RGB

```
IPF_RGB
```

RGB.

Definition at line 30 of file se_image.h.

IPF_BGR

```
IPF_BGR
```

BGR.

Definition at line 31 of file se_image.h.

IPF_BGRA

```
IPF_BGRA
```

BGR + Alpha.

Definition at line 32 of file se_image.h.

IPF_ARGB

```
IPF_ARGB
```

Alpha + RGB.

Definition at line 33 of file se_image.h.

YUVTYPE_UNDEFINED

```
YUVTYPE_UNDEFINED = 0
```

No format.

Definition at line 41 of file se_image.h.

YUVTYPE_NV21

```
YUVTYPE_NV21 = 1
```

NV 21.

Definition at line 42 of file se_image.h.

2.22 se_image.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_IMAGE_H_INCLUDED
00012 #define SECOMMON_SE_IMAGE_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015 #include <secommon/se_geometry.h>
00016 #include <secommon/se_serialization.h>
00017 #include <secommon/se_string.h>
00018
00019 #include <secommon/se_images_iterator.h>
00020
00021 namespace se { namespace common {
00022
00026 enum SE_DLL_EXPORT ImagePixelFormat {
00027   IPF_G = 0,
00028   IPF_GA,
00029   IPF_AG,
00030   IPF_RGB,
00031   IPF_BGR,
00032   IPF_BGRA,
```

```
00033   IPF_ARGB,
00034   IPF_RGBA
00035 };
00036
00040 enum SE_DLL_EXPORT YUVType {
00041   YUVTYPE_UNDEFINED = 0,
00042   YUVTYPE_NV21 = 1,
00043   YUVTYPE_420_888 = 2
00044 };
00045
00049 class SE_DLL_EXPORT YUVDimensions {
00050 public:
00052   YUVDimensions();
00053
00055   YUVDimensions(int y_pixel_stride,
00056                 int y_row_stride,
00057                 int u_pixel_stride,
00058                 int u_row_stride,
00059                 int v_pixel_stride,
00060                 int v_row_stride,
00061                 int width,
00062                 int height,
00063                 YUVType type);
00064
00065   int y_plane_pixel_stride;
00066   int y_plane_row_stride;
00067   int u_plane_pixel_stride;
00068   int u_plane_row_stride;
00069   int v_plane_pixel_stride;
00070   int v_plane_row_stride;
00071   int width;
00072   int height;
00073   YUVType type;
00074 };
00075
00079 class SE_DLL_EXPORT Image {
00080 public:
00086   static int GetNumberOfPages(const char* image_filename);
00087
00094   static MutableString GetImagePageName(const char *image_filename,
00095                                         int page_number);
00096
00102   static Image* CreateEmpty();
00103
00113   static Image* FromFile(
00114       const char* image_filename,
00115       const int   page_number = 0,
00116       const Size& max_size = Size(25000, 25000));
00117
00128   static Image* FromFileBuffer(
00129       unsigned char* data,
00130       int            data_length,
00131       const int      page_number = 0,
00132       const Size&    max_size = Size(25000, 25000));
00133
00147   static Image* FromBuffer(
00148       unsigned char* raw_data,
00149       int            raw_data_length,
00150       int            width,
00151       int            height,
00152       int            stride,
00153       int            channels);
00154
00168   static Image* FromBufferExtended(
00169       unsigned char*   raw_data,
00170       int              raw_data_length,
00171       int              width,
00172       int              height,
00173       int              stride,
00174       ImagePixelFormat pixel_format,
00175       int              bytes_per_channel);
00176
00186   static Image* FromYUVBuffer(
00187       unsigned char* yuv_data,
00188       int            yuv_data_length,
00189       int            width,
00190       int            height);
00191
00192
00205   static Image* FromYUV(
00206       unsigned char*       y_plane,
00207       int                  y_plane_length,
00208       unsigned char*       u_plane,
00209       int                  u_plane_length,
00210       unsigned char*       v_plane,
00211       int                  v_plane_length,
00212       const YUVDimensions& dimensions);
```

```
00213
00223   static Image* FromBase64Buffer(
00224       const char* base64_buffer,
00225       const int   page_number = 0,
00226       const Size& max_size = Size(25000, 25000));
00227
00228 public:
00230   virtual ~Image() = default;
00231
00236   virtual int GetNumberOfLayers() const = 0;
00237
00243   virtual const Image& GetLayer(const char* name) const = 0;
00244
00250   virtual const Image* GetLayerPtr(const char* name) const = 0;
00251
00256   virtual ImagesMapIterator LayersBegin() const = 0;
00257
00262   virtual ImagesMapIterator LayersEnd() const = 0;
00263
00269   virtual bool HasLayer(const char* name) const = 0;
00270
00275   virtual bool HasLayers() const = 0;
00276
00281   virtual void RemoveLayer(const char* name) = 0;
00282
00284   virtual void RemoveLayers() = 0;
00285
00292   virtual void SetLayer(const char* name, const Image& image) = 0;
00293
00301   virtual void SetLayerWithOwnership(const char* name, Image* image) = 0;
00302
00303 public:
00309   virtual Image* CloneDeep() const = 0;
00310
00318   virtual Image* CloneShallow() const = 0;
00319
00321   virtual void Clear() = 0;
00322
00328   virtual int GetRequiredBufferLength() const = 0;
00329
00337   virtual int CopyToBuffer(unsigned char* buffer, int buffer_length) const = 0;
00338
00339 #ifndef STRICT_DATA_CONTAINMENT
00345   virtual void Save(const char* image_filename) const = 0;
00346 #endif // #ifndef STRICT_DATA_CONTAINMENT
00347
00353   virtual int GetRequiredBase64BufferLength() const = 0;
00354
00363   virtual int CopyBase64ToBuffer(
00364       char* out_buffer, int buffer_length) const = 0;
00365
00370   virtual MutableString GetBase64String() const = 0;
00371
00377   virtual double EstimateFocusScore(double quantile = 0.95) const = 0;
00378
00383   virtual void Resize(const Size& new_size) = 0;
00384
00391   virtual Image* CloneResized(const Size& new_size) const = 0;
00392
00399   virtual void Crop(const Quadrangle& quad) = 0;
00400
00408   virtual Image* CloneCropped(const Quadrangle& quad) const = 0;
00409
00415   virtual void Crop(const Quadrangle& quad, const Size& size) = 0;
00416
00424   virtual Image* CloneCropped(const Quadrangle& quad, const Size& size) const = 0;
00425
00430   virtual void Crop(const Rectangle& rect) = 0;
00431
00439   virtual Image* CloneCropped(const Rectangle& rect) const = 0;
00440
00450   virtual Image* CloneCroppedShallow(const Rectangle& rect) const = 0;
00451
00458   virtual void Mask(const Rectangle& rect, int pixel_expand = 0, double pixel_density = 0) = 0;
00459
00467   virtual Image* CloneMasked(const Rectangle& rect, int pixel_expand = 0) const = 0;
00468
00474   virtual void Mask(const Quadrangle& quad, int pixel_expand = 0, double pixel_density = 0) = 0;
00475
00484   virtual Image* CloneMasked(const Quadrangle& quad, int pixel_expand = 0) const = 0;
00485
00496   virtual void Fill(const Rectangle& rect, int ch1, int ch2 = 0, int ch3 = 0, int ch4 = 0, int
      pixel_expand = 0) = 0;
00497
00510   virtual Image* CloneFilled(const Rectangle& rect, int ch1, int ch2 = 0, int ch3 = 0, int ch4 = 0,
      int pixel_expand = 0) const = 0;
00511
```

```
00522   virtual void Fill(const Quadrangle& quad, int ch1, int ch2 = 0, int ch3 = 0, int ch4 = 0, int
      pixel_expand = 0) = 0;
00523
00536   virtual Image* CloneFilled(const Quadrangle& quad, int ch1, int ch2 = 0, int ch3 = 0, int ch4 = 0,
      int pixel_expand = 0) const = 0;
00537
00541   virtual void FlipVertical() = 0;
00542
00548   virtual Image* CloneFlippedVertical() const = 0;
00549
00553   virtual void FlipHorizontal() = 0;
00554
00560   virtual Image* CloneFlippedHorizontal() const = 0;
00561
00566   virtual void Rotate90(int times) = 0;
00567
00574   virtual Image* CloneRotated90(int times) const = 0;
00575
00579   virtual void AverageChannels() = 0;
00580
00586   virtual Image* CloneAveragedChannels() const = 0;
00587
00591   virtual void Invert() = 0;
00592
00598   virtual Image* CloneInverted() const = 0;
00599
00601   virtual int GetWidth() const = 0;
00602
00604   virtual int GetHeight() const = 0;
00605
00607   virtual Size GetSize() const = 0;
00608
00610   virtual int GetStride() const = 0;
00611
00613   virtual int GetChannels() const = 0;
00614
00616   virtual void* GetUnsafeBufferPtr() const = 0;
00617
00619   virtual bool IsMemoryOwner() const = 0;
00620
00622   virtual void ForceMemoryOwner() = 0;
00623
00625   virtual void Serialize(Serializer& serializer) const = 0;
00626 };
00627
00628
00629 } } // namespace se::common
00630
00631 #endif // SECOMMON_SE_IMAGE_H_INCLUDED
```

2.23 se_serialization.h File Reference

Facilities for serialization of objects.

Classes

- class se::common::SerializationParameters

  Class representing serialization parameters.
- class se::common::Serializer

  Class representing the serializer object.

2.23.1 Detailed Description

Facilities for serialization of objects.

Definition in file se_serialization.h.

2.24 se_serialization.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_SERIALIZATION_H_INCLUDED
00012 #define SECOMMON_SE_SERIALIZATION_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015 #include <secommon/se_strings_iterator.h>
00016
00017 namespace se { namespace common {
00018
00020 class SerializationParametersImpl;
00021
00025 class SE_DLL_EXPORT SerializationParameters {
00026 public:
00028   SerializationParameters();
00030   ~SerializationParameters();
00032   SerializationParameters(const SerializationParameters& copy);
00034   SerializationParameters& operator =(
00035       const SerializationParameters& other);
00036
00037 public:
00044   bool HasIgnoredObjectType(const char* object_type) const;
00045
00050   void AddIgnoredObjectType(const char* object_type);
00051
00056   void RemoveIgnoredObjectType(const char* object_type);
00057
00059   se::common::StringsSetIterator IgnoredObjectTypesBegin() const;
00060
00062   se::common::StringsSetIterator IgnoredObjectTypesEnd() const;
00063
00069   bool HasIgnoredKey(const char* key) const;
00070
00075   void AddIgnoredKey(const char* key);
00076
00081   void RemoveIgnoredKey(const char* key);
00082
00084   se::common::StringsSetIterator IgnoredKeysBegin() const;
00085
00087   se::common::StringsSetIterator IgnoredKeysEnd() const;
00088
00089 public:
00091   const SerializationParametersImpl& GetImpl() const;
00092
00093 private:
00094   SerializationParametersImpl* pimpl_;
00095 };
00096
00097
00099 class SerializerImplBase;
00100
00104 class SE_DLL_EXPORT Serializer {
00105 public:
00107   virtual ~Serializer() = default;
00108
00110   virtual void Reset() = 0;
00111
00113   virtual const char* GetCStr() const = 0;
00114
00116   virtual const char* SerializerType() const = 0;
00117
00118 public:
00125   static Serializer* CreateJSONSerializer(
00126       const SerializationParameters& params);
00127 };
00128
00129
00130 } } // namespace se::common
00131
00132 #endif // SECOMMON_SE_SERIALIZATION_H_INCLUDED
```

2.25 se_string.h File Reference

OcrString and related classes for secommon library.

Classes

- class se::common::MutableString

  Class representing a mutable, memory-owner string.
- class se::common::OcrCharVariant

  Class representing a possible character recognition result.
- class se::common::OcrChar

  Class representing an OCR information for a given recognized character.
- class se::common::OcrString

  Class representing text string recognition result.
- class se::common::ByteString

  Class representing byte string.

2.25.1 Detailed Description

OcrString and related classes for secommon library.

Definition in file se_string.h.

2.26 se_string.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_STRING_H_INCLUDED
00012 #define SECOMMON_SE_STRING_H_INCLUDED
00013
00014 #include <cstddef>
00015 #include <cstdint>
00016 #include <secommon/se_export_defs.h>
00017 #include <secommon/se_geometry.h>
00018 #include <secommon/se_serialization.h>
00019
00020 namespace se { namespace common {
00021
00025 class SE_DLL_EXPORT MutableString {
00026 public:
00028   MutableString();
00029
00031   explicit MutableString(const char* c_str);
00032
00034   MutableString(const MutableString& other);
00035
00037   MutableString& operator =(const MutableString& other);
00038
00040   ~MutableString();
00041
00043   MutableString& operator +=(const MutableString& other);
00044
00046   MutableString operator +(const MutableString& other) const;
00047
00049   const char* GetCStr() const;
00050
00053   int GetLength() const;
00054
00056   void Serialize(Serializer& serializer) const;
00057
00059   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00060
00061 private:
00062   int len_;
00063   char* buf_;
00064 };
00065
00066
00070 class SE_DLL_EXPORT OcrCharVariant {
```

```
00071 public:
00073   OcrCharVariant();
00074
00080   OcrCharVariant(const MutableString& utf8_char, float confidence);
00081
00087   OcrCharVariant(const char* utf8_char, float confidence);
00088
00090   ~OcrCharVariant() = default;
00091
00093   const char* GetCharacter() const;
00094
00096   void SetCharacter(const MutableString& utf8_char);
00097
00099   void SetCharacter(const char* utf8_char);
00100
00102   float GetConfidence() const;
00103
00105   void SetConfidence(float confidence);
00106
00108   float GetInternalScore() const;
00109
00111   void SetInternalScore(float internal_score);
00112
00114   void Serialize(Serializer& serializer) const;
00115
00117   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00118
00119 private:
00120   MutableString char_;
00121   float conf_;
00122   float internal_score_;
00123 };
00124
00125
00129 class SE_DLL_EXPORT OcrChar {
00130 public:
00132   OcrChar();
00133
00141   OcrChar(const OcrCharVariant* variants,
00142           int                   variants_count,
00143           bool                  is_highlighted,
00144           const Quadrangle&     quad);
00145
00147   OcrChar(const OcrChar& other);
00148
00150   OcrChar& operator =(const OcrChar& other);
00151
00153   ~OcrChar();
00154
00156   int GetVariantsCount() const;
00157
00159   const OcrCharVariant* GetVariants() const;
00160
00162   OcrCharVariant& operator [](int index);
00163
00165   const OcrCharVariant& operator [](int index) const;
00166
00168   const OcrCharVariant& GetVariant(int index) const;
00169
00171   OcrCharVariant& GetMutableVariant(int index);
00172
00174   void SetVariant(int index, const OcrCharVariant& v);
00175
00177   void Resize(int size);
00178
00180   bool GetIsHighlighted() const;
00181
00183   void SetIsHighlighted(bool is_highlighted);
00184
00186   const Quadrangle& GetQuadrangle() const;
00187
00189   Quadrangle& GetMutableQuadrangle();
00190
00192   void SetQuadrangle(const Quadrangle& quad);
00193
00195   void SortVariants();
00196
00198   const OcrCharVariant& GetFirstVariant() const;
00199
00201   void Serialize(Serializer& serializer) const;
00202
00204   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00205
00206 private:
00207   int vars_cnt_;
00208   OcrCharVariant* vars_;
00209   bool is_highlighted_;
```

```
00210   Quadrangle quad_;
00211 };
00212
00213
00215 class OcrStringImpl;
00216
00220 class SE_DLL_EXPORT OcrString {
00221 private:
00223   OcrString(const OcrStringImpl& ocr_string_impl);
00224
00225 public:
00227   OcrString();
00228
00234   OcrString(const char* utf8_str);
00235
00241   OcrString(const OcrChar* chars, int chars_count);
00242
00244   OcrString(const OcrString& other);
00245
00247   OcrString& operator =(const OcrString& other);
00248
00250   ~OcrString();
00251
00256   static OcrString ConstructFromImpl(const class OcrStringImpl& ocr_string_impl);
00257
00259   const class OcrStringImpl* GetOcrStringImplPtr() const;
00260
00262   int GetCharsCount() const;
00263
00265   const OcrChar* GetChars() const;
00266
00268   OcrChar& operator [](int index);
00269
00271   const OcrChar& operator [](int index) const;
00272
00274   const OcrChar& GetChar(int index) const;
00275
00277   OcrChar& GetMutableChar(int index);
00278
00280   void SetChar(int index, const OcrChar& chr);
00281
00283   void AppendChar(const OcrChar& chr);
00284
00286   void AppendString(const OcrString& str);
00287
00289   void Resize(int size);
00290
00292   const Quadrangle GetQuadrangleByIndex(int idx) const;
00293
00295   float GetBestVariantConfidenceByIndex(int idx) const;
00296
00298   void SortVariants();
00299
00301   MutableString GetFirstString() const;
00302
00304   void UnpackChars();
00305
00307   void RepackChars();
00308
00310   void Serialize(Serializer& serializer) const;
00311
00313   void SerializeImpl(SerializerImplBase& serializer_impl) const;
00314
00315 private:
00316   OcrStringImpl* ocr_string_impl_;
00317 };
00318
00322 class SE_DLL_EXPORT ByteString {
00323 public:
00325   ByteString();
00326
00328   ~ByteString();
00329
00331   explicit ByteString(const unsigned char* bytes, size_t n);
00332
00334   ByteString(const ByteString &other);
00335
00337   ByteString &operator=(const ByteString &other);
00338
00340   void swap(ByteString &other) noexcept;
00341
00343   int GetLength() const noexcept;
00344
00346   int GetRequiredBase64BufferLength() const;
00347
00349   int CopyBase64ToBuffer(char* out_buffer, int buffer_length) const;
00350
```

```
00352   MutableString GetBase64String() const;
00353
00355   int GetRequiredHexBufferLength() const;
00356
00358   int CopyHexToBuffer(char* out_buffer, int buffer_length) const;
00359
00361   MutableString GetHexString() const;
00362
00363 private:
00364   size_t len_;
00365   uint8_t *buf_;
00366 };
00367
00368 } } // namespace se::common::
00369
00370 #endif // SECOMMON_SE_STRING_H_INCLUDED
```

2.27 se_strings_iterator.h File Reference

String iterators used in SE libraries.

Classes

- class se::common::StringsVectorIterator

  Iterator to a vector-like collection of strings.
- class se::common::StringsSetIterator

  Iterator to a set-like collection of strings.
- class se::common::StringsMapIterator

  Iterator to a map from strings to strings.

2.27.1 Detailed Description

String iterators used in SE libraries.

Definition in file se_strings_iterator.h.

2.28 se_strings_iterator.h

Go to the documentation of this file.

```
00001 /*
00002   Copyright (c) 2016-2024, Smart Engines Service LLC
00003   All rights reserved.
00004 */
00005
00011 #ifndef SECOMMON_SE_STRINGS_ITERATOR_H_INCLUDED
00012 #define SECOMMON_SE_STRINGS_ITERATOR_H_INCLUDED
00013
00014 #include <secommon/se_export_defs.h>
00015
00016 namespace se { namespace common {
00017
00018
00020 class StringsVectorIteratorImpl;
00021
00022
00026 class SE_DLL_EXPORT StringsVectorIterator {
00027 private:
00029   StringsVectorIterator(const StringsVectorIteratorImpl& pimpl);
00030
00031 public:
00033   StringsVectorIterator(const StringsVectorIterator& other);
00034
00036   StringsVectorIterator& operator =(const StringsVectorIterator& other);
00037
```

```
00039   ~StringsVectorIterator();
00040
00042   static StringsVectorIterator ConstructFromImpl(
00043       const StringsVectorIteratorImpl& pimpl);
00044
00046   const char* GetValue() const;
00047
00049   bool Equals(const StringsVectorIterator& rvalue) const;
00050
00052   bool operator ==(const StringsVectorIterator& rvalue) const;
00053
00055   bool operator !=(const StringsVectorIterator& rvalue) const;
00056
00058   void Advance();
00059
00061   void operator ++();
00062
00063 private:
00064   class StringsVectorIteratorImpl* pimpl_;
00065 };
00066
00067
00069 class StringsSetIteratorImpl;
00070
00071
00075 class SE_DLL_EXPORT StringsSetIterator {
00076 private:
00078   StringsSetIterator(const StringsSetIteratorImpl& pimpl);
00079
00080 public:
00082   StringsSetIterator(const StringsSetIterator& other);
00083
00085   StringsSetIterator& operator =(const StringsSetIterator& other);
00086
00088   ~StringsSetIterator();
00089
00091   static StringsSetIterator ConstructFromImpl(
00092       const StringsSetIteratorImpl& pimpl);
00093
00095   const char* GetValue() const;
00096
00098   bool Equals(const StringsSetIterator& rvalue) const;
00099
00101   bool operator ==(const StringsSetIterator& rvalue) const;
00102
00104   bool operator !=(const StringsSetIterator& rvalue) const;
00105
00107   void Advance();
00108
00110   void operator ++();
00111
00112 private:
00113   class StringsSetIteratorImpl* pimpl_;
00114 };
00115
00116
00118 class StringsMapIteratorImpl;
00119
00120
00124 class SE_DLL_EXPORT StringsMapIterator {
00125 private:
00127   StringsMapIterator(const StringsMapIteratorImpl& pimpl);
00128
00129 public:
00131   StringsMapIterator(const StringsMapIterator& other);
00132
00134   StringsMapIterator& operator =(const StringsMapIterator& other);
00135
00137   ~StringsMapIterator();
00138
00140   static StringsMapIterator ConstructFromImpl(
00141       const StringsMapIteratorImpl& pimpl);
00142
00144   const char* GetKey() const;
00145
00147   const char* GetValue() const;
00148
00150   bool Equals(const StringsMapIterator& rvalue) const;
00151
00153   bool operator==(const StringsMapIterator& rvalue) const;
00154
00156   bool operator!=(const StringsMapIterator& rvalue) const;
00157
00159   void Advance();
00160
00162   void operator ++();
00163
```

```
00164 private:
00165   class StringsMapIteratorImpl* pimpl_;
00166 };
00167
00168
00169 } } // namespace se::common::
00170
00171 #endif // SECOMMON_SE_STRINGS_ITERATOR_H_INCLUDED
```

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