Sensor Stream Pipe

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Contents

Chapter 1

[Checkout the Sensor Stream Pipe gitbook for full documentation](https://moetsi.gitbook.io/sensor-stream-pipe/)

What is Sensor Stream Pipe?

Moetsi's Sensor Stream Pipe (SSP) is the first open-source C++ modular kit-of-parts that compresses, streams, and processes sensor data (RGB-D). It does this by efficiently compressing raw data streams, allowing developers to send multiple video types over the network in real time. Frame data can be sent in its raw form (JPG/PNG frames), or compressed using a myriad of codecs, leveraged on FFmpeg/LibAV and NV Codec to considerably reduce bandwidth strain.

SSP is designed to help overcome the limitations of on-device sensor data processing. By taking data processing off device, you will be able to run far more powerful computations on your sensor data and make the most of the tools at your disposal.

The Moetsi Sensor Stream Pipe is designed to overcome the limitations of on-device sensor data processing. It does this by encoding and compressing your device's color or depth frames, and transmitting them to a remote server where they can be decoded and processed at scale.

Currently, Moetsi's Sensor Stream Pipe supports:

- .mkv (matroska) RGB-D recordings
- `Azure Kinect DK` RGB-D camera
- seminal computer vision/spatial computing datasets (e.g. `BundleFusion`, `MS RGB-D 7 scenes` and `VSFS`)
- iOS ARKit data (streams `ARFrame data`)

We're planning to support other cameras and devices (e.g. Kinect v2 and Structure Core) in the near future. At the same time, we've made the Moetsi SSP totally open source so that anyone can build out support for any device.

`Checkout the Sensor Stream Pipe gitbook for full documentation`

Features include:

- Synchronized streaming of color, depth and IR frames
- Support for Azure Kinect DK (live and recorded video streaming) and image datasets (e.g. `BundleFusion`, `MS RGB-D 7 scenes` and `VSFS`) and .mkv (matroska) files
- Hardware-accelerated encoding (e.g. Nvidia codec), providing you with the lowest possible latency and bandwidth without compromising on quality
- Interoperability with Libav and FFmpeg creates a hyperflexible framework for all the use cases you brilliant developers can come up with!
- Access to the calibration data for each of the sensors on the Kinect, enabling you to build a point cloud from the color and depth images, perform body tracking, etc.

But why though...?

- If you have 4 sensor streams and want to do an environment reconstruction using their data feeds
- If you have a couple of sensors and want to find where they are relative to each other
- You want to run pose detection algorithms on a dozen sensors and synthesize the results into a single 3D model
- Basically if you want to do any spatial computing/computer vision on multiple incoming data streams

You can use Sensor Stream Server to send compressed sensor data to reduce bandwidth requirements and Sensor Stream Client to receive these streams as an ingestion step for a computer vision/spatial computing pipeline.

If you want to synthesize RGB-D+ data from multiple feeds in real-time, you will probably need something like Sensor Stream Pipe.

Component parts

`Checkout the Sensor Stream Pipe gitbook for full documentation`

`Sensor Stream Server`

The ssp_server is the frame encoder and sender.

"Frames" are a sample of data from a frame source. For example, the Azure Kinect collects: RGB (color), depth, and IR data. If we want to stream RGB-D and IR, we sample our frame source (the Azure Kinect), and create 3 frames, one for each frame type: 1 for color data, 1 for depth data, and 1 for ir data. We then package these 3 frames as a zmq message and send through a zmq socket.

Sensor Stream Server reads its configurations from a yaml file (examples in /configs). The config file provides Sensor Stream Server: a destination for its frames, the frame source (video, Azure Kinect, or dataset), and how each frame type should be encoded.

`Sensor Stream Client`

The ssp_clients are the frame receiver and decoder. They run on the remote processing server and receive the frames from the ssp_server for further processing.

There are a few templates for how you can use Sensor Stream Client in

Sensor Stream Client with OpenCV processing

If you run Sensor Stream Client with OpenCV visualization:

You can see it's receiving real-time data from a Kinect DK and rendering it for on-screen display. In this scenario we achieved a substantial 20x data compression, reducing the stream size from 400 Mbps to just 20 Mbps, along with a PSNR of ∼39 dB and a processing overhead of ∼10-15 ms .

Sensor Stream Client is built so it can be an ingestion step for a spatial computing/computer vision pipeline.

Sensor Stream Tester

A reproducible tester for measuring SSP compression and quality. You can use this to measure how different encodings and settings affect bandwidth/compression.

Getting started

We recommend going through Streaming a Video from our Gitbook

to get up to speed quickly. You will stream using Sensor Stream Server and receive on Sensor Stream Client a pre-recorded RGB-D+ stream to get a quick feel of what Sensor Stream Pipe does.

Sensor Stream Pipe Development

Feedback

Moetsi's Sensor Stream Pipe is currently in alpha. Features will probably change, bugs will probably be found. It's a work in progress after all! That said, we welcome both feedback and pull requests.

We would also love to hear more about how you plan to use the Moetsi Sensor Stream Pipe! So if you have any problems, questions, feature requests, or ideas for improvement, please feel free to reach out at olenka@moetsi.↩com.

The better we understand how you're using the Moetsi SSP, the better we can plan future developments!

About Moetsi

At Moetsi we are super excited about the idea of digitizing reality. Creating a seamless interface between the world as we know it, and a world augmented, improved and expressed through new technologies is plain cool. But we think there's a problem. On-device computation is limited, platform-specific frameworks are restrictive, and sorting raw depth data is seriously challenging.

To address the first problem, we've created the Moetsi Sensor Stream Pipe; to make it easier to process off-device without throttling bandwidth. It means you are no longer confined to the computational limits of your local device, and you don't have to make a massive trade-off on time-to-computation because our pipeline is super fast (latency is less than 30 ms for Kinect data).

But it doesn't end here.

Our pipeline is just one of the first pieces of the puzzle. To develop a robust enough infrastructure to support a true digital twin of the physical world, a lot more needs to be done. This includes creating algorithms that can turn this raw depth data into real, usable applications.

How to Contribute

We're always excited to work with like-minded people, and invite you to experiment with our pipeline however you like! If you enjoy our work and think you can help take this project to the next level, feel free to drop us a message on olenka@moetsi.com to get involved.

If you happen to discover any bugs in our code, we'd really appreciate knowing about them. Please just create an issue here on GitHub.

In terms of related projects that fall outside of this repo's scope, we'd be super excited to see, and think the community could benefit from development on:

More devices

Working with the Kinect v2, and other sensors such as the Structure Core sensor.

Integrations

Any other sort of output that you can imagine!

Encoding

Improve encoding performance on AMD/Intel graphic cards, by using the AMD Media Codec/Intel Quick Sync Video instead of relying on libav (VAAPI or OpenCK) for hardware accelerated encoding. Feel free to do the same for Intel cards using Intel Quick Sync Video too!

Moetsi's Permissive License

Support Moetsi!

Our Sensor Stream Pipe is always going to be free, but it has taken a lot of blood, sweat and tears to get to this point. If you love what we've made, please consider reaching out to olenka@moetsi.com.

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Chapter 2

Sensor Stream Pipe Instalation

Linux

To get our Sensor Stream Pipe up and running, you will require the following:

The following steps were tested on Ubuntu 18.04. Installing on other recent Linux distributions should be pretty similar, but please check the installation instructions for OpenCV and Kinect DK on your respective platform first. Installation instructions for Windows should be ready soon. If you encounter any problems or have any suggestions, please let us know by emailing contact@moetsi.com or post on our forum.

Dependencies

To get our Sensor Stream Pipe up and running, you will require the following:

- OpenCV 3.2.0 (tested on version available on Ubuntu 18.04 repo) is used for image processing.
- libav 3.4.6 (tested on version available on Ubuntu 18.04 repo) encodes, decodes and processes image frames.
- Cereal 1.2.2 (headers only) serializes data for network transmission.
- ZeroMQ and cppzmq (libzmq3 4.3.1, cppzmq 4.3.0) perform network and low-level I/O operations.
- spdlog 1.4.1 Logging library.
- yaml-cpp 0.6.0 reads server configuration files.
- Zdepth: compresses depth data.
- NvPipe (*optional*, but **recommended if you have an NVidia GPU**) encodes and decodes frames. This is optional, but recommended for users with Nvidia GPUs.
- Azure Kinect SDK 1.3 (to support the Azure Kinect Body Tracking SDK), 1.4 otherwise (*optional*) accesses Kinect DK data.
- Azure Kinect Body Tracking SDK 1.0 (*optional*) SSP Body Tracking client.

Download and install repo libraries

OpenCV 3.2.0

```
sudo apt install libopencv-dev libopencv-core-dev uuid-dev
```

Libav 3.4.6

```
sudo apt install libavformat-dev libavutil-dev libavcodec-dev libavfilter-dev
```

Download and extract "out-of-repo" libraries

First, create a folder where local libs are to be installed:

```
mkdir ~/libs
mkdir ~/libs/srcOriginal
```

Cereal 1.2.2

```
cd ~/libs/srcOriginal
wget https://codeload.github.com/USCiLab/cereal/tar.gz/v1.2.2
tar xf v1.2.2
cp -r cereal-1.2.2/include ~/libs
```

ZeroMQ

libzmq3 4.3.1

```
cd ~/libs/srcOriginal
wget https://github.com/zeromq/libzmq/releases/download/v4.3.1/zeromq-4.3.1.tar.gz
tar xf zeromq-4.3.1.tar.gz
cd zeromq-4.3.1
mkdir build
cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs
make install -j4
```

If you want to take advantage of ZMQ pulling support to check for new frames, compile ZMQ and CPPZMQ with the `draft API suppport`. Replace the cmake line with:

```
cmake .. -DENABLE_DRAFTS=ON -DCMAKE_INSTALL_PREFIX=~/libs
```

Also, you must set SSP_WITH_ZMQ_POLLING at SSP build time.

cppzmq 4.3.0

```
cd ~/libs/srcOriginal
wget https://github.com/zeromq/cppzmq/archive/v4.3.0.tar.gz
tar xf v4.3.0.tar.gz
cd cppzmq-4.3.0
cp *.hpp ~/libs/include
```

yaml-cpp 0.6.0

```
cd ~/libs/srcOriginal
wget https://github.com/jbeder/yaml-cpp/archive/yaml-cpp-0.6.0.tar.gz
tar xf yaml-cpp-0.6.0.tar.gz
cd yaml-cpp-yaml-cpp-0.6.0
mkdir build
cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs
make install
```

Zdepth

```
cd ~/libs/srcOriginal
git clone https://github.com/catid/Zdepth.git
cd Zdepth
mkdir build
cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs
make install
cp libzdepth.a ~/libs/lib/
cp zstd/libzstd.a ~/libs/lib/
```

spdlog

```
cd ~/libs/srcOriginal
wget https://github.com/gabime/spdlog/archive/v1.4.1.tar.gz
tar xf v1.4.1.tar.gz
cd spdlog-1.4.1 && mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs
make -j
make install
```

NVPipe (optional, recommended for users with Nvidia GPU)

```
cd ~/libs/srcOriginal
git clone https://github.com/NVIDIA/NvPipe.git
cd NvPipe/
mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs
make
make install
```

Azure Kinect SDK 1.3/4 (optional)

Note: to avoid getting a password prompt, run any command as sudo before starting this section of the tutorial

1) Add the Linux Software Repository for Microsoft Products.

```
curl https://packages.microsoft.com/keys/microsoft.asc | sudo apt-key add -
sudo apt-add-repository https://packages.microsoft.com/ubuntu/18.04/prod
sudo apt-get update
```

2) Install Azure Kinect SDK 1.3 (change 1.3 to 1.4 if you do not need body tracking)

```
sudo apt install libk4a1.3 libk4a1.3-dev
```

3) To be able to use the Kinect as non-root, please run the following:

```
wget https://raw.githubusercontent.com/microsoft/Azure-Kinect-Sensor-SDK/develop/scripts/99-k4a.rules
sudo cp 99-k4a.rules /etc/udev/rules.d/
```

4 a) If using 1.4, in the current package, the link to the canonical version of the depth lib is missing. You can create it by running the following command:

```
sudo ln -s /usr/lib/x86_64-linux-gnu/libk4a1.4/libdepthengine.so.2.0
       /usr/lib/x86_64-linux-gnu/libdepthengine.so
```

4 a) If using 1.3, the depth engine is missing from the package. Microsoft is aware of the problem, but it only corrected it in 1.4.

https://github.com/microsoft/Azure-Kinect-Sensor-SDK/blob/develop/docs/depthengine.↩
md

You can get the libdepthengine.so.2.0 file from the package at https://packages.microsoft.↩
com/ubuntu/18.04/prod/pool/main/libk/libk4a1.4/libk4a1.4_1.4.1_amd64.deb.
Open with Archive Manager (or equivalent), the file is in (data/./usr/lib/x86_64-linux-gnu/libk4a1.4/), and extract it to ~/libs/lib. You can then perform an equivalent command as above.

```
cd ~/libs/lib
ln -s libdepthengine.so.2.0 libdepthengine.so
```

Azure Kinect Body Tracking SDK (optional)

Check instructions above to add the Linux Software Repository for Microsoft Products and then do:

```
sudo apt install libk4abt1.0-dev
```

Building Sensor Stream Pipe

Download and build the project (the ssp_server, ssp_client and ssp_tester):

```
git clone git@github.com:moetsi/Sensor-Stream-Pipe.git
cd Sensor-Stream-Pipe
mkdir build
cd build
cmake .. -DSSP_WITH_KINECT_SUPPORT=OFF -DSSP_WITH_K4A_BODYTRACK=OFF -DSSP_WITH_NVPIPE_SUPPORT=OFF
make
```

You can turn on Kinect, Bodytrack and NVPipe support by adding the following to the `cmake ..` line respectively:

```
-DSSP_WITH_KINECT_SUPPORT=ON
-DSSP_WITH_K4A_BODYTRACK=ON
-DSSP_WITH_NVPIPE_SUPPORT=ON
```

Windows

Windows installation process was performed using vcpkg to install most dependencies. Tested on Windows 10 Build 19041, Visual Studio 2019 Community Edition (VS).

This process may also work for Linux, but this was not tested.

Install vcpkg

Follow vcpkg installation instructions available here

Install dependencies available on vcpkg

Install dependencies using vcpkg.

```
vcpkg install azure-kinect-sensor-sdk:x64-windows cereal:x64-windows cppzmq:x64-windows ffmpeg:x64-windows
       opencv3:x64-windows spdlog:x64-windows yaml-cpp:x64-windows zeromq:x64-windows
```

Build and install remaining dependecies

Prepare a directory to place the remaining dependecies lib and include files (refered henceforth as `$LIBS`). This directory should have a `lib` and `include` subfolders with the corresponding `.lib` and headers respectively.

Zdepth

Clone Zdepth repo

```
git clone https://github.com/catid/Zdepth.git
```

Open CMakeLists file in VS and build accorcing to your desired profile (x86 or x64; Debug or Release).

If you did not specify an install dir during the CMake configuration, copy the `Zdepth\include` and output lib folders (e.g. `ZDepth\out\*`) to `$LIBS`.

Azure Kinect Body Tracking SDK (optional)

Install Azure Body Tracker SDK from the instructions available here.

Copy the SDK include and lib files from the SDK install list to `$LIBS`, or add the SDK path to SSP CMakeLists (see below)

Building Sensor Stream Pipe

Clone the SSP repo

```
git clone git@github.com:moetsi/Sensor-Stream-Pipe.git
```

Due to the diferences in the build process, the Windows CMake file is named CMakeListsWindows.txt at the root of the SSP repo.

Thus, you shoud delete CMakeLists.txt and rename CMakeListsWindows.txt to CMakeLists.txt.

Open CMakeLists.txt in VS.

Replace/Add the include ("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//include") and link paths ("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//lib") at the top of the file with your `$LIBS` paths

```
include_directories("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//include")
link_directories("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//lib")
```

You can also add your `vcpkg//installed//` dir to the include and link paths.

After replacing the paths, set the desired compile options (SSP_WITH_KINECT_SUPPORT, SSP_WITH_K4A_B↩ ODYTRACK, ...), regenerate CMakeCache and build the project.

Linking errors?

if you have linking errors (missing .lib files), try replacing the short lib name with the full lib path in CMake: "libzmq" -> "C:/Users/Andre/source/repos/vcpkg/installed/x64-windows/lib/libzmq.lib"

Chapter 3

Namespace Index

3.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Chapter 4

Hierarchical Index

4.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 5

Class Index

5.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 6

File Index

6.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 7

Namespace Documentation

7.1 moetsi Namespace Reference

Moetsi creations.

Namespaces

- ssp

  Sensor Stream Pipe.

7.1.1 Detailed Description

Moetsi creations.

7.2 moetsi::ssp Namespace Reference

Sensor Stream Pipe.

Classes

- struct AVCodecContextDeleter
- struct AVCodecDeleter
- struct AVCodecParametersDeleter
- struct AVCodecParametersNullDeleter
- struct AVFormatContextDeleter
- struct AVFrameDeleter
- struct AVIOContextDeleter
- struct AVPacketDeleter
- struct buffer_data
- struct CameraCalibrationStruct

  Camera calibration data.
- struct CodecParamsStruct

Codec parameters.

- struct ExtendedAzureConfig

  Azure Kinect configuration.
- struct FrameStruct

  Frame struct: SSP frame.
- class IDecoder

  IDecoder abstract decoder interface.
- class IEncoder

  IEncoder abstract encoder class.
- class ImageDecoder

  Decode image to AV frame.
- class ImageReader
- class iPhoneReader
- class iPhoneReaderImpl
- class IReader

  SSP reader interface - abstract class.
- class KinectReader
- class LibAvDecoder

  AV (Jpeg/Mpeg) decoder.
- class LibAvEncoder

  LibAV encoder for Jpeg/Mpeg.
- class MultiImageReader
- class NetworkReader

  Network reader.
- class NullEncoder

  Nullencoder Straight pipe encoder.
- class NvDecoder

  NvPipe decoder.
- class NvEncoder

  NvPipe encoder.
- struct NVPipeDeleter
- struct SwsContextDeleter
- class VideoFileReader
- class ZDepthDecoder

  ZDepthDecoder ZDepth format decoder.
- class ZDepthEncoder

  ZDepth encoder.

Typedefs

- typedef std::unique_ptr< AVFrame, AVFrameDeleter > **AVFrameSafeP**
- typedef std::shared_ptr< AVFrame > **AVFrameSharedP**
- typedef std::unique_ptr< AVCodecContext, AVCodecContextDeleter > **AVCodecContextSafeP**
- typedef std::unique_ptr< AVPacket, AVPacketDeleter > **AVPacketSafeP**
- typedef std::shared_ptr< AVPacket > **AVPacketSharedP**
- typedef std::unique_ptr< AVCodecParameters, AVCodecParametersDeleter > **AVCodecParametersSafeP**
- typedef std::unique_ptr< AVCodecParameters, AVCodecParametersNullDeleter > **AVCodecParameters↩ SafePNullDelete**
- typedef std::unique_ptr< struct SwsContext, SwsContextDeleter > **SwsContextSafeP**
- typedef std::unique_ptr< AVFormatContext, AVFormatContextDeleter > **AVFormatContextSafeP**
- typedef std::unique_ptr< AVCodec, AVCodecDeleter > **AVCodecSafeP**
- typedef std::unique_ptr< AVIOContext, AVIOContextDeleter > **AVIOContextSafeP**
- typedef std::unique_ptr< NvPipe, NVPipeDeleter > **NvPipeSafeP**

Enumerations

- enum CameraCalibrationType : short { CameraCalibrationType::CameraCalibrationTypeDefault = -1, CameraCalibrationType::CameraCalibrationTypeKinect = 0, CameraCalibrationType::CameraCalibrationTypeDefault = -1, CameraCalibrationType::CameraCalibrationTypeKinect = 0 }

  Camera calibration type i.e. the kind of sensor calibration data present.
- enum FrameType : short {
  FrameType::FrameTypeColor = 0, FrameType::FrameTypeDepth = 1, FrameType::FrameTypeIR = 2, FrameType::FrameTypeConfidence = 3,
  FrameType::FrameTypeColor = 0, FrameType::FrameTypeDepth = 1, FrameType::FrameTypeIR = 2, FrameType::FrameTypeConfidence = 3 }

  Frame type: color, depth, IR as well as confidence matrices.
- enum CodecParamsType : short {
  CodecParamsType::CodecParamsTypeDefault = -1, CodecParamsType::CodecParamsTypeAv = 0, CodecParamsType::CodecParamsTypeNvPipe = 1, CodecParamsType::CodecParamsTypeZDepth = 2,
  CodecParamsType::CodecParamsTypeDefault = -1, CodecParamsType::CodecParamsTypeAv = 0, CodecParamsType::CodecParamsTypeNvPipe = 1, CodecParamsType::CodecParamsTypeZDepth = 2 }

  Codec parameters type.
- enum SSPMessageType : short { SSPMessageType::MessageTypeDefault = 0, SSPMessageType::MessageTypeDefault = 0 }

  SSP Message type.
- enum FrameDataType : short {
  FrameDataType::FrameDataTypeImageFrame = 0, FrameDataType::FrameDataTypeLibavPackets = 1, FrameDataType::FrameDataTypeRawRGBA = 2, FrameDataType::FrameDataTypeGRAY16LE = 3, FrameDataType::FrameDataTypeNvPipePacket = 4, FrameDataType::FrameDataTypeRaw32FC1 = 5, FrameDataType::FrameDataTypeYUV = 6, FrameDataType::FrameDataTypeU8C1 = 7,
  FrameDataType::FrameDataTypeImageFrame = 0, FrameDataType::FrameDataTypeLibavPackets = 1, FrameDataType::FrameDataTypeRawRGBA = 2, FrameDataType::FrameDataTypeGRAY16LE = 3, FrameDataType::FrameDataTypeNvPipePacket = 4, FrameDataType::FrameDataTypeRaw32FC1 = 5, FrameDataType::FrameDataTypeYUV = 6, FrameDataType::FrameDataTypeU8C1 = 7 }

  Frame data type. This is a precise binary format information.
- enum SensorType : short {
  SensorType::SensorTypeColor = 0, SensorType::SensorTypeDepth = 1, SensorType::SensorTypeIR = 2, SensorType::SensorTypeConfidence = 3,
  SensorType::SensorTypeColor = 0, SensorType::SensorTypeDepth = 1, SensorType::SensorTypeIR = 2, SensorType::SensorTypeConfidence = 3 }

  Sensor type: color or depth.
- enum video_reader_k4a_depth_mode_t {
  VIDEO_READER_K4A_DEPTH_MODE_OFF, VIDEO_READER_K4A_DEPTH_MODE_NFOV_2X2BINNED, VIDEO_READER_K4A_DEPTH_MODE_NFOV_UNBINNED, VIDEO_READER_K4A_DEPTH_MODE_WFOV_2X2BINNED,
  VIDEO_READER_K4A_DEPTH_MODE_WFOV_UNBINNED, VIDEO_READER_K4A_DEPTH_MODE_PASSIVE_IR }
- enum video_reader_k4a_color_resolution_t {
  VIDEO_READER_K4A_COLOR_RESOLUTION_OFF, VIDEO_READER_K4A_COLOR_RESOLUTION_720P, VIDEO_READER_K4A_COLOR_RESOLUTION_1080P, VIDEO_READER_K4A_COLOR_RESOLUTION_1440P,
  VIDEO_READER_K4A_COLOR_RESOLUTION_1536P, VIDEO_READER_K4A_COLOR_RESOLUTION_2160P, VIDEO_READER_K4A_COLOR_RESOLUTION_3072P }
- enum CameraCalibrationType : short { CameraCalibrationType::CameraCalibrationTypeDefault = -1, CameraCalibrationType::CameraCalibrationTypeKinect = 0, CameraCalibrationType::CameraCalibrationTypeDefault = -1, CameraCalibrationType::CameraCalibrationTypeKinect = 0 }

  Camera calibration type i.e. the kind of sensor calibration data present.
- enum FrameType : short {
  FrameType::FrameTypeColor = 0, FrameType::FrameTypeDepth = 1, FrameType::FrameTypeIR = 2, FrameType::FrameTypeConfidence = 3,

FrameType::FrameTypeColor = 0, FrameType::FrameTypeDepth = 1, FrameType::FrameTypeIR = 2, FrameType::FrameTypeConfidence = 3 }

Frame type: color, depth, IR as well as confidence matrices.

- enum CodecParamsType : short { CodecParamsType::CodecParamsTypeDefault = -1, CodecParamsType::CodecParamsTypeAv = 0, CodecParamsType::CodecParamsTypeNvPipe = 1, CodecParamsType::CodecParamsTypeZDepth = 2, CodecParamsType::CodecParamsTypeDefault = -1, CodecParamsType::CodecParamsTypeAv = 0, CodecParamsType::CodecParamsTypeNvPipe = 1, CodecParamsType::CodecParamsTypeZDepth = 2 }

  Codec parameters type.
- enum SSPMessageType : short { SSPMessageType::MessageTypeDefault = 0, SSPMessageType::MessageTypeDefault = 0 }

  SSP Message type.
- enum FrameDataType : short { FrameDataType::FrameDataTypeImageFrame = 0, FrameDataType::FrameDataTypeLibavPackets = 1, FrameDataType::FrameDataTypeRawRGBA = 2, FrameDataType::FrameDataTypeGRAY16LE = 3, FrameDataType::FrameDataTypeNvPipePacket = 4, FrameDataType::FrameDataTypeRaw32FC1 = 5, FrameDataType::FrameDataTypeYUV = 6, FrameDataType::FrameDataTypeU8C1 = 7, FrameDataType::FrameDataTypeImageFrame = 0, FrameDataType::FrameDataTypeLibavPackets = 1, FrameDataType::FrameDataTypeRawRGBA = 2, FrameDataType::FrameDataTypeGRAY16LE = 3, FrameDataType::FrameDataTypeNvPipePacket = 4, FrameDataType::FrameDataTypeRaw32FC1 = 5, FrameDataType::FrameDataTypeYUV = 6, FrameDataType::FrameDataTypeU8C1 = 7 }

  Frame data type. This is a precise binary format information.
- enum SensorType : short { SensorType::SensorTypeColor = 0, SensorType::SensorTypeDepth = 1, SensorType::SensorTypeIR = 2, SensorType::SensorTypeConfidence = 3, SensorType::SensorTypeColor = 0, SensorType::SensorTypeDepth = 1, SensorType::SensorTypeIR = 2, SensorType::SensorTypeConfidence = 3 }

  Sensor type: color or depth.

Functions

- std::shared_ptr< IDecoder > IDecoderFactory (const std::string &config)

  IDecoder factory.
- std::shared_ptr< IEncoder > IEncoderFactory (const std::string &config)

  IEncoder factory.
- void SetupLogging (std::string &level, std::string &file)

  Setup logging.
- std::shared_ptr< IReader > IReaderFactory (const std::string &config)

  IReader factory.
- std::atomic_bool **exiting** (false)
- unsigned long **elapsed** (unsigned long start, unsigned long end)
- bool FrameStructToMat (FrameStruct &f, cv::Mat &img, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Convert frame struct to opencv matrix.
- ExtendedAzureConfig BuildKinectConfigFromYAML (YAML::Node config)

  Build Kinect configuration from YAML configuration.
- void FrameStructToK4A (std::vector< FrameStruct > &f, k4a::capture &sensor_capture, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Transform frame structure to K4A format Update decoder dictionary.
- double GetMSE (const Mat &I1, const Mat &I2)

  Get Mean Square Error (distance) between images.
- double GetPSNR (const Mat &I1, const Mat &I2, double max_value)

  Get Peak Signal to Noise Ration similarity.

- Scalar GetMSSIM (const Mat &i1, const Mat &i2)

  Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html *for a simple SSIM introduction.*
- uint64_t _CurrentTimeMs ()

  Get current time in ms.
- uint64_t CurrentTimeUs ()

  Get current time in usec/microseconds.
- uint64_t CurrentTimeNs ()

  Get current time in ns/nanosecconds.
- std::string RandomString (size_t length)

  Build a random string.
- void SetupLogging (YAML::Node &general_parameters)

  Setup SSP logging.
- void AVFrameToMatYUV (AVFrameSharedP &frame, cv::Mat &image)

  Convert an AVFrame to YUV image.
- void AVFrameToMatGray (AVFrameSharedP &frame, cv::Mat &image)

  Convert an AVFrame to grayscale image.
- AVCodecParameters * getParams (FrameStruct &frame_struct)

  Get AVCodec parameters from a FrameStruct.
- template<typename T >
  void **MinMaxFilter** (cv::Mat &in_mat, cv::Mat &out_mat, double min, double max)

Variables

- std::atomic_bool **exiting**

7.2.1 Detailed Description

Sensor Stream Pipe.

Video utilities.

Types for libav support.

MOETSI_RAAS

Namespace libav_types.h

Namespace video_utils.cc

7.2.2 Enumeration Type Documentation

7.2.2.1 CameraCalibrationType [1/2]

```
enum moetsi::ssp::CameraCalibrationType : short [strong]
```

Camera calibration type i.e. the kind of sensor calibration data present.

Enumerator

CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type
CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type

7.2.2.2 CameraCalibrationType [2/2]

```
enum moetsi::ssp::CameraCalibrationType : short [strong]
```

Camera calibration type i.e. the kind of sensor calibration data present.

Enumerator

CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type
CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type

7.2.2.3 CodecParamsType [1/2]

```
enum moetsi::ssp::CodecParamsType : short [strong]
```

Codec parameters type.

Enumerator

CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration
CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration

7.2.2.4 CodecParamsType [2/2]

```
enum moetsi::ssp::CodecParamsType : short [strong]
```

Codec parameters type.

Enumerator

CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration
CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration

7.2.2.5 FrameDataType [1/2]

```
enum moetsi::ssp::FrameDataType : short [strong]
```

Frame data type. This is a precise binary format information.

Enumerator

FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data
FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data

7.2.2.6 FrameDataType [2/2]

```
enum moetsi::ssp::FrameDataType : short [strong]
```

Frame data type. This is a precise binary format information.

Enumerator

FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data
FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data

7.2.2.7 FrameType [1/2]

```
enum moetsi::ssp::FrameType : short [strong]
```

Frame type: color, depth, IR as well as confidence matrices.

Enumerator

FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels
FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels

7.2.2.8 FrameType [2/2]

```
enum moetsi::ssp::FrameType : short [strong]
```

Frame type: color, depth, IR as well as confidence matrices.

Enumerator

FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels
FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels

7.2.2.9 SensorType [1/2]

`enum moetsi::ssp::SensorType : short [strong]`

Sensor type: color or depth.

Enumerator

SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence
SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence

7.2.2.10 SensorType [2/2]

`enum moetsi::ssp::SensorType : short [strong]`

Sensor type: color or depth.

Enumerator

SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence
SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence

7.2.2.11 SSPMessageType [1/2]

enum moetsi::ssp::SSPMessageType : short [strong]

SSP Message type.

Enumerator

MessageTypeDefault	Default only
MessageTypeDefault	Default only

7.2.2.12 SSPMessageType [2/2]

enum moetsi::ssp::SSPMessageType : short [strong]

SSP Message type.

Enumerator

MessageTypeDefault	Default only
MessageTypeDefault	Default only

7.2.2.13 video_reader_k4a_color_resolution_t

enum moetsi::ssp::video_reader_k4a_color_resolution_t

Enumerator

VIDEO_READER_K4A_COLOR_RESOLUTION_OFF	Color camera will be turned off with this setting
VIDEO_READER_K4A_COLOR_RESOLUTION_720P	1280 * 720 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1080P	1920 * 1080 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1440P	2560 * 1440 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1536P	2048 * 1536 4:3
VIDEO_READER_K4A_COLOR_RESOLUTION_2160P	3840 * 2160 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_3072P	4096 * 3072 4:3

7.2.2.14 video_reader_k4a_depth_mode_t

enum moetsi::ssp::video_reader_k4a_depth_mode_t

Enumerator

VIDEO_READER_K4A_DEPTH_MODE_OFF	Depth sensor will be turned off with this setting.
VIDEO_READER_K4A_DEPTH_MODE_NFOV_2↩ X2BINNED	Depth captured at 320x288. Passive IR is also captured at 320x288.
VIDEO_READER_K4A_DEPTH_MODE_NFOV_U↩ NBINNED	Depth captured at 640x576. Passive IR is also captured at 640x576.
VIDEO_READER_K4A_DEPTH_MODE_WFOV_2↩ X2BINNED	Depth captured at 512x512. Passive IR is also captured at 512x512.
VIDEO_READER_K4A_DEPTH_MODE_WFOV_U↩ NBINNED	Depth captured at 1024x1024. Passive IR is also captured at 1024x1024.
VIDEO_READER_K4A_DEPTH_MODE_PASSIVE↩ _IR	Passive IR only, captured at 1024x1024.

7.2.3 Function Documentation

7.2.3.1 _CurrentTimeMs()

```
uint64_t moetsi::ssp::_CurrentTimeMs ( )
```

Get current time in ms.

Returns

ms since UTC epoch

7.2.3.2 AVFrameToMatGray()

```
void moetsi::ssp::AVFrameToMatGray (
            AVFrameSharedP & frame,
            cv::Mat & image )
```

Convert an AVFrame to grayscale image.

Parameters

frame	AVFrame
image	dest opencv image

7.2.3.3 AVFrameToMatYUV()

```
void moetsi::ssp::AVFrameToMatYUV (
            AVFrameSharedP & frame,
            cv::Mat & image )
```

Convert an AVFrame to YUV image.

Parameters

frame	AVFrame
image	dest opencv image

7.2.3.4 BuildKinectConfigFromYAML()

```
ExtendedAzureConfig moetsi::ssp::BuildKinectConfigFromYAML (
            YAML::Node config )
```

Build Kinect configuration from YAML configuration.

Parameters

config	yaml confirguration

Returns

Azure Kinect configuration

7.2.3.5 CurrentTimeNs()

```
uint64_t moetsi::ssp::CurrentTimeNs ( )
```

Get current time in ns/nanosecconds.

Returns

nsec since UTC epoch

7.2.3.6 CurrentTimeUs()

```
uint64_t moetsi::ssp::CurrentTimeUs ( )
```

Get current time in usec/microseconds.

Returns

usec since UTC epoch

7.2.3.7 FrameStructToK4A()

```
void moetsi::ssp::FrameStructToK4A (
            std::vector< FrameStruct > & f,
            k4a::capture & sensor_capture,
            std::unordered_map< std::string, std::shared_ptr< IDecoder >> & decoders )
```

Transform frame structure to K4A format Update decoder dictionary.

Parameters

f	source frame structure
sensor_capture	destination "capture" structure
decoders	decoders map - updated

7.2.3.8 FrameStructToMat()

```
bool moetsi::ssp::FrameStructToMat (
            FrameStruct & f,
            cv::Mat & img,
            std::unordered_map< std::string, std::shared_ptr< IDecoder >> & decoders )
```

Convert frame struct to opencv matrix.

Parameters

f	Frame struct
img	Target opencv image
decoders	decoder dictionary

7.2.3.9 GetMSE()

```
double moetsi::ssp::GetMSE (
            const Mat & I1,
            const Mat & I2 )
```

Get Mean Square Error (distance) between images.

Parameters

I1	image 1
I2	image 2

Returns

MSE between these 2 images

7.2.3.10 GetMSSIM()

```
Scalar moetsi::ssp::GetMSSIM (
            const Mat & i1,
            const Mat & i2 )
```

Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html for a simple SSIM introduction.

Parameters

I1	image 1
I2	image 2

Returns

3 channel similarity measure

7.2.3.11 getParams()

```
AVCodecParameters * moetsi::ssp::getParams (
            FrameStruct & frame_struct )
```

Get AVCodec parameters from a FrameStruct.

Parameters

frame_struct	frame struct

Returns

AVCodec parameters

7.2.3.12 GetPSNR()

```
double moetsi::ssp::GetPSNR (
            const Mat & I1,
            const Mat & I2,
            double max_value )
```

Get Peak Signal to Noise Ration similarity.

Parameters

I1	image 1
I2	image 2
max_value	max value in the PSNR formula

Returns

PSNR image similarity

7.2.3.13 IDecoderFactory()

```
std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (
            const std::string & config )
```

IDecoder factory.

Parameters

config	configuration

Returns

IDecoder instance

7.2.3.14 IEncoderFactory()

```
std::shared_ptr< IEncoder > moetsi::ssp::IEncoderFactory (
            const std::string & config )
```

IEncoder factory.

Parameters

config	configuration

Returns

IEncoder instance

7.2.3.15 IReaderFactory()

```
std::shared_ptr< IReader > moetsi::ssp::IReaderFactory (
            const std::string & config )
```

IReader factory.

Parameters

config	configuration

Returns

an IReader instance

7.2.3.16 SetupLogging() [1/2]

```
void moetsi::ssp::SetupLogging (
            std::string & level,
            std::string & file )
```

Setup logging.

Setup SSP logging.

Parameters

level	logging level
file	logging file
level	logging level
file	log file

7.2.3.17 SetupLogging() [2/2]

```
void moetsi::ssp::SetupLogging (
            YAML::Node & general_parameters )
```

Setup SSP logging.

Parameters

general_parameters	configuration

Chapter 8

Class Documentation

8.1 _custom_k4abt_body_t Struct Reference

Public Attributes

- int32_t **id**
- float **pelvis_x**
- float **pelvis_y**
- float **pelvis_z**
- float **pelvis_QX**
- float **pelvis_QY**
- float **pelvis_QZ**
- float **pelvis_QW**
- BYTE **pelvis_conf**
- float **spine_navel_x**
- float **spine_navel_y**
- float **spine_navel_z**
- float **spine_navel_QX**
- float **spine_navel_QY**
- float **spine_navel_QZ**
- float **spine_navel_QW**
- BYTE **spine_navel_conf**
- float **spine_chest_x**
- float **spine_chest_y**
- float **spine_chest_z**
- float **spine_chest_QX**
- float **spine_chest_QY**
- float **spine_chest_QZ**
- float **spine_chest_QW**
- BYTE **spine_chest_conf**
- float **neck_x**
- float **neck_y**
- float **neck_z**
- float **neck_QX**
- float **neck_QY**
- float **neck_QZ**
- float **neck_QW**
- BYTE **neck_conf**

- float **clavicle_left_x**
- float **clavicle_left_y**
- float **clavicle_left_z**
- float **clavicle_left_QX**
- float **clavicle_left_QY**
- float **clavicle_left_QZ**
- float **clavicle_left_QW**
- BYTE **clavicle_left_conf**
- float **shoulder_left_x**
- float **shoulder_left_y**
- float **shoulder_left_z**
- float **shoulder_left_QX**
- float **shoulder_left_QY**
- float **shoulder_left_QZ**
- float **shoulder_left_QW**
- BYTE **shoulder_left_conf**
- float **elbow_left_x**
- float **elbow_left_y**
- float **elbow_left_z**
- float **elbow_left_QX**
- float **elbow_left_QY**
- float **elbow_left_QZ**
- float **elbow_left_QW**
- BYTE **elbow_left_conf**
- float **wrist_left_x**
- float **wrist_left_y**
- float **wrist_left_z**
- float **wrist_left_QX**
- float **wrist_left_QY**
- float **wrist_left_QZ**
- float **wrist_left_QW**
- BYTE **wrist_left_conf**
- float **hand_left_x**
- float **hand_left_y**
- float **hand_left_z**
- float **hand_left_QX**
- float **hand_left_QY**
- float **hand_left_QZ**
- float **hand_left_QW**
- BYTE **hand_left_conf**
- float **handtip_left_x**
- float **handtip_left_y**
- float **handtip_left_z**
- float **handtip_left_QX**
- float **handtip_left_QY**
- float **handtip_left_QZ**
- float **handtip_left_QW**
- BYTE **handtip_left_conf**
- float **thumb_left_x**
- float **thumb_left_y**
- float **thumb_left_z**
- float **thumb_left_QX**
- float **thumb_left_QY**
- float **thumb_left_QZ**
- float **thumb_left_QW**

- BYTE **thumb_left_conf**
- float **clavicle_right_x**
- float **clavicle_right_y**
- float **clavicle_right_z**
- float **clavicle_right_QX**
- float **clavicle_right_QY**
- float **clavicle_right_QZ**
- float **clavicle_right_QW**
- BYTE **clavicle_right_conf**
- float **shoulder_right_x**
- float **shoulder_right_y**
- float **shoulder_right_z**
- float **shoulder_right_QX**
- float **shoulder_right_QY**
- float **shoulder_right_QZ**
- float **shoulder_right_QW**
- BYTE **shoulder_right_conf**
- float **elbow_right_x**
- float **elbow_right_y**
- float **elbow_right_z**
- float **elbow_right_QX**
- float **elbow_right_QY**
- float **elbow_right_QZ**
- float **elbow_right_QW**
- BYTE **elbow_right_conf**
- float **wrist_right_x**
- float **wrist_right_y**
- float **wrist_right_z**
- float **wrist_right_QX**
- float **wrist_right_QY**
- float **wrist_right_QZ**
- float **wrist_right_QW**
- BYTE **wrist_right_conf**
- float **hand_right_x**
- float **hand_right_y**
- float **hand_right_z**
- float **hand_right_QX**
- float **hand_right_QY**
- float **hand_right_QZ**
- float **hand_right_QW**
- BYTE **hand_right_conf**
- float **handtip_right_x**
- float **handtip_right_y**
- float **handtip_right_z**
- float **handtip_right_QX**
- float **handtip_right_QY**
- float **handtip_right_QZ**
- float **handtip_right_QW**
- BYTE **handtip_right_conf**
- float **thumb_right_x**
- float **thumb_right_y**
- float **thumb_right_z**
- float **thumb_right_QX**
- float **thumb_right_QY**
- float **thumb_right_QZ**

- float **thumb_right_QW**
- BYTE **thumb_right_conf**
- float **hip_left_x**
- float **hip_left_y**
- float **hip_left_z**
- float **hip_left_QX**
- float **hip_left_QY**
- float **hip_left_QZ**
- float **hip_left_QW**
- BYTE **hip_left_conf**
- float **knee_left_x**
- float **knee_left_y**
- float **knee_left_z**
- float **knee_left_QX**
- float **knee_left_QY**
- float **knee_left_QZ**
- float **knee_left_QW**
- BYTE **knee_left_conf**
- float **ankle_left_x**
- float **ankle_left_y**
- float **ankle_left_z**
- float **ankle_left_QX**
- float **ankle_left_QY**
- float **ankle_left_QZ**
- float **ankle_left_QW**
- BYTE **ankle_left_conf**
- float **foot_left_x**
- float **foot_left_y**
- float **foot_left_z**
- float **foot_left_QX**
- float **foot_left_QY**
- float **foot_left_QZ**
- float **foot_left_QW**
- BYTE **foot_left_conf**
- float **hip_right_x**
- float **hip_right_y**
- float **hip_right_z**
- float **hip_right_QX**
- float **hip_right_QY**
- float **hip_right_QZ**
- float **hip_right_QW**
- BYTE **hip_right_conf**
- float **knee_right_x**
- float **knee_right_y**
- float **knee_right_z**
- float **knee_right_QX**
- float **knee_right_QY**
- float **knee_right_QZ**
- float **knee_right_QW**
- BYTE **knee_right_conf**
- float **ankle_right_x**
- float **ankle_right_y**
- float **ankle_right_z**
- float **ankle_right_QX**
- float **ankle_right_QY**

- float **ankle_right_QZ**
- float **ankle_right_QW**
- BYTE **ankle_right_conf**
- float **foot_right_x**
- float **foot_right_y**
- float **foot_right_z**
- float **foot_right_QX**
- float **foot_right_QY**
- float **foot_right_QZ**
- float **foot_right_QW**
- BYTE **foot_right_conf**
- float **head_x**
- float **head_y**
- float **head_z**
- float **head_QX**
- float **head_QY**
- float **head_QZ**
- float **head_QW**
- BYTE **head_conf**
- float **nose_x**
- float **nose_y**
- float **nose_z**
- float **nose_QX**
- float **nose_QY**
- float **nose_QZ**
- float **nose_QW**
- BYTE **nose_conf**
- float **eye_left_x**
- float **eye_left_y**
- float **eye_left_z**
- float **eye_left_QX**
- float **eye_left_QY**
- float **eye_left_QZ**
- float **eye_left_QW**
- BYTE **eye_left_conf**
- float **ear_left_x**
- float **ear_left_y**
- float **ear_left_z**
- float **ear_left_QX**
- float **ear_left_QY**
- float **ear_left_QZ**
- float **ear_left_QW**
- BYTE **ear_left_conf**
- float **eye_right_x**
- float **eye_right_y**
- float **eye_right_z**
- float **eye_right_QX**
- float **eye_right_QY**
- float **eye_right_QZ**
- float **eye_right_QW**
- BYTE **eye_right_conf**
- float **ear_right_x**
- float **ear_right_y**
- float **ear_right_z**
- float **ear_right_QX**

- float **ear_right_QY**
- float **ear_right_QZ**
- float **ear_right_QW**
- BYTE **ear_right_conf**

The documentation for this struct was generated from the following file:

- ssp_client_k4a.cc

8.2 moetsi::ssp::AVCodecContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecContext ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.3 moetsi::ssp::AVCodecDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodec ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.4 moetsi::ssp::AVCodecParametersDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecParameters ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.5 moetsi::ssp::AVCodecParametersNullDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecParameters ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.6 moetsi::ssp::AVFormatContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVFormatContext ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.7 moetsi::ssp::AVFrameDeleter Struct Reference

Public Member Functions

- void **operator()** (AVFrame ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.8 moetsi::ssp::AVIOContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVIOContext ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.9 moetsi::ssp::AVPacketDeleter Struct Reference

Public Member Functions

- void **operator()** (AVPacket ∗ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.10 BodyTracker Class Reference

Public Member Functions

- **BodyTracker** (int port)
- int **update** ()
- int **getBodyCount** () const
- int **getBodiesStruct** (k4abt_body_t ∗pBodies, int n) const
- custom_k4abt_body_t **getCustomBodiesStruct** (int n) const
- int **getBodies** (k4abt_skeleton_t ∗pSkeletons, int ∗pIds, int n) const

The documentation for this class was generated from the following file:

- ssp_client_k4a.cc

8.11 moetsi::ssp::buffer_data Struct Reference

Public Attributes

- uint8_t ∗ **ptr**
- size_t size

  size left in the buffer

The documentation for this struct was generated from the following file:

- image_decoder.cc

8.12 moetsi::ssp::CameraCalibrationStruct Struct Reference

Camera calibration data.

`#include <frame_struct.h>`

Public Member Functions

- CameraCalibrationStruct ()
- CameraCalibrationStruct (CameraCalibrationType t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
  void **serialize** (Archive &ar)
- CameraCalibrationStruct ()
- CameraCalibrationStruct (CameraCalibrationType t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
  void **serialize** (Archive &ar)

Public Attributes

- CameraCalibrationType type = CameraCalibrationType::CameraCalibrationTypeDefault
- std::vector< unsigned char > data
- std::vector< unsigned char > extra_data

8.12.1 Detailed Description

Camera calibration data.

8.12.2 Constructor & Destructor Documentation

8.12.2.1 CameraCalibrationStruct() [1/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct ( )  [inline]
```

Default constructor

8.12.2.2 CameraCalibrationStruct() [2/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct (
            CameraCalibrationType t,
            std::vector< unsigned char > d,
            std::vector< unsigned char > ed )  [inline]
```

Structure constructor

Parameters

t	camera calibration type
d	opaque data blob #1
ed	opaque data blob #2

8.12.2.3 CameraCalibrationStruct() [3/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct ( )  [inline]
```

Default constructor

8.12.2.4 CameraCalibrationStruct() [4/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct (
            CameraCalibrationType t,
            std::vector< unsigned char > d,
            std::vector< unsigned char > ed )  [inline]
```

Structure constructor

Parameters

t	camera calibration type
d	opaque data blob #1
ed	opaque data blob #2

8.12.3 Member Data Documentation

8.12.3.1 data

```
std::vector< unsigned char > moetsi::ssp::CameraCalibrationStruct::data
```

Opaque data blob #1

8.12.3.2 extra_data

```
std::vector< unsigned char > moetsi::ssp::CameraCalibrationStruct::extra_data
```

Opaque data blob #2

8.12.3.3 type

```
CameraCalibrationType moetsi::ssp::CameraCalibrationStruct::type = CameraCalibrationType::↩
CameraCalibrationTypeDefault
```

Camera calibration type

The documentation for this struct was generated from the following file:

- include/structs/frame_struct.h

8.13 moetsi::ssp::CodecParamsStruct Struct Reference

Codec parameters.

`#include <frame_struct.h>`

Public Member Functions

- CodecParamsStruct ()
- CodecParamsStruct (CodecParamsType t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
  void **serialize** (Archive &ar)
- CodecParamsStruct ()
- CodecParamsStruct (CodecParamsType t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
  void **serialize** (Archive &ar)

Public Attributes

- CodecParamsType type = CodecParamsType::CodecParamsTypeDefault
- std::vector< unsigned char > data
- std::vector< unsigned char > extra_data

8.13.1 Detailed Description

Codec parameters.

8.13.2 Constructor & Destructor Documentation

8.13.2.1 CodecParamsStruct() [1/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct ( )  [inline]
```

Default constructor

8.13.2.2 CodecParamsStruct() [2/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct (
            CodecParamsType t,
            std::vector< unsigned char > d,
            std::vector< unsigned char > ed )  [inline]
```

Structural constructor

Parameters

t	codec type
d	opaque data blob #1
ed	opaque data blob #2

8.13.2.3 CodecParamsStruct() [3/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct ( )  [inline]
```

Default constructor

8.13.2.4 CodecParamsStruct() [4/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct (
            CodecParamsType t,
            std::vector< unsigned char > d,
            std::vector< unsigned char > ed )  [inline]
```

Structural constructor

Parameters

t	codec type
d	opaque data blob #1
ed	opaque data blob #2

8.13.3 Member Data Documentation

8.13.3.1 data

```
std::vector< unsigned char > moetsi::ssp::CodecParamsStruct::data
```

Opaque data blob #1

8.13.3.2 extra_data

```
std::vector< unsigned char > moetsi::ssp::CodecParamsStruct::extra_data
```

Opaque data blob #2

8.13.3.3 type

```
CodecParamsType moetsi::ssp::CodecParamsStruct::type = CodecParamsType::CodecParamsTypeDefault
```

Codec parameters type

The documentation for this struct was generated from the following file:

- include/structs/frame_struct.h

8.14 color_point_t Struct Reference

Public Attributes

- int16_t **xyz** [3]
- uint8_t **rgb** [3]

The documentation for this struct was generated from the following file:

- ssp_client_pointcloud.cc

8.15 moetsi::ssp::ExtendedAzureConfig Struct Reference

Azure Kinect configuration.

```
#include <kinect_utils.h>
```

Public Attributes

- k4a_device_configuration_t device_config
- bool stream_color
- bool stream_depth
- bool stream_ir
- int absolute_exposure_value

8.15.1 Detailed Description

Azure Kinect configuration.

8.15.2 Member Data Documentation

8.15.2.1 absolute_exposure_value

```
int moetsi::ssp::ExtendedAzureConfig::absolute_exposure_value
```

Absolute exposure value

8.15.2.2 device_config

```
k4a_device_configuration_t moetsi::ssp::ExtendedAzureConfig::device_config
```

Device configuration

8.15.2.3 stream_color

```
bool moetsi::ssp::ExtendedAzureConfig::stream_color
```

If true, stream color frames

8.15.2.4 stream_depth

```
bool moetsi::ssp::ExtendedAzureConfig::stream_depth
```

If true, stream depth frames

8.15.2.5 stream_ir

```
bool moetsi::ssp::ExtendedAzureConfig::stream_ir
```

If true, stream infrared frames

The documentation for this struct was generated from the following file:

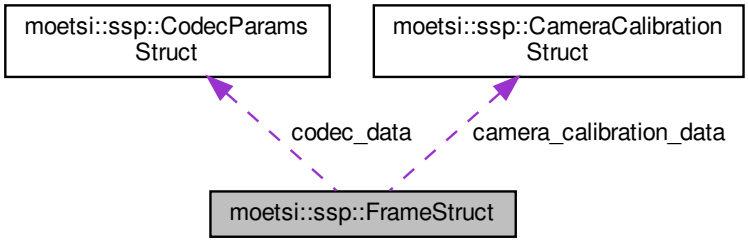
- kinect_utils.h

8.16 moetsi::ssp::FrameStruct Struct Reference

Frame struct: SSP frame.

```
#include <frame_struct.h>
```

Collaboration diagram for moetsi::ssp::FrameStruct:



Public Member Functions

- template<class Archive >
  void **serialize** (Archive &ar)
- template<class Archive >
  void **serialize** (Archive &ar)

Public Attributes

- SSPMessageType message_type
- FrameType frame_type
- FrameDataType frame_data_type
- std::string stream_id
- std::vector< unsigned char > frame
- CodecParamsStruct codec_data
- CameraCalibrationStruct camera_calibration_data
- std::string scene_desc
- unsigned int sensor_id
- unsigned int device_id
- unsigned int frame_id
- std::vector< uint64_t > timestamps

8.16.1 Detailed Description

Frame struct: SSP frame.

8.16.2 Member Data Documentation

8.16.2.1 camera_calibration_data

`CameraCalibrationStruct moetsi::ssp::FrameStruct::camera_calibration_data`

Codec info for video frames, null for image frames

8.16.2.2 codec_data

`CodecParamsStruct moetsi::ssp::FrameStruct::codec_data`

Codec info for video frames, null for image frames Video decoder needs to know about the last receive frame Requires to know the codec as well as additional parameters

8.16.2.3 device_id

`unsigned int moetsi::ssp::FrameStruct::device_id`

Integer device id: distingish between devices in the same scene Can be set by user.

8.16.2.4 frame

```
std::vector< unsigned char > moetsi::ssp::FrameStruct::frame
```

Frame binary data We use a vector to know the size, basically a vector of bytes to store binary data

8.16.2.5 frame_data_type

```
FrameDataType moetsi::ssp::FrameStruct::frame_data_type
```

Frame data type

8.16.2.6 frame_id

```
unsigned int moetsi::ssp::FrameStruct::frame_id
```

Current frame number (increases over time) Increases by 1 for each frame automatically when SSP server starts

8.16.2.7 frame_type

```
FrameType moetsi::ssp::FrameStruct::frame_type
```

Frame type

8.16.2.8 message_type

```
SSPMessageType moetsi::ssp::FrameStruct::message_type
```

SSP message type

8.16.2.9 scene_desc

```
std::string moetsi::ssp::FrameStruct::scene_desc
```

Optional: scene description

8.16.2.10 sensor_id

```
unsigned int moetsi::ssp::FrameStruct::sensor_id
```

Sensor id

8.16.2.11 stream_id

```
std::string moetsi::ssp::FrameStruct::stream_id
```

Random 16 char string that uniquely ids the frame stream. Some decoders (like video) are stateful and so must keep track of streams. This is automatically generated.

8.16.2.12 timestamps

```
std::vector< uint64_t > moetsi::ssp::FrameStruct::timestamps
```

Use for logging and timing to understand processing speeds. Times are in ns

The documentation for this struct was generated from the following file:

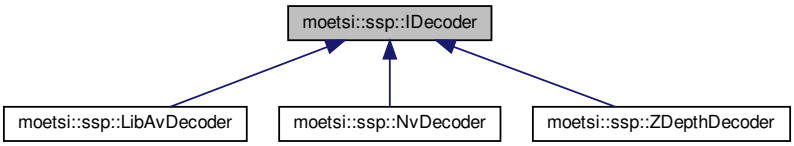
- include/structs/frame_struct.h

8.17 moetsi::ssp::IDecoder Class Reference

IDecoder abstract decoder interface.

```
#include <idecoder.h>
```

Inheritance diagram for moetsi::ssp::IDecoder:



Public Member Functions

- virtual ~IDecoder ()
  Virtual destructor.
- virtual cv::Mat Decode (FrameStruct &data)=0
  Extract an opencv image from a FrameStruct.
- virtual ~IDecoder ()
  Virtual destructor.
- virtual cv::Mat Decode (FrameStruct &data)=0
  Extract an opencv image from a FrameStruct.

8.17.1 Detailed Description

IDecoder abstract decoder interface.

8.17.2 Member Function Documentation

8.17.2.1 Decode() [1/2]

```
virtual cv::Mat moetsi::ssp::IDecoder::Decode (
            FrameStruct & data )  [pure virtual]
```

Extract an opencv image from a FrameStruct.

Parameters

data	FrameStruct

Returns

OpenCV matrix/image

Implemented in moetsi::ssp::LibAvDecoder, moetsi::ssp::NvDecoder, and moetsi::ssp::ZDepthDecoder.

8.17.2.2 Decode() [2/2]

```
virtual cv::Mat moetsi::ssp::IDecoder::Decode (
            FrameStruct & data )  [pure virtual]
```

Extract an opencv image from a FrameStruct.

Parameters

data	FrameStruct

Returns

OpenCV matrix/image

Implemented in moetsi::ssp::LibAvDecoder, moetsi::ssp::NvDecoder, and moetsi::ssp::ZDepthDecoder.

The documentation for this class was generated from the following file:

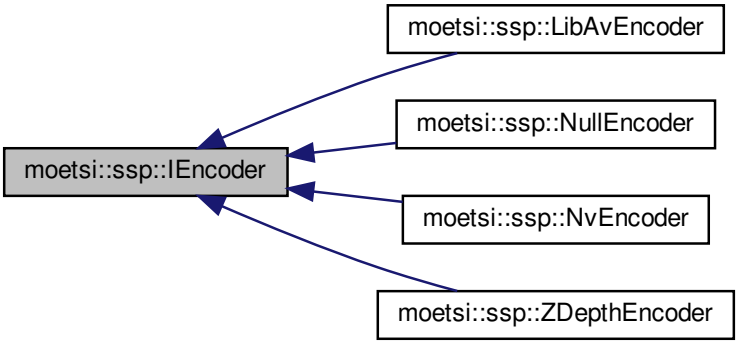
- decoders/idecoder.h

8.18 moetsi::ssp::IEncoder Class Reference

IEncoder abstract encoder class.

```
#include <iencoder.h>
```

Inheritance diagram for moetsi::ssp::IEncoder:



Public Member Functions

- virtual ~IEncoder ()
  Virtual destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)=0
  Add a frame struct.
- virtual void NextPacket ()=0
  Go to next packet.
- virtual bool HasNextPacket ()=0
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()=0
  Get current encoded frame.
- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()=0
  Get current frame in its original format.
- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()=0
  Get codec parameters.
- virtual unsigned int GetFps ()=0
  Get FPS.
- virtual ~IEncoder ()
  Virtual destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)=0
  Add a frame struct.
- virtual void NextPacket ()=0
  Go to next packet.
- virtual bool HasNextPacket ()=0
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()=0
  Get current encoded frame.
- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()=0
  Get current frame in its original format.
- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()=0
  Get codec parameters.
- virtual unsigned int GetFps ()=0
  Get FPS.

8.18.1 Detailed Description

IEncoder abstract encoder class.

8.18.2 Member Function Documentation

8.18.2.1 AddFrameStruct() [1/2]

```
virtual void moetsi::ssp::IEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.2 AddFrameStruct() [2/2]

```
virtual void moetsi::ssp::IEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.3 CurrentFrameEncoded() [1/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameEncoded ( ) [pure
virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.4 CurrentFrameEncoded() [2/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameEncoded ( )  [pure virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.5 CurrentFrameOriginal() [1/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameOriginal ( )  [pure virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.6 CurrentFrameOriginal() [2/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameOriginal ( )  [pure virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.7 GetCodecParamsStruct() [1/2]

```
virtual std::shared_ptr<CodecParamsStruct> moetsi::ssp::IEncoder::GetCodecParamsStruct ( )
[pure virtual]
```

Get codec parameters.

Returns

codec parameters

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.8 GetCodecParamsStruct() [2/2]

```
virtual std::shared_ptr<CodecParamsStruct> moetsi::ssp::IEncoder::GetCodecParamsStruct ( )
[pure virtual]
```

Get codec parameters.

Returns

codec parameters

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.9 GetFps() [1/2]

```
virtual unsigned int moetsi::ssp::IEncoder::GetFps ( )  [pure virtual]
```

Get FPS.

Returns

FPS in frame per second

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.10 GetFps() [2/2]

```
virtual unsigned int moetsi::ssp::IEncoder::GetFps ( )  [pure virtual]
```

Get FPS.

Returns

FPS in frame per second

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.11 HasNextPacket() [1/2]

```
virtual bool moetsi::ssp::IEncoder::HasNextPacket ( )  [pure virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

8.18.2.12 HasNextPacket() [2/2]

```
virtual bool moetsi::ssp::IEncoder::HasNextPacket ( )  [pure virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implemented in moetsi::ssp::LibAvEncoder, moetsi::ssp::NvEncoder, moetsi::ssp::ZDepthEncoder, and moetsi::ssp::NullEncoder.

The documentation for this class was generated from the following file:

- encoders/iencoder.h

8.19 moetsi::ssp::ImageDecoder Class Reference

Decode image to AV frame.

`#include <image_decoder.h>`

Public Member Functions

- ImageDecoder ()
  Contructor.
- ~ImageDecoder ()
  Destructor.
- void ImageBufferToAVFrame (std::shared_ptr< FrameStruct > &fs, AVFrameSharedP pFrame)
  Read frame structs to AVFrame.s.

8.19.1 Detailed Description

Decode image to AV frame.

8.19.2 Member Function Documentation

8.19.2.1 ImageBufferToAVFrame()

```
void moetsi::ssp::ImageDecoder::ImageBufferToAVFrame (
            std::shared_ptr< FrameStruct > & fs,
            AVFrameSharedP pFrame )
```

Read frame structs to AVFrame.s.

Parameters

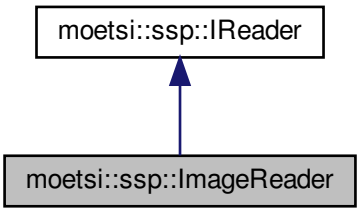
fs	frame structs
pFrame	destination AVFrame

The documentation for this class was generated from the following files:

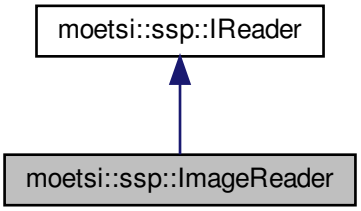
- image_decoder.h
- image_decoder.cc

8.20 moetsi::ssp::ImageReader Class Reference

Inheritance diagram for moetsi::ssp::ImageReader:



Collaboration diagram for moetsi::ssp::ImageReader:



Public Member Functions

- **ImageReader** (std::string filename)
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()
  Get current frame data.
- virtual std::vector< FrameType > GetType ()
  Get frame types.
- virtual bool HasNextFrame ()
  Check if there is a next frame.
- virtual void NextFrame ()
  Go to next frame.
- virtual void Reset ()
  Reset this reader.
- virtual void GoToFrame (unsigned int frame_id)
  Go to a given frame.
- virtual unsigned int GetCurrentFrameId ()
  Get current frame number.
- virtual unsigned int GetFps ()
  Get indicative FPS in frame per second.

8.20.1 Member Function Documentation

8.20.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::ImageReader::GetCurrentFrameId ( )  [virtual]
```

Get current frame number.

Returns

current frame number.

Implements moetsi::ssp::IReader.

8.20.1.2 GetFps()

```
unsigned int moetsi::ssp::ImageReader::GetFps ( )  [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements moetsi::ssp::IReader.

8.20.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::ImageReader::GetType ( )  [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements moetsi::ssp::IReader.

8.20.1.4 GoToFrame()

```
void moetsi::ssp::ImageReader::GoToFrame (
            unsigned int frame_id )  [virtual]
```

Go to a given frame.

Parameters

frame_id	target frame number

Implements moetsi::ssp::IReader.

8.20.1.5 HasNextFrame()

```
bool moetsi::ssp::ImageReader::HasNextFrame ( )  [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

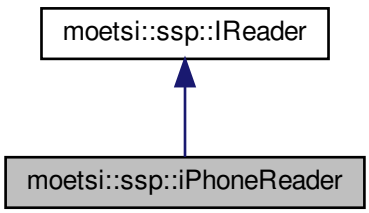
Implements moetsi::ssp::IReader.

The documentation for this class was generated from the following files:

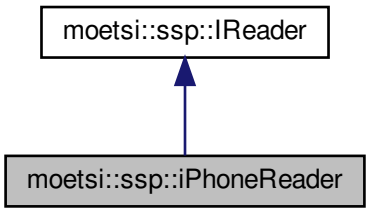
- image_reader.h
- image_reader.cc

8.21 moetsi::ssp::iPhoneReader Class Reference

Inheritance diagram for moetsi::ssp::iPhoneReader:



Collaboration diagram for moetsi::ssp::iPhoneReader:



Public Member Functions

- void Reset () override
  Reset this reader.
- bool HasNextFrame () override
  Check if there is a next frame.
- void NextFrame () override
  Go to next frame.
- std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame () override
  Get current frame data.
- unsigned int GetCurrentFrameId () override
  Get current frame number.
- void GoToFrame (unsigned int frame_id) override
  Go to a given frame.
- unsigned int GetFps () override
  Get indicative FPS in frame per second.
- std::vector< FrameType > GetType () override
  Get frame types.

8.21.1 Member Function Documentation

8.21.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::iPhoneReader::GetCurrentFrameId ( )  [override], [virtual]
```

Get current frame number.

Returns

current frame number.

Implements moetsi::ssp::IReader.

8.21.1.2 GetFps()

```
unsigned int moetsi::ssp::iPhoneReader::GetFps ( )  [override], [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements moetsi::ssp::IReader.

8.21.1.3 GetType()

```
vector< FrameType > moetsi::ssp::iPhoneReader::GetType ( )  [override], [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements moetsi::ssp::IReader.

8.21.1.4 GoToFrame()

```
void moetsi::ssp::iPhoneReader::GoToFrame (
            unsigned int frame_id )  [override], [virtual]
```

Go to a given frame.

Parameters

frame_id	target frame number

Implements moetsi::ssp::IReader.

8.21.1.5 HasNextFrame()

```
bool moetsi::ssp::iPhoneReader::HasNextFrame ( )  [override], [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

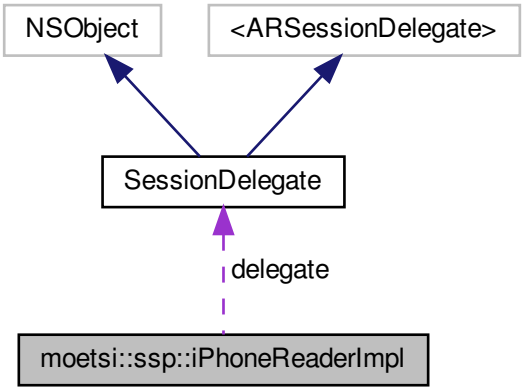
Implements moetsi::ssp::IReader.

The documentation for this class was generated from the following files:

- iphone_reader.h
- iphone_reader.mm

8.22 moetsi::ssp::iPhoneReaderImpl Class Reference

Collaboration diagram for moetsi::ssp::iPhoneReaderImpl:



Public Attributes

- ARSession * **session**
- SessionDelegate * **delegate**
- unsigned int **fps**
- std::shared_ptr< FrameStruct > **image**
- std::shared_ptr< FrameStruct > **depth**
- std::shared_ptr< FrameStruct > **confidence**

The documentation for this class was generated from the following file:

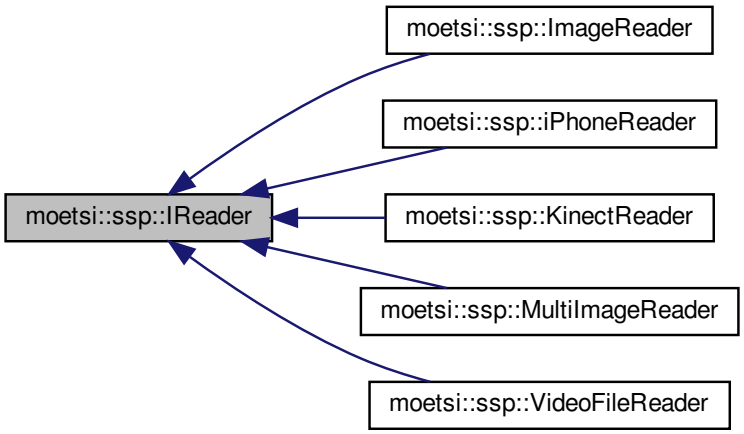
- iphone_reader.mm

8.23 moetsi::ssp::IReader Class Reference

SSP reader interface - abstract class.

`#include <ireader.h>`

Inheritance diagram for moetsi::ssp::IReader:



Public Member Functions

- virtual ~IReader ()
  Destructor.
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()=0
  Get current frame data.
- virtual std::vector< FrameType > GetType ()=0
  Get frame types.
- virtual bool HasNextFrame ()=0
  Check if there is a next frame.
- virtual void NextFrame ()=0
  Go to next frame.
- virtual void Reset ()=0
  Reset this reader.
- virtual void GoToFrame (unsigned int frame_id)=0
  Go to a given frame.
- virtual unsigned int GetCurrentFrameId ()=0
  Get current frame number.
- virtual unsigned int GetFps ()=0
  Get indicative FPS in frame per second.
- virtual ~IReader ()
  Destructor.
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()=0

Get current frame data.

- virtual std::vector< FrameType > GetType ()=0

  Get frame types.

- virtual bool HasNextFrame ()=0

  Check if there is a next frame.

- virtual void NextFrame ()=0

  Go to next frame.

- virtual void Reset ()=0

  Reset this reader.

- virtual void GoToFrame (unsigned int frame_id)=0

  Go to a given frame.

- virtual unsigned int GetCurrentFrameId ()=0

  Get current frame number.

- virtual unsigned int GetFps ()=0

  Get indicative FPS in frame per second.

8.23.1 Detailed Description

SSP reader interface - abstract class.

8.23.2 Member Function Documentation

8.23.2.1 GetCurrentFrameId() [1/2]

```
virtual unsigned int moetsi::ssp::IReader::GetCurrentFrameId ( )  [pure virtual]
```

Get current frame number.

Returns

current frame number.

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.2 GetCurrentFrameId() [2/2]

```
virtual unsigned int moetsi::ssp::IReader::GetCurrentFrameId ( )  [pure virtual]
```

Get current frame number.

Returns

current frame number.

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.3 GetFps() [1/2]

```
virtual unsigned int moetsi::ssp::IReader::GetFps ( )  [pure virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.4 GetFps() [2/2]

```
virtual unsigned int moetsi::ssp::IReader::GetFps ( )  [pure virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.5 GetType() [1/2]

```
virtual std::vector<FrameType> moetsi::ssp::IReader::GetType ( )  [pure virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.6 GetType() [2/2]

```
virtual std::vector<FrameType> moetsi::ssp::IReader::GetType ( )  [pure virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.7 GoToFrame() [1/2]

```
virtual void moetsi::ssp::IReader::GoToFrame (
            unsigned int frame_id )  [pure virtual]
```

Go to a given frame.

Parameters

frame↩ _id	target frame number

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi↩ ::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.8 GoToFrame() [2/2]

```
virtual void moetsi::ssp::IReader::GoToFrame (
            unsigned int frame_id )  [pure virtual]
```

Go to a given frame.

Parameters

frame↩ _id	target frame number

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi↩ ::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.9 HasNextFrame() [1/2]

```
virtual bool moetsi::ssp::IReader::HasNextFrame ( )  [pure virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi↩ ::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

8.23.2.10 HasNextFrame() [2/2]

```
virtual bool moetsi::ssp::IReader::HasNextFrame ( )  [pure virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

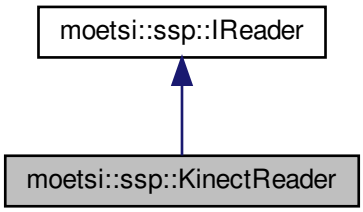
Implemented in moetsi::ssp::KinectReader, moetsi::ssp::VideoFileReader, moetsi::ssp::ImageReader, moetsi↩ ::ssp::MultiImageReader, and moetsi::ssp::iPhoneReader.

The documentation for this class was generated from the following file:

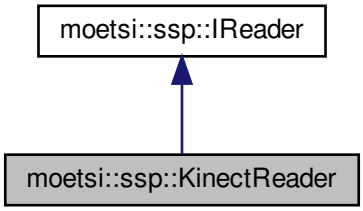
- include/readers/ireader.h

8.24 moetsi::ssp::KinectReader Class Reference

Inheritance diagram for moetsi::ssp::KinectReader:



Collaboration diagram for moetsi::ssp::KinectReader:



Public Member Functions

- **KinectReader** (uint8_t device_index, ExtendedAzureConfig device_config)
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()
  Get current frame data.
- virtual std::vector< FrameType > GetType ()
  Get frame types.
- virtual bool HasNextFrame ()
  Check if there is a next frame.
- virtual void NextFrame ()
  Go to next frame.
- virtual void Reset ()
  Reset this reader.
- virtual void GoToFrame (unsigned int frame_id)
  Go to a given frame.
- virtual unsigned int GetCurrentFrameId ()
  Get current frame number.
- virtual unsigned int GetFps ()
  Get indicative FPS in frame per second.

8.24.1 Member Function Documentation

8.24.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::KinectReader::GetCurrentFrameId ( )  [virtual]
```

Get current frame number.

Returns

current frame number.

Implements moetsi::ssp::IReader.

8.24.1.2 GetFps()

```
unsigned int moetsi::ssp::KinectReader::GetFps ( )  [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements moetsi::ssp::IReader.

8.24.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::KinectReader::GetType ( )  [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements moetsi::ssp::IReader.

8.24.1.4 GoToFrame()

```
void moetsi::ssp::KinectReader::GoToFrame (
            unsigned int frame_id )  [virtual]
```

Go to a given frame.

Parameters

frame↩ _id	target frame number

Implements moetsi::ssp::IReader.

8.24.1.5 HasNextFrame()

```
bool moetsi::ssp::KinectReader::HasNextFrame ( )  [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements moetsi::ssp::IReader.

The documentation for this class was generated from the following files:

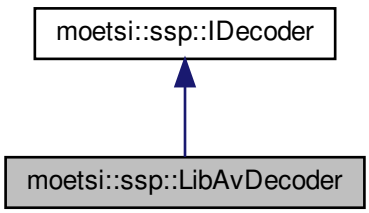
- kinect_reader.h
- kinect_reader.cc

8.25 moetsi::ssp::LibAvDecoder Class Reference

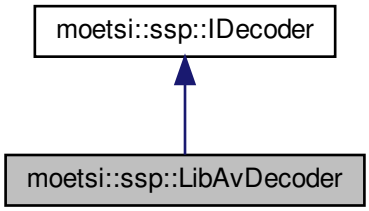
AV (Jpeg/Mpeg) decoder.

```
#include <libav_decoder.h>
```

Inheritance diagram for moetsi::ssp::LibAvDecoder:



Collaboration diagram for moetsi::ssp::LibAvDecoder:



Public Member Functions

- LibAvDecoder ()
  constructor
- ~LibAvDecoder ()
  destructor
- void Init (AVCodecParameters *codec_parameters)
  Initialize.
- cv::Mat Decode (FrameStruct &frame_struct)
  Extract an opencv image from a FrameStruct.
- AVFrameSharedP DecodeFrame (FrameStruct &frame_struct)
  Decode frame to libav AVFrame structure.

8.25.1 Detailed Description

AV (Jpeg/Mpeg) decoder.

8.25.2 Member Function Documentation

8.25.2.1 Decode()

```
cv::Mat moetsi::ssp::LibAvDecoder::Decode (
            FrameStruct & frame_struct ) [virtual]
```

Extract an opencv image from a FrameStruct.

Parameters

data	FrameStruct

Returns

OpenCV matrix/image

Implements moetsi::ssp::IDecoder.

8.25.2.2 DecodeFrame()

```
AVFrameSharedP moetsi::ssp::LibAvDecoder::DecodeFrame (
            FrameStruct & frame_struct )
```

Decode frame to libav AVFrame structure.

Parameters

frame_struct	SSP FrameStruct

Returns

Libav AVFrame structure

8.25.2.3 Init()

```
void moetsi::ssp::LibAvDecoder::Init (
            AVCodecParameters * codec_parameters )
```

Initialize.

Parameters

codec_parameters	parameters

The documentation for this class was generated from the following files:

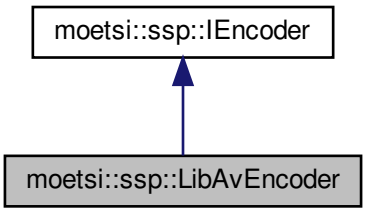
- libav_decoder.h
- libav_decoder.cc

8.26 moetsi::ssp::LibAvEncoder Class Reference

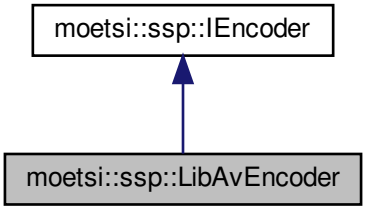
LibAV encoder for Jpeg/Mpeg.

```
#include <libav_encoder.h>
```

Inheritance diagram for moetsi::ssp::LibAvEncoder:



Collaboration diagram for moetsi::ssp::LibAvEncoder:



Public Member Functions

- LibAvEncoder (std::string codec_parameters_file, unsigned int fps)
  Constructor.
- LibAvEncoder (YAML::Node &_codec_parameters, unsigned int fps)
  Constructor.
- virtual ~LibAvEncoder ()
  Destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)
  Add a frame struct.
- virtual void NextPacket ()
  Go to next packet.
- virtual bool HasNextPacket ()
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()
  Get current encoded frame.
- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()
  Get current frame in its original format.
- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()
  Get codec parameters.
- virtual unsigned int GetFps ()
  Get FPS.

8.26.1 Detailed Description

LibAV encoder for Jpeg/Mpeg.

8.26.2 Constructor & Destructor Documentation

8.26.2.1 LibAvEncoder() [1/2]

```
moetsi::ssp::LibAvEncoder::LibAvEncoder (
            std::string codec_parameters_file,
            unsigned int fps )
```

Constructor.

Parameters

codec_parameters_file	File with codec parameters
fps	Frame per second

8.26.2.2 LibAvEncoder() [2/2]

```
moetsi::ssp::LibAvEncoder::LibAvEncoder (
            YAML::Node & _codec_parameters,
            unsigned int fps )
```

Constructor.

Parameters

_codec_parameters	Yaml codec parameters
fps	Frame per second

8.26.3 Member Function Documentation

8.26.3.1 AddFrameStruct()

```
void moetsi::ssp::LibAvEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct )  [virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implements moetsi::ssp::IEncoder.

8.26.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::LibAvEncoder::CurrentFrameEncoded ( )  [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements moetsi::ssp::IEncoder.

8.26.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::LibAvEncoder::CurrentFrameOriginal ( )  [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements moetsi::ssp::IEncoder.

8.26.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::LibAvEncoder::GetCodecParamsStruct ( )
[virtual]
```

Get codec parameters.

Returns

codec parameters

Implements moetsi::ssp::IEncoder.

8.26.3.5 GetFps()

```
unsigned int moetsi::ssp::LibAvEncoder::GetFps ( )  [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements moetsi::ssp::IEncoder.

8.26.3.6 HasNextPacket()

```
bool moetsi::ssp::LibAvEncoder::HasNextPacket ( )  [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

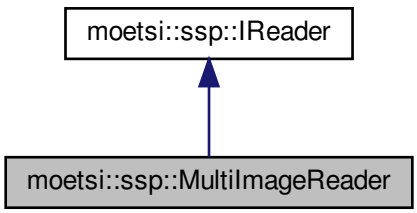
Implements moetsi::ssp::IEncoder.

The documentation for this class was generated from the following files:

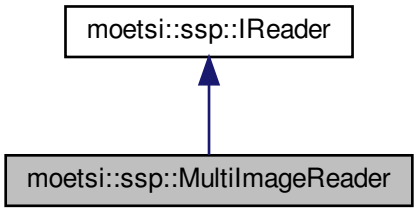
- libav_encoder.h
- libav_encoder.cc

8.27 moetsi::ssp::MultiImageReader Class Reference

Inheritance diagram for moetsi::ssp::MultiImageReader:



Collaboration diagram for moetsi::ssp::MultiImageReader:



Public Member Functions

- **MultiImageReader** (std::vector< std::string > filename)
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()
  Get current frame data.
- virtual std::vector< FrameType > GetType ()
  Get frame types.
- virtual bool HasNextFrame ()
  Check if there is a next frame.
- virtual void NextFrame ()
  Go to next frame.
- virtual void Reset ()
  Reset this reader.
- virtual void GoToFrame (unsigned int frame_id)
  Go to a given frame.
- virtual unsigned int GetCurrentFrameId ()
  Get current frame number.
- virtual unsigned int GetFps ()
  Get indicative FPS in frame per second.

8.27.1 Member Function Documentation

8.27.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::MultiImageReader::GetCurrentFrameId ( )  [virtual]
```

Get current frame number.

Returns

current frame number.

Implements moetsi::ssp::IReader.

8.27.1.2 GetFps()

```
unsigned int moetsi::ssp::MultiImageReader::GetFps ( )  [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements moetsi::ssp::IReader.

8.27.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::MultiImageReader::GetType ( )  [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements moetsi::ssp::IReader.

8.27.1.4 GoToFrame()

```
void moetsi::ssp::MultiImageReader::GoToFrame (
            unsigned int frame_id )  [virtual]
```

Go to a given frame.

Parameters

frame_id	target frame number

Implements moetsi::ssp::IReader.

8.27.1.5 HasNextFrame()

```
bool moetsi::ssp::MultiImageReader::HasNextFrame ( )  [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements moetsi::ssp::IReader.

The documentation for this class was generated from the following files:

- multi_image_reader.h
- multi_image_reader.cc

8.28 moetsi::ssp::NetworkReader Class Reference

Network reader.

`#include <network_reader.h>`

Public Member Functions

- **NetworkReader** (int port)
- void **init** ()
- bool **HasNextFrame** ()
- void **NextFrame** ()
- std::vector< FrameStruct > **GetCurrentFrame** ()
- unsigned int **GetCurrentFrameId** ()

8.28.1 Detailed Description

Network reader.

The documentation for this class was generated from the following files:

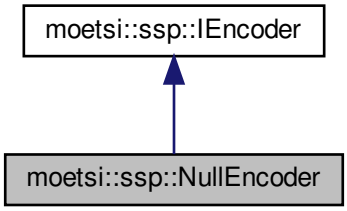
- network_reader.h
- network_reader.cc

8.29 moetsi::ssp::NullEncoder Class Reference

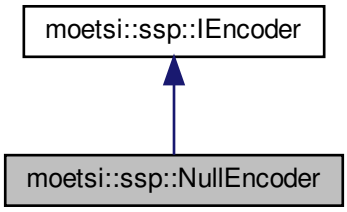
Nullencoder Straight pipe encoder.

`#include <null_encoder.h>`

Inheritance diagram for moetsi::ssp::NullEncoder:



Collaboration diagram for moetsi::ssp::NullEncoder:



Public Member Functions

- NullEncoder (int _fps)
  Constructor.
- virtual ~NullEncoder ()
  Destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)
  Add a frame struct.
- virtual void NextPacket ()
  Go to next packet.
- virtual bool HasNextPacket ()
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()

Get current encoded frame.

- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()

  Get current frame in its original format.

- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()

  Get codec parameters.

- virtual unsigned int GetFps ()

  Get FPS.

8.29.1 Detailed Description

Nullencoder Straight pipe encoder.

8.29.2 Constructor & Destructor Documentation

8.29.2.1 NullEncoder()

```
moetsi::ssp::NullEncoder::NullEncoder (
            int _fps )
```

Constructor.

Parameters

_fps	frame per seconds

8.29.3 Member Function Documentation

8.29.3.1 AddFrameStruct()

```
void moetsi::ssp::NullEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct ) [virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implements moetsi::ssp::IEncoder.

8.29.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NullEncoder::CurrentFrameEncoded ( )  [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements moetsi::ssp::IEncoder.

8.29.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NullEncoder::CurrentFrameOriginal ( )  [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements moetsi::ssp::IEncoder.

8.29.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::NullEncoder::GetCodecParamsStruct ( )  [virtual]
```

Get codec parameters.

Returns

codec parameters

Implements moetsi::ssp::IEncoder.

8.29.3.5 GetFps()

```
unsigned int moetsi::ssp::NullEncoder::GetFps ( )  [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements moetsi::ssp::IEncoder.

8.29.3.6 HasNextPacket()

```
bool moetsi::ssp::NullEncoder::HasNextPacket ( )  [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements moetsi::ssp::IEncoder.

The documentation for this class was generated from the following files:

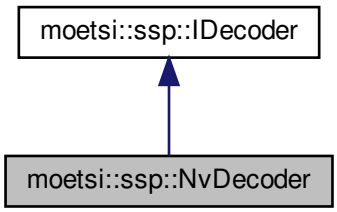
- null_encoder.h
- null_encoder.cc

8.30 moetsi::ssp::NvDecoder Class Reference

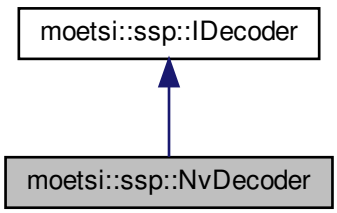
NvPipe decoder.

```
#include <nv_decoder.h>
```

Inheritance diagram for moetsi::ssp::NvDecoder:



Collaboration diagram for moetsi::ssp::NvDecoder:



Public Member Functions

- NvDecoder ()
  Constructor.
- ~NvDecoder ()
  Destructor.
- void Init (std::vector< unsigned char > parameter_data)
  Initialize.
- cv::Mat Decode (FrameStruct &frame)
  Extract an opencv image from a FrameStruct.

8.30.1 Detailed Description

NvPipe decoder.

8.30.2 Member Function Documentation

8.30.2.1 Decode()

```
cv::Mat moetsi::ssp::NvDecoder::Decode (
            FrameStruct & frame )  [virtual]
```

Extract an opencv image from a FrameStruct.

Parameters

data	FrameStruct

Returns

OpenCV matrix/image

Implements moetsi::ssp::IDecoder.

8.30.2.2 Init()

```
void moetsi::ssp::NvDecoder::Init (
            std::vector< unsigned char > parameter_data )
```

Initialize.

Parameters

parameter_data	parameters

The documentation for this class was generated from the following files:

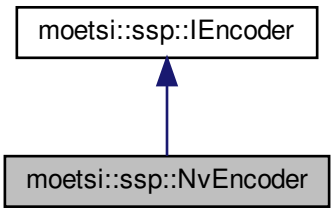
- nv_decoder.h
- nv_decoder.cc

8.31 moetsi::ssp::NvEncoder Class Reference

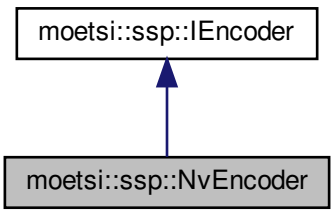
NvPipe encoder.

`#include <nv_encoder.h>`

Inheritance diagram for moetsi::ssp::NvEncoder:



Collaboration diagram for moetsi::ssp::NvEncoder:



Public Member Functions

- NvEncoder (YAML::Node _codec_parameters, unsigned int _fps)
  Constructor.
- ~NvEncoder ()
  Destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)=0
  Add a frame struct.
- virtual void NextPacket ()
  Go to next packet.
- virtual bool HasNextPacket ()
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()
  Get current encoded frame.
- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()
  Get current frame in its original format.
- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()
  Get codec parameters.
- virtual unsigned int GetFps ()
  Get FPS.

8.31.1 Detailed Description

NvPipe encoder.

8.31.2 Constructor & Destructor Documentation

8.31.2.1 NvEncoder()

```
moetsi::ssp::NvEncoder::NvEncoder (
            YAML::Node _codec_parameters,
            unsigned int _fps )
```

Constructor.

Parameters

_codec_parameters	Yaml parameters
_fps	Frame per second

8.31.3 Member Function Documentation

8.31.3.1 AddFrameStruct()

```
void moetsi::ssp::NvEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implements moetsi::ssp::IEncoder.

8.31.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NvEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements moetsi::ssp::IEncoder.

8.31.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NvEncoder::CurrentFrameOriginal ( ) [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements moetsi::ssp::IEncoder.

8.31.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::NvEncoder::GetCodecParamsStruct ( ) [virtual]
```

Get codec parameters.

Returns

codec parameters

Implements moetsi::ssp::IEncoder.

8.31.3.5 GetFps()

```
unsigned int moetsi::ssp::NvEncoder::GetFps ( )  [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements moetsi::ssp::IEncoder.

8.31.3.6 HasNextPacket()

```
bool moetsi::ssp::NvEncoder::HasNextPacket ( )  [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements moetsi::ssp::IEncoder.

The documentation for this class was generated from the following files:

- nv_encoder.h
- nv_encoder.cc

8.32 moetsi::ssp::NVPipeDeleter Struct Reference

Public Member Functions

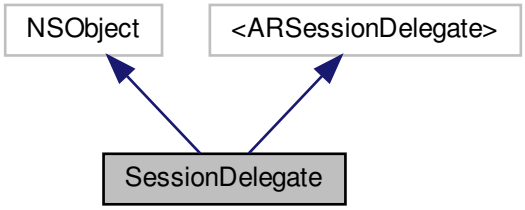
- void **operator()** (NvPipe *ptr) const

The documentation for this struct was generated from the following file:

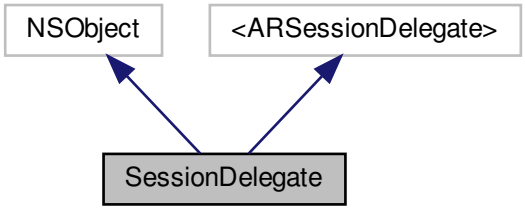
- nvpipe_types.h

8.33 SessionDelegate Class Reference

Inheritance diagram for SessionDelegate:



Collaboration diagram for SessionDelegate:



Public Attributes

- semaphore_t **_semaphore**
- pthread_mutex_t **_mutex**
- CVPixelBufferRef **_pixelBuffer**
- CVPixelBufferRef **_depthBuffer**
- CVPixelBufferRef **_confidenceBuffer**
- unsigned long **_timestamp**

The documentation for this class was generated from the following file:

- iphone_reader.mm

8.34 moetsi::ssp::SwsContextDeleter Struct Reference

Public Member Functions

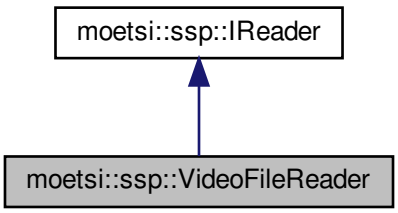
- void **operator()** (SwsContext ∗ptr) const

The documentation for this struct was generated from the following file:

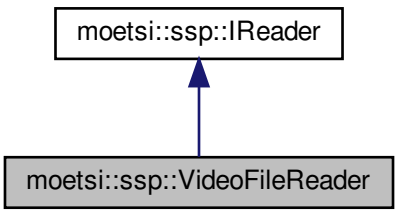
- libav_types.h

8.35 moetsi::ssp::VideoFileReader Class Reference

Inheritance diagram for moetsi::ssp::VideoFileReader:



Collaboration diagram for moetsi::ssp::VideoFileReader:



Public Member Functions

- **VideoFileReader** (std::string &filename)
- **VideoFileReader** (std::string &filename, std::vector< unsigned int > &video_stream_indexes)
- virtual std::vector< std::shared_ptr< FrameStruct > > GetCurrentFrame ()

  Get current frame data.
- virtual std::vector< FrameType > GetType ()

  Get frame types.
- virtual bool HasNextFrame ()

  Check if there is a next frame.
- virtual void NextFrame ()

  Go to next frame.
- virtual void Reset ()

  Reset this reader.
- virtual void GoToFrame (unsigned int frame_id)

  Go to a given frame.
- virtual unsigned int GetCurrentFrameId ()

  Get current frame number.
- virtual unsigned int GetFps ()

  Get indicative FPS in frame per second.

8.35.1 Member Function Documentation

8.35.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::VideoFileReader::GetCurrentFrameId ( )  [virtual]
```

Get current frame number.

Returns

current frame number.

Implements moetsi::ssp::IReader.

8.35.1.2 GetFps()

```
unsigned int moetsi::ssp::VideoFileReader::GetFps ( )  [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements moetsi::ssp::IReader.

8.35.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::VideoFileReader::GetType ( )  [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements moetsi::ssp::IReader.

8.35.1.4 GoToFrame()

```
void moetsi::ssp::VideoFileReader::GoToFrame (
            unsigned int frame_id )  [virtual]
```

Go to a given frame.

Parameters

frame_id	target frame number

Implements moetsi::ssp::IReader.

8.35.1.5 HasNextFrame()

```
bool moetsi::ssp::VideoFileReader::HasNextFrame ( )  [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements moetsi::ssp::IReader.

The documentation for this class was generated from the following files:

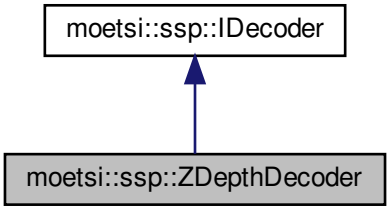
- video_file_reader.h
- video_file_reader.cc

8.36 moetsi::ssp::ZDepthDecoder Class Reference

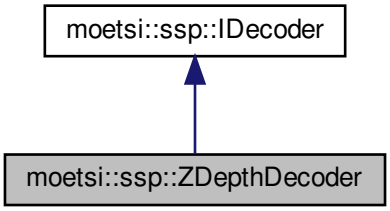
ZDepthDecoder ZDepth format decoder.

`#include <zdepth_decoder.h>`

Inheritance diagram for moetsi::ssp::ZDepthDecoder:



Collaboration diagram for moetsi::ssp::ZDepthDecoder:



Public Member Functions

- ZDepthDecoder ()
  Constructor.
- ~ZDepthDecoder ()
  Destructor.
- void Init (std::vector< unsigned char > parameter_data)
  Initialize.
- cv::Mat Decode (FrameStruct &frame)
  Extract an opencv image from a FrameStruct.

8.36.1 Detailed Description

ZDepthDecoder ZDepth format decoder.

8.36.2 Member Function Documentation

8.36.2.1 Decode()

```
cv::Mat moetsi::ssp::ZDepthDecoder::Decode (
            FrameStruct & frame )  [virtual]
```

Extract an opencv image from a FrameStruct.

Parameters

data	FrameStruct

Returns

OpenCV matrix/image

Implements moetsi::ssp::IDecoder.

8.36.2.2 Init()

```
void moetsi::ssp::ZDepthDecoder::Init (
            std::vector< unsigned char > parameter_data )
```

Initialize.

Parameters

parameter_data	parameters

The documentation for this class was generated from the following files:

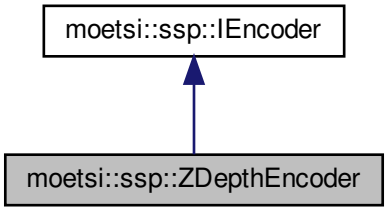
- zdepth_decoder.h
- zdepth_decoder.cc

8.37 moetsi::ssp::ZDepthEncoder Class Reference

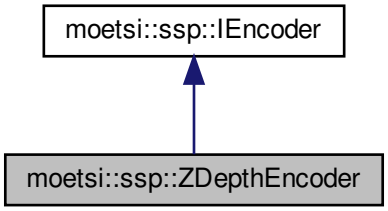
ZDepth encoder.

```
#include <zdepth_encoder.h>
```

Inheritance diagram for moetsi::ssp::ZDepthEncoder:



Collaboration diagram for moetsi::ssp::ZDepthEncoder:



Public Member Functions

- ZDepthEncoder (YAML::Node &_codec_parameters, int _fps)
  Constructor.
- ~ZDepthEncoder ()
  Destructor.
- virtual void AddFrameStruct (std::shared_ptr< FrameStruct > &frame_struct)
  Add a frame struct.
- virtual void NextPacket ()
  Go to next packet.
- virtual bool HasNextPacket ()
  Check if there is a next packet.
- virtual std::shared_ptr< FrameStruct > CurrentFrameEncoded ()
  Get current encoded frame.
- virtual std::shared_ptr< FrameStruct > CurrentFrameOriginal ()
  Get current frame in its original format.
- virtual std::shared_ptr< CodecParamsStruct > GetCodecParamsStruct ()
  Get codec parameters.
- virtual unsigned int GetFps ()
  Get FPS.

8.37.1 Detailed Description

ZDepth encoder.

8.37.2 Constructor & Destructor Documentation

8.37.2.1 ZDepthEncoder()

```
moetsi::ssp::ZDepthEncoder::ZDepthEncoder (
            YAML::Node & _codec_parameters,
            int _fps )
```

Constructor.

Parameters

_codec_parameters	
_fps	Frame per second

8.37.3 Member Function Documentation

8.37.3.1 AddFrameStruct()

```
void moetsi::ssp::ZDepthEncoder::AddFrameStruct (
            std::shared_ptr< FrameStruct > & frame_struct ) [virtual]
```

Add a frame struct.

Parameters

frame_struct	FrameStruct to add

Implements moetsi::ssp::IEncoder.

8.37.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::ZDepthEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements moetsi::ssp::IEncoder.

8.37.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::ZDepthEncoder::CurrentFrameOriginal ( )  [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements moetsi::ssp::IEncoder.

8.37.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::ZDepthEncoder::GetCodecParamsStruct ( )
[virtual]
```

Get codec parameters.

Returns

codec parameters

Implements moetsi::ssp::IEncoder.

8.37.3.5 GetFps()

```
unsigned int moetsi::ssp::ZDepthEncoder::GetFps ( )  [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements moetsi::ssp::IEncoder.

8.37.3.6 HasNextPacket()

```
bool moetsi::ssp::ZDepthEncoder::HasNextPacket ( )  [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements moetsi::ssp::IEncoder.

The documentation for this class was generated from the following files:

- zdepth_encoder.h
- zdepth_encoder.cc

Chapter 9

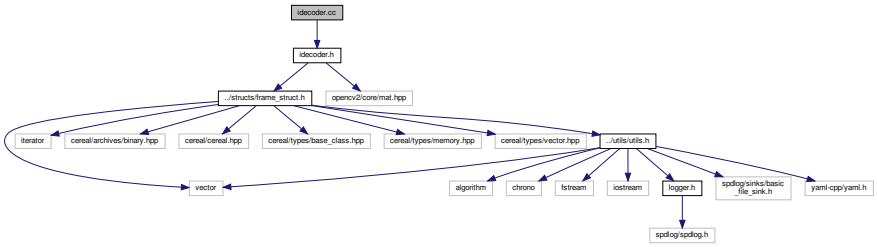
File Documentation

9.1 idecoder.cc File Reference

IDecoder factory.

```
#include "idecoder.h"
```

Include dependency graph for idecoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (const std::string &config)

  IDecoder factory.

9.1.1 Detailed Description

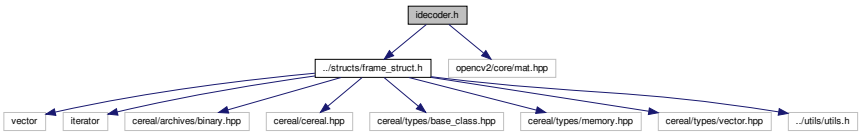
IDecoder factory.

9.2 idecoder.h File Reference

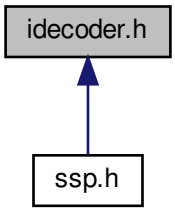
Frame decoder interface.

```
#include "../structs/frame_struct.h"
#include <opencv2/core/mat.hpp>
```

Include dependency graph for include/decoders/idecoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::IDecoder

  IDecoder abstract decoder interface.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (const std::string &config)

  IDecoder factory.

9.2.1 Detailed Description

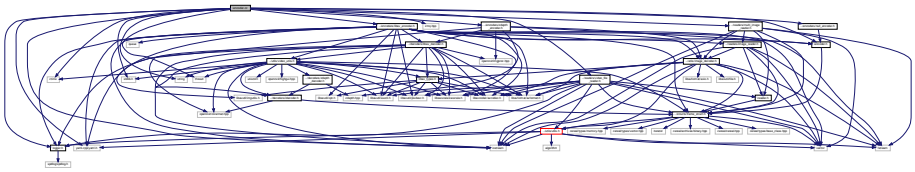
Frame decoder interface.

9.3 iencoder.cc File Reference

IEncoder factory.

```
#include "iencoder.h"
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
```

Include dependency graph for iencoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::shared_ptr< IEncoder > moetsi::ssp::IEncoderFactory (const std::string &config)

  IEncoder factory.

9.3.1 Detailed Description

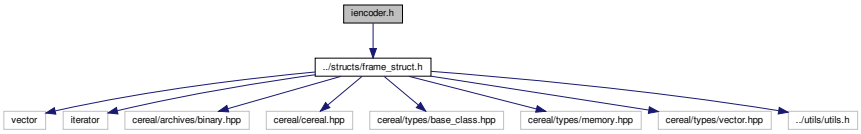
IEncoder factory.

9.4 iencoder.h File Reference

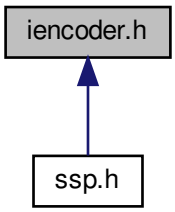
IEncoder factory.

```
#include "../structs/frame_struct.h"
```

Include dependency graph for include/encoders/iencoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::IEncoder

  IEncoder abstract encoder class.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::shared_ptr< IEncoder > moetsi::ssp::IEncoderFactory (const std::string &config)

  IEncoder factory.

9.4.1 Detailed Description

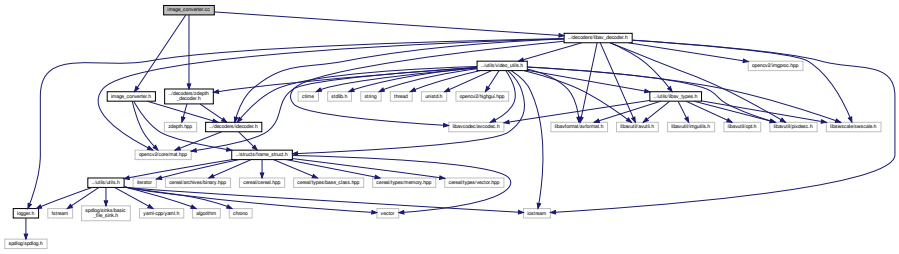
IEncoder factory.

9.5 image_converter.cc File Reference

Image converter from frame struct to opencv image.

```
#include "image_converter.h"
#include "../decoders/libav_decoder.h"
#include "../decoders/zdepth_decoder.h"
```

Include dependency graph for image_converter.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- bool moetsi::ssp::FrameStructToMat (FrameStruct &f, cv::Mat &img, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Convert frame struct to opencv matrix.

9.5.1 Detailed Description

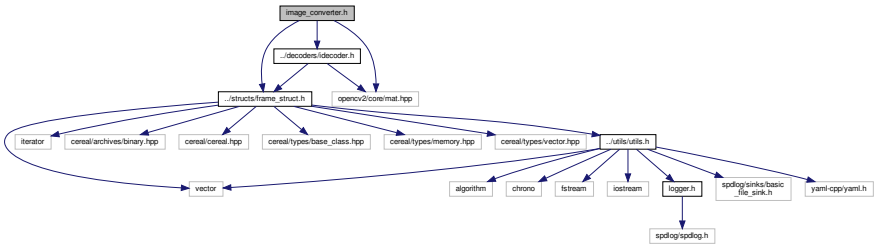
Image converter from frame struct to opencv image.

9.6 image_converter.h File Reference

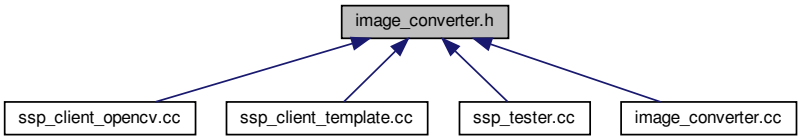
Image converter from frame struct to opencv.

```
#include "../decoders/idecoder.h"
#include "../structs/frame_struct.h"
#include <opencv2/core/mat.hpp>
```

Include dependency graph for image_converter.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- bool moetsi::ssp::FrameStructToMat (FrameStruct &f, cv::Mat &img, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Convert frame struct to opencv matrix.

9.6.1 Detailed Description

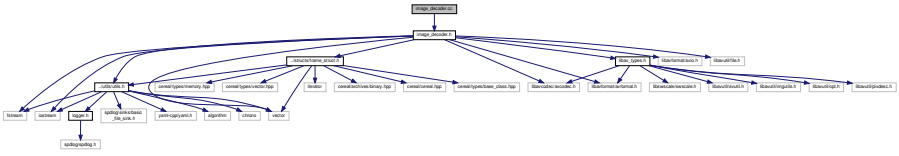
Image converter from frame struct to opencv.

9.7 image_decoder.cc File Reference

mpeg/jpeg image decoder

```
#include "image_decoder.h"
```

Include dependency graph for image_decoder.cc:



Classes

- struct moetsi::ssp::buffer_data

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.7.1 Detailed Description

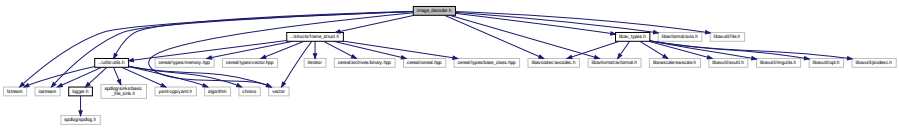
mpeg/jpeg image decoder

9.8 image_decoder.h File Reference

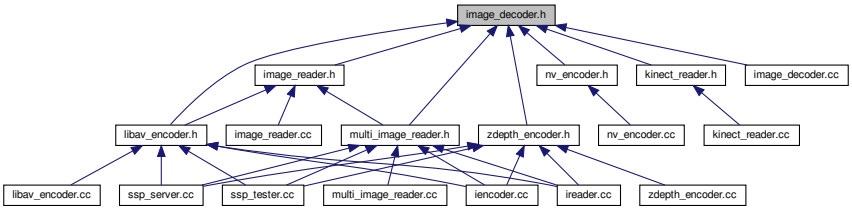
AV Image decoder.

```
#include <fstream>
#include <iostream>
#include <vector>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavformat/avio.h>
#include <libavutil/file.h>
#include "../structs/frame_struct.h"
#include "libav_types.h"
#include "utils.h"
```

Include dependency graph for image_decoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::ImageDecoder

  Decode image to AV frame.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.8.1 Detailed Description

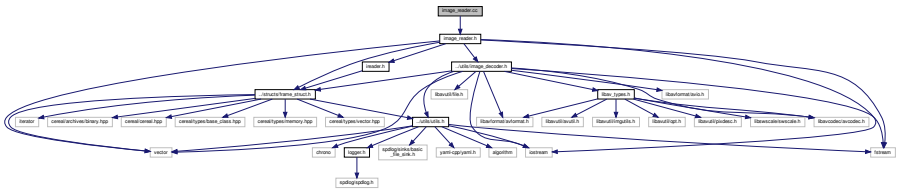
AV Image decoder.

9.9 image_reader.cc File Reference

Image reader.

```
#include "image_reader.h"
```

Include dependency graph for image_reader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.9.1 Detailed Description

Image reader.

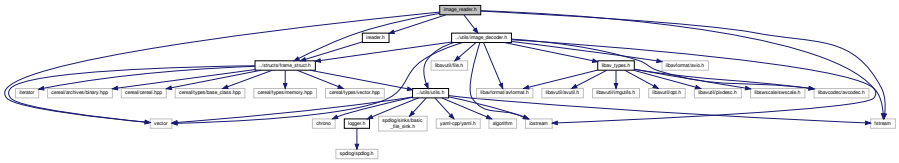
9.10 image_reader.h File Reference

Image reader.

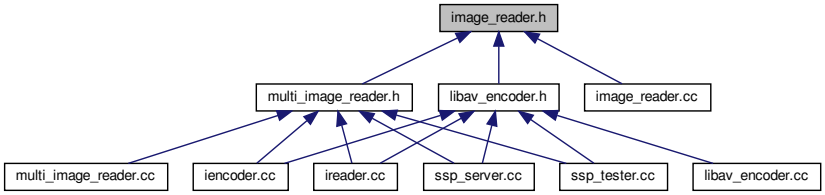
```
#include <fstream>
#include <iostream>
#include <vector>
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
```

```
#include "ireader.h"
```

Include dependency graph for image_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::ImageReader

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.10.1 Detailed Description

Image reader.

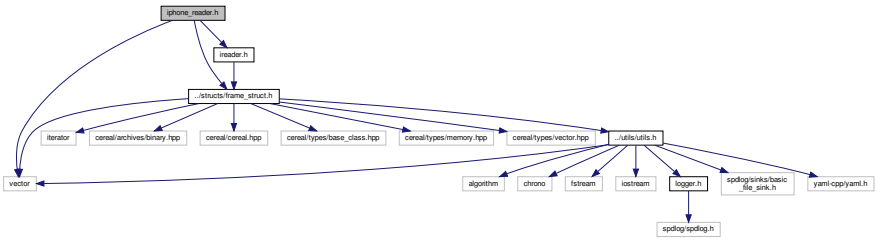
9.11 iphone_reader.h File Reference

iPhone driver

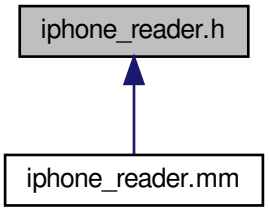
```
#include <vector>
#include "../structs/frame_struct.h"
```

```
#include "ireader.h"
```

Include dependency graph for iphone_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::iPhoneReader

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.11.1 Detailed Description

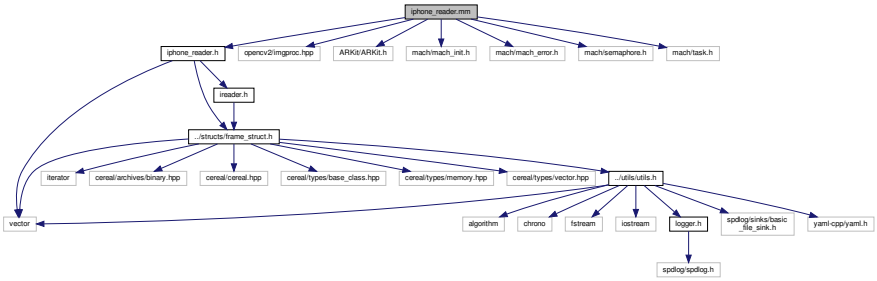
iPhone driver

9.12 iphone_reader.mm File Reference

iPhone driver

```
#include "iphone_reader.h"
#include <opencv2/imgproc.hpp>
#import <ARKit/ARKit.h>
#include <mach/mach_init.h>
#include <mach/mach_error.h>
#include <mach/semaphore.h>
#include <mach/task.h>
```

Include dependency graph for iphone_reader.mm:



Classes

- class SessionDelegate
- class moetsi::ssp::iPhoneReaderImpl

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.12.1 Detailed Description

iPhone driver

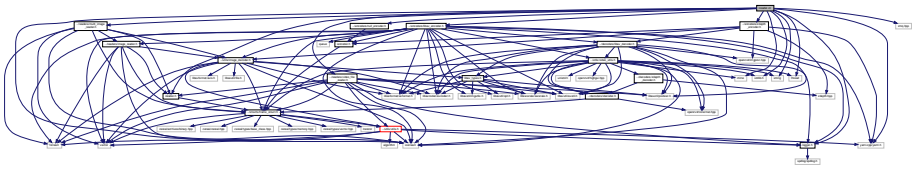
9.13 ireader.cc File Reference

IReader factory.

```
#include "ireader.h"
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
```

```
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
```

Include dependency graph for ireader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::shared_ptr< IReader > moetsi::ssp::IReaderFactory (const std::string &config)

  IReader factory.

9.13.1 Detailed Description

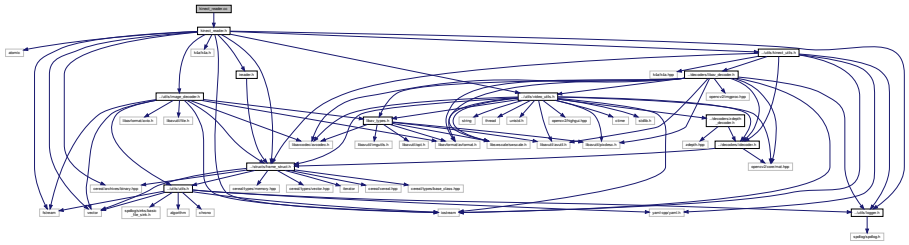
IReader factory.

9.14 kinect_reader.cc File Reference

Kinect driver.

```
#include "kinect_reader.h"
```

Include dependency graph for kinect_reader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- std::atomic_bool **moetsi::ssp::exiting** (false)

9.14.1 Detailed Description

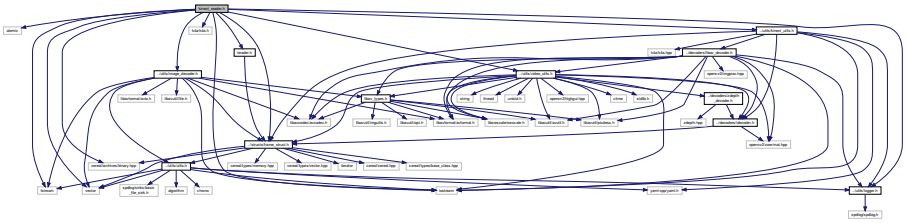
Kinect driver.

9.15 kinect_reader.h File Reference

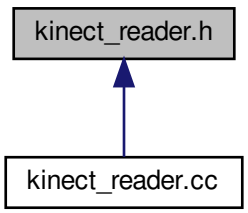
Kinect driver.

```
#include <atomic>
#include <fstream>
#include <iostream>
#include <vector>
#include "../utils/logger.h"
#include <k4a/k4a.h>
#include <cereal/archives/binary.hpp>
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "../utils/kinect_utils.h"
#include "../utils/video_utils.h"
#include "ireader.h"
```

Include dependency graph for kinect_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::KinectReader

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Macros

- #define **CHECK**(x, device)

Variables

- std::atomic_bool **moetsi::ssp::exiting**

9.15.1 Detailed Description

Kinect driver.

9.15.2 Macro Definition Documentation

9.15.2.1 CHECK

```
#define CHECK(
              x,
              device )
```

Value:

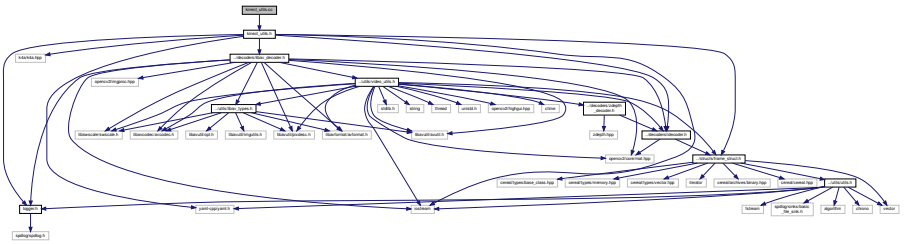
```
{                                                                                \
    auto retval = (x);                                                            \
    if (retval) {                                                                 \
      spdlog::error("\"Runtime error: {} returned {} ", #x, retval);              \
      k4a_device_close(device);                                                   \
      exit(1);                                                                    \
    }                                                                             \
  }
```

9.16 kinect_utils.cc File Reference

Utils for Kinect RT integration.

```
#include "kinect_utils.h"
```

Include dependency graph for kinect_utils.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- ExtendedAzureConfig moetsi::ssp::BuildKinectConfigFromYAML (YAML::Node config)

  Build Kinect configuration from YAML configuration.
- void moetsi::ssp::FrameStructToK4A (std::vector< FrameStruct > &f, k4a::capture &sensor_capture, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Transform frame structure to K4A format Update decoder dictionary.

9.16.1 Detailed Description

Utils for Kinect RT integration.

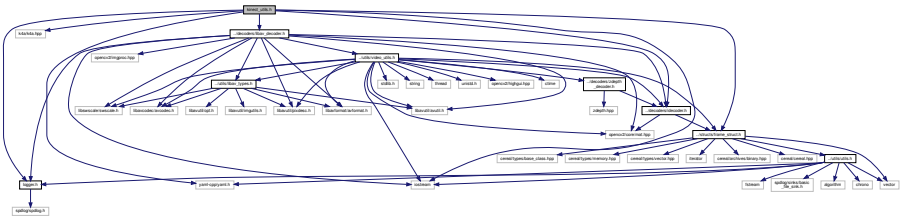
9.17 kinect_utils.h File Reference

Utils for Kinect RT integration.

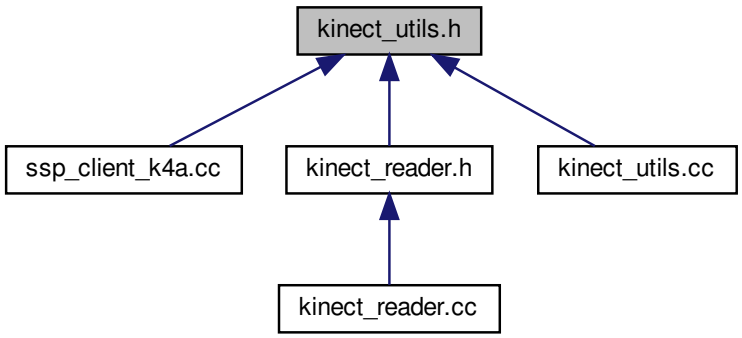
```
#include <iostream>
#include <k4a/k4a.hpp>
#include <yaml-cpp/yaml.h>
#include "../decoders/idecoder.h"
#include "../decoders/libav_decoder.h"
#include "../structs/frame_struct.h"
```

```
#include "logger.h"
```

Include dependency graph for kinect_utils.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct moetsi::ssp::ExtendedAzureConfig

  Azure Kinect configuration.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- ExtendedAzureConfig moetsi::ssp::BuildKinectConfigFromYAML (YAML::Node config)

  Build Kinect configuration from YAML configuration.
- void moetsi::ssp::FrameStructToK4A (std::vector< FrameStruct > &f, k4a::capture &sensor_capture, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)

  Transform frame structure to K4A format Update decoder dictionary.

9.17.1 Detailed Description

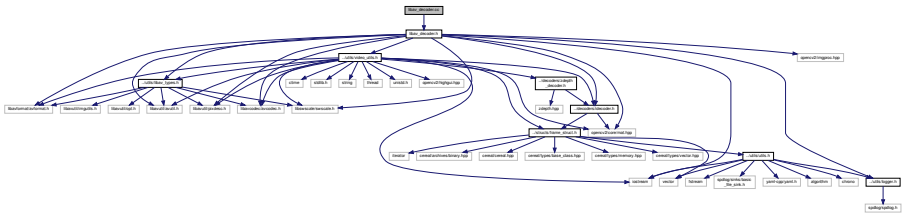
Utils for Kinect RT integration.

9.18 libav_decoder.cc File Reference

Jpeg/Mpeg decoder.

```
#include "libav_decoder.h"
```

Include dependency graph for libav_decoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.18.1 Detailed Description

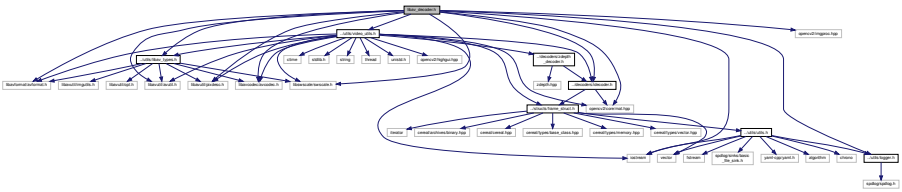
Jpeg/Mpeg decoder.

9.19 libav_decoder.h File Reference

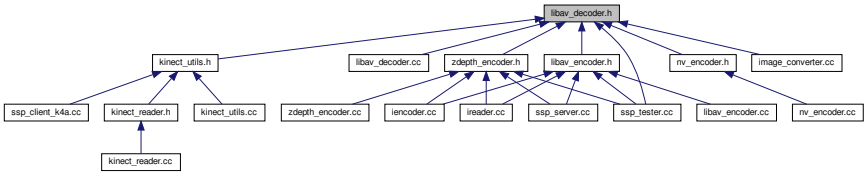
Jpeg/Mpeg decoder.

```
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include <iostream>
#include <opencv2/core/mat.hpp>
#include <opencv2/imgproc.hpp>
#include "../utils/video_utils.h"
#include "../utils/libav_types.h"
```

```
#include "idecoder.h"
```
Include dependency graph for libav_decoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::LibAvDecoder

  AV (Jpeg/Mpeg) decoder.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

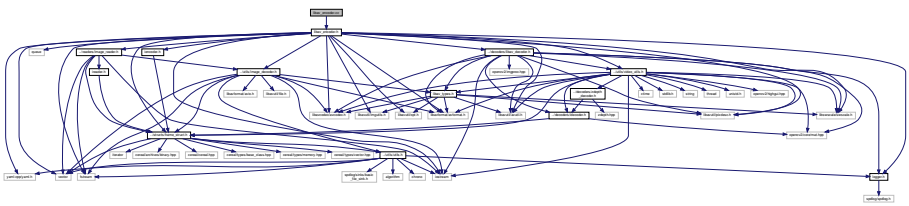
9.19.1 Detailed Description

Jpeg/Mpeg decoder.

9.20 libav_encoder.cc File Reference

Jpef/Mpeg encoder.

```
#include "libav_encoder.h"
```
Include dependency graph for libav_encoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.20.1 Detailed Description

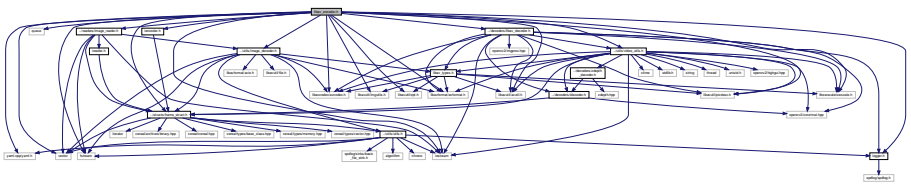
Jpef/Mpeg encoder.

9.21 libav_encoder.h File Reference

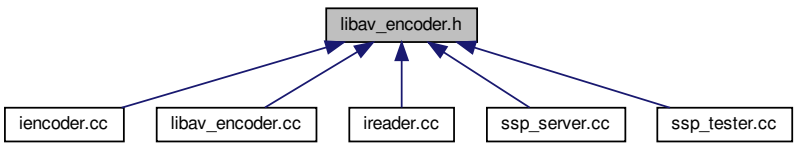
Jpeg/Mpeg encoder.

```
#include <fstream>
#include <iostream>
#include <queue>
#include <vector>
#include <yaml-cpp/yaml.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/imgutils.h>
#include <libavutil/opt.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../readers/image_reader.h"
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "../utils/video_utils.h"
#include "iencoder.h"
#include "../decoders/libav_decoder.h"
#include "../utils/logger.h"
```

Include dependency graph for libav_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::LibAvEncoder
  LibAV encoder for Jpeg/Mpeg.

Namespaces

- moetsi::ssp
  Sensor Stream Pipe.

9.21.1 Detailed Description

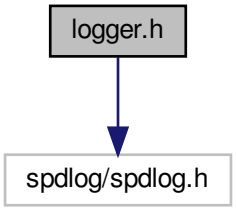
Jpeg/Mpeg encoder.

9.22 logger.h File Reference

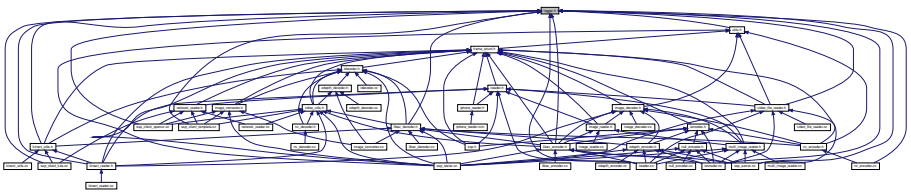
Logger header.

```
#include <spdlog/spdlog.h>
```

Include dependency graph for logger.h:



This graph shows which files directly or indirectly include this file:



9.22.1 Detailed Description

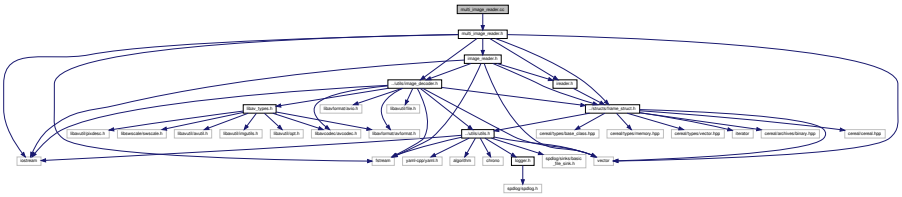
Logger header.

9.23 multi_image_reader.cc File Reference

Multi image reader.

```
#include "multi_image_reader.h"
```

Include dependency graph for multi_image_reader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.23.1 Detailed Description

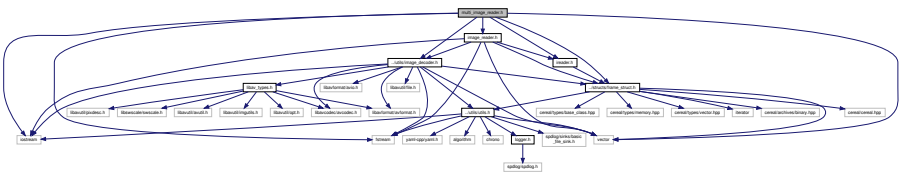
Multi image reader.

9.24 multi_image_reader.h File Reference

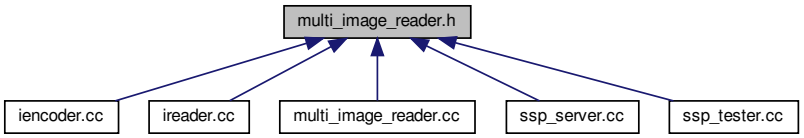
Multi image reader.

```
#include <fstream>
#include <iostream>
#include <vector>
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "image_reader.h"
#include "ireader.h"
```

Include dependency graph for multi_image_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::MultiImageReader

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.24.1 Detailed Description

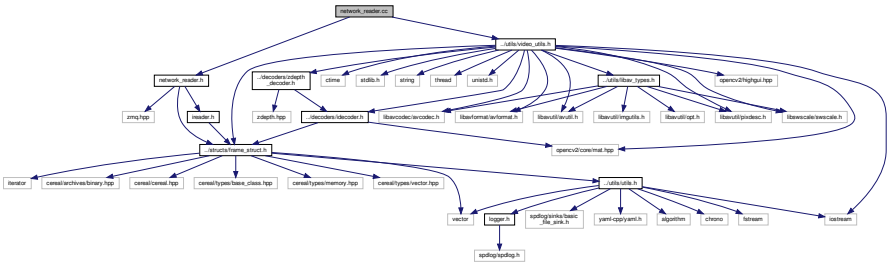
Multi image reader.

9.25 network_reader.cc File Reference

Network reader.

```
#include "network_reader.h"
#include "../utils/video_utils.h"
```

Include dependency graph for network_reader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- unsigned long **moetsi::ssp::elapsed** (unsigned long start, unsigned long end)

9.25.1 Detailed Description

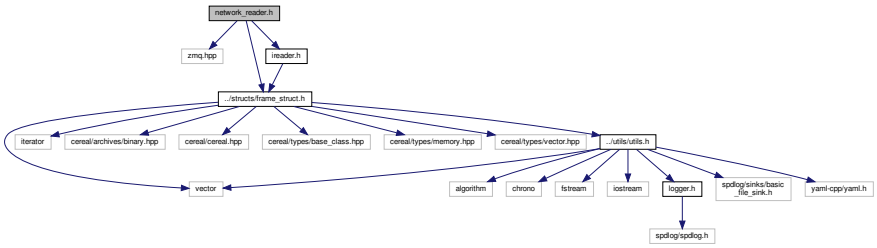
Network reader.

9.26 network_reader.h File Reference

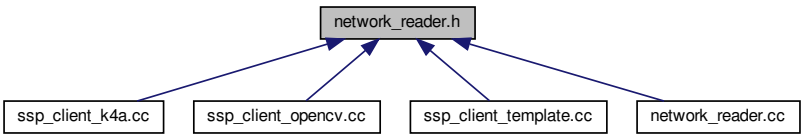
Network reader.

```
#include <zmq.hpp>
#include "../structs/frame_struct.h"
#include "ireader.h"
```

Include dependency graph for network_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::NetworkReader

  Network reader.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Macros

- #define **POLL_TIMEOUT_MS** 500

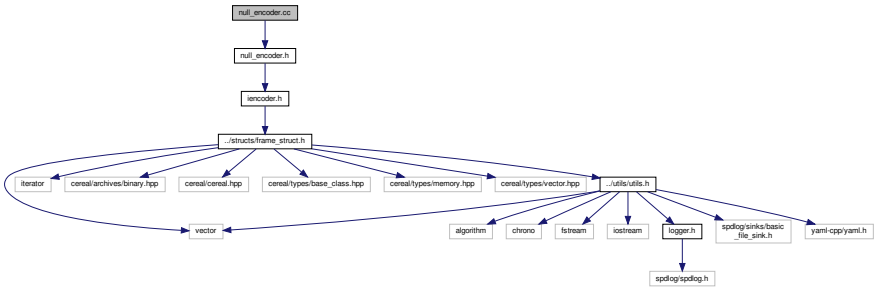
9.26.1 Detailed Description

Network reader.

9.27 null_encoder.cc File Reference

Straight pipe encoder.

```
#include "null_encoder.h"
```
Include dependency graph for null_encoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

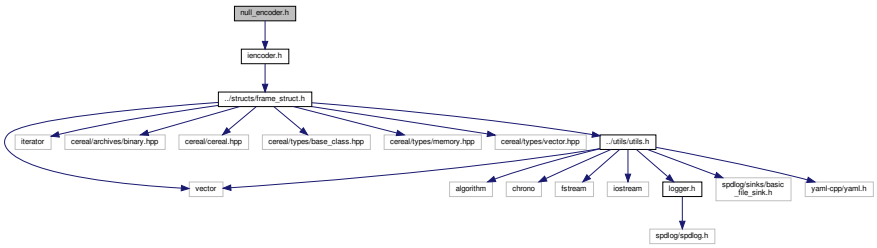
9.27.1 Detailed Description

Straight pipe encoder.

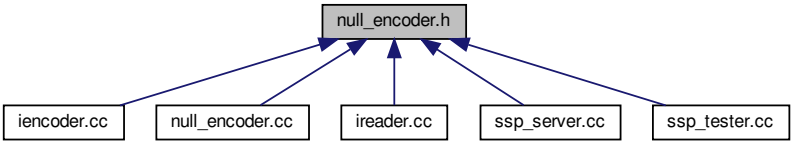
9.28 null_encoder.h File Reference

```
#include "iencoder.h"
```

Include dependency graph for null_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::NullEncoder

  Nullencoder Straight pipe encoder.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.28.1 Detailed Description

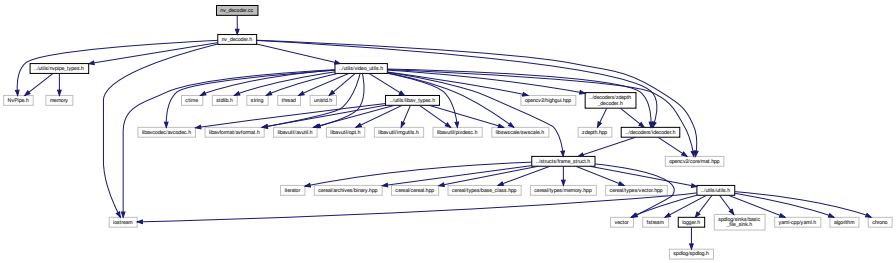
Straight pipe encoder

9.29 nv_decoder.cc File Reference

NvPipe decoder.

```
#include "nv_decoder.h"
```

Include dependency graph for nv_decoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.29.1 Detailed Description

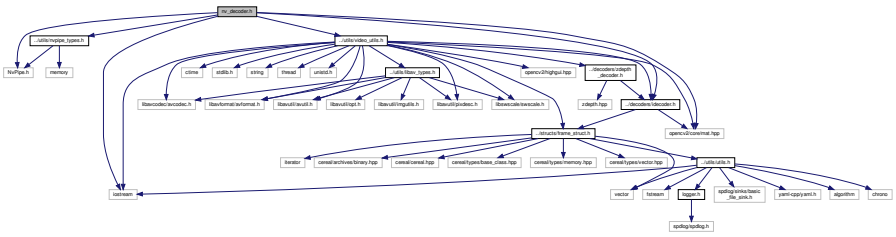
NvPipe decoder.

9.30 nv_decoder.h File Reference

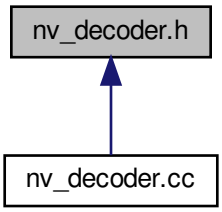
NvPipe decoder.

```
#include <NvPipe.h>
#include <iostream>
#include <opencv2/core/mat.hpp>
#include "../utils/nvpipe_types.h"
#include "../utils/video_utils.h"
#include "idecoder.h"
```

Include dependency graph for nv_decoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::NvDecoder

  NvPipe decoder.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.30.1 Detailed Description

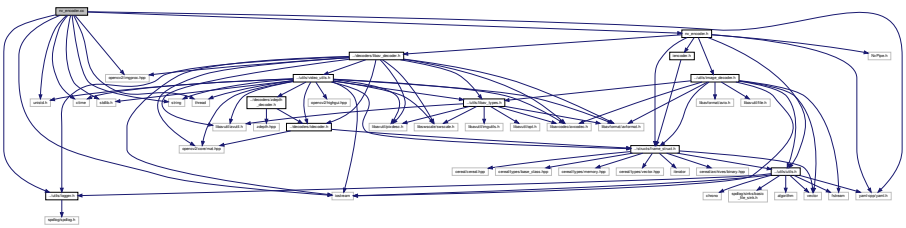
NvPipe decoder.

9.31 nv_encoder.cc File Reference

NvPipe encoder.

```
#include <unistd.h>
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <opencv2/imgproc.hpp>
#include <yaml-cpp/yaml.h>
#include "nv_encoder.h"
```

Include dependency graph for nv_encoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.31.1 Detailed Description

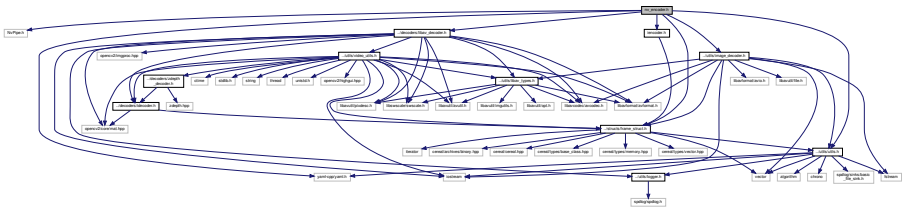
NvPipe encoder.

9.32 nv_encoder.h File Reference

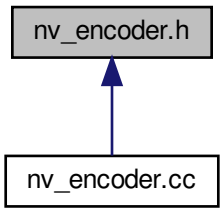
NvPipe encoder.

```
#include <NvPipe.h>
#include <yaml-cpp/yaml.h>
#include "../decoders/libav_decoder.h"
#include "../utils/image_decoder.h"
#include "iencoder.h"
#include "../structs/frame_struct.h"
#include "../utils/utils.h"
```

Include dependency graph for nv_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::NvEncoder

  NvPipe encoder.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.32.1 Detailed Description

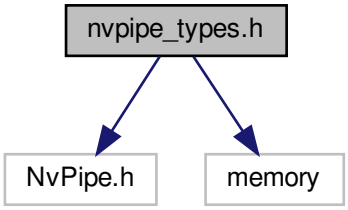
NvPipe encoder.

9.33 nvpipe_types.h File Reference

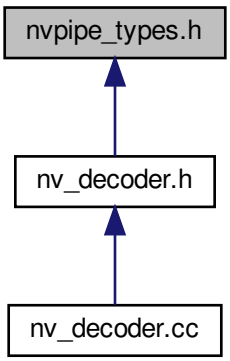
Types for NvPipe support.

```
#include <NvPipe.h>
#include <memory>
```

Include dependency graph for nvpipe_types.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct moetsi::ssp::NVPipeDeleter

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Typedefs

- typedef std::unique_ptr< NvPipe, NVPipeDeleter > **moetsi::ssp::NvPipeSafeP**

9.33.1 Detailed Description

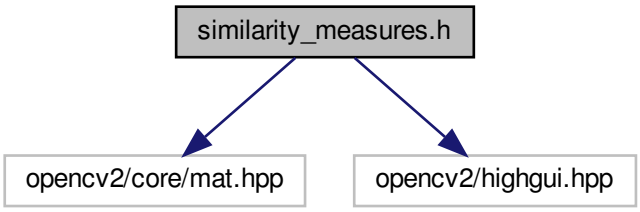
Types for NvPipe support.

9.34 similarity_measures.h File Reference

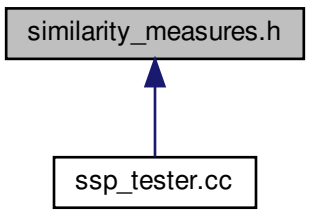
Similarity measures.

```
#include <opencv2/core/mat.hpp>
#include <opencv2/highgui.hpp>
```

Include dependency graph for similarity_measures.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Functions

- double moetsi::ssp::GetPSNR (const Mat &I1, const Mat &I2, double max_value)

  Get Peak Signal to Noise Ration similarity.
- double moetsi::ssp::GetMSE (const Mat &I1, const Mat &I2)

  Get Mean Square Error (distance) between images.
- Scalar moetsi::ssp::GetMSSIM (const Mat &i1, const Mat &i2)

  Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html *for a simple SSIM introduction.*

9.34.1 Detailed Description

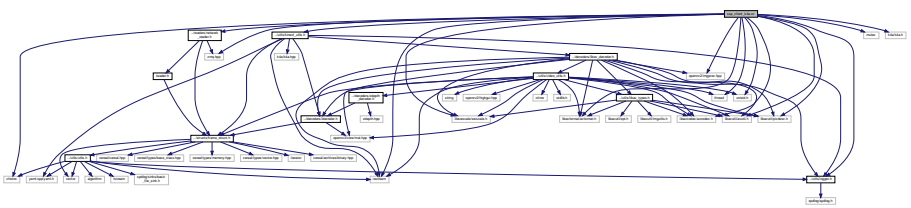
Similarity measures.

9.35 ssp_client_k4a.cc File Reference

SSP client with lib k4a.

```
#include <chrono>
#include <iostream>
#include <mutex>
#include <thread>
#include <unistd.h>
#include <k4a/k4a.h>
#include <opencv2/imgproc.hpp>
#include <zmq.hpp>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include "../readers/network_reader.h"
#include "../utils/kinect_utils.h"
```

Include dependency graph for ssp_client_k4a.cc:



Classes

- struct _custom_k4abt_body_t
- class BodyTracker

Typedefs

- typedef struct _custom_k4abt_body_t **custom_k4abt_body_t**

Functions

- SSP_EXPORT int **open_k4a** (int port)
- SSP_EXPORT int **close_k4a** ()
- void **update** ()
- SSP_EXPORT int **start_k4a** (int port)
- SSP_EXPORT int **stop_k4a** ()
- SSP_EXPORT int **update_k4a** ()
- SSP_EXPORT int **getBodyCount** ()
- SSP_EXPORT int **getBodiesStruct** (k4abt_body_t *pBodies, int n)
- SSP_EXPORT custom_k4abt_body_t **getCustomBodiesStruct** (int n)
- SSP_EXPORT int **getBodies** (k4abt_skeleton_t *pSkeletons, int *pIds, int n)
- void **PrintBodyInformation** (k4abt_body_t body)
- void **PrintBodyIndexMapMiddleLine** (k4a::image body_index_map)
- int **main** (int argc, char *argv[])

Variables

- BodyTracker * **gTracker** = NULL
- std::thread **gUpdateThread**
- bool **gStop** = false

9.35.1 Detailed Description

SSP client with lib k4a.

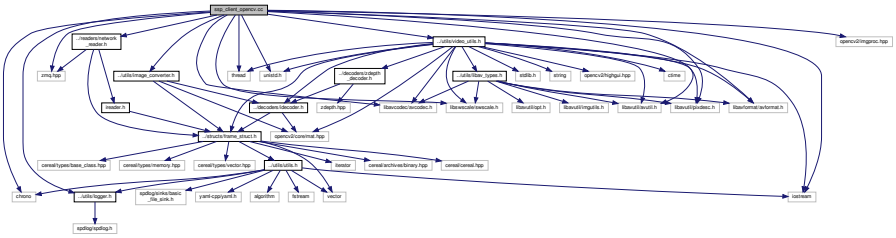
9.36 ssp_client_opencv.cc File Reference

OpenCV based ssp client client.

```
#include <chrono>
#include <iostream>
#include <thread>
#include <unistd.h>
#include <opencv2/imgproc.hpp>
#include <zmq.hpp>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
```

```
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include "../readers/network_reader.h"
#include "../utils/video_utils.h"
#include "../utils/image_converter.h"
```

Include dependency graph for ssp_client_opencv.cc:



Macros

- #define **SSP_EXPORT**
- #define **HAS_IMSHOW** 1

Functions

- SSP_EXPORT int **ssp_client_opencv** (int port)
- int **main** (int argc, char ∗argv[ ])

9.36.1 Detailed Description

OpenCV based ssp client client.

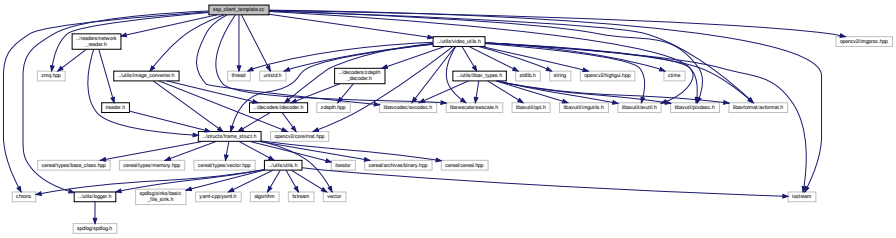
9.37 ssp_client_template.cc File Reference

Template for an SSP client.

```
#include <chrono>
#include <iostream>
#include <thread>
#include <unistd.h>
#include <opencv2/imgproc.hpp>
#include <zmq.hpp>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include "../readers/network_reader.h"
#include "../utils/video_utils.h"
```

```
#include "../utils/image_converter.h"
```

Include dependency graph for ssp_client_template.cc:



Functions

- SSP_EXPORT int **ssp_client_template** (int port)
- int **main** (int argc, char ∗argv[ ])

9.37.1 Detailed Description

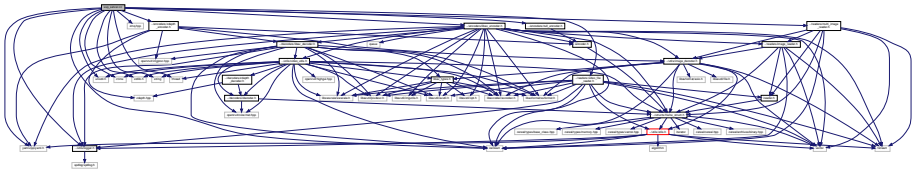
Template for an SSP client.

9.38 ssp_server.cc File Reference

SSP, server side.

```
#include <unistd.h>
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
```

Include dependency graph for ssp_server.cc:



Functions

- SSP_EXPORT int **ssp_server** (const char *filename)
- int **main** (int argc, char *argv[])

9.38.1 Detailed Description

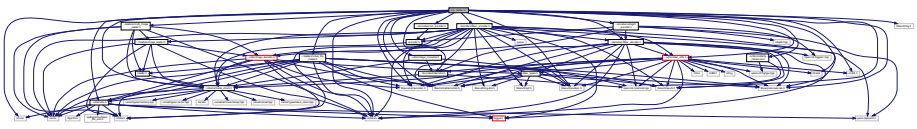
SSP, server side.

9.39 ssp_tester.cc File Reference

SSP test program.

```
#include <chrono>
#include <iostream>
#include <thread>
#include <unistd.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/log.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../encoders/libav_encoder.h"
#include "../structs/frame_struct.h"
#include "../decoders/idecoder.h"
#include "../decoders/libav_decoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
#include "../utils/image_converter.h"
#include "../utils/similarity_measures.h"
#include "../utils/utils.h"
#include "../utils/video_utils.h"
```

Include dependency graph for ssp_tester.cc:



Functions

- int **main** (int argc, char *argv[])

9.39.1 Detailed Description

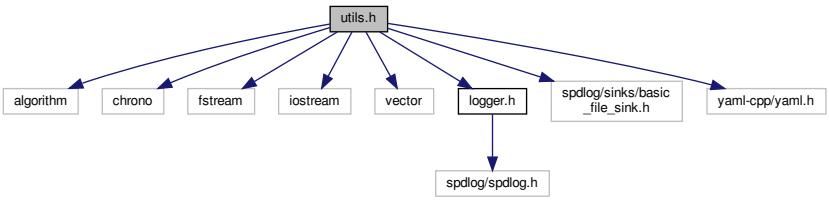
SSP test program.

9.40 utils.h File Reference

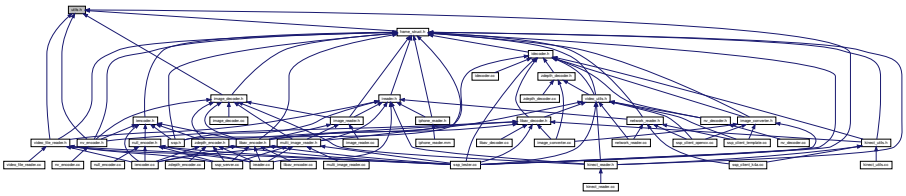
Utilities.

```
#include <algorithm>
#include <chrono>
#include <fstream>
#include <iostream>
#include <vector>
#include "logger.h"
#include "spdlog/sinks/basic_file_sink.h"
#include <yaml-cpp/yaml.h>
```

Include dependency graph for utils.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Macros

- #define **av_err2str**(errnum)

Functions

- uint64_t moetsi::ssp::_CurrentTimeMs ()

  Get current time in ms.
- uint64_t moetsi::ssp::CurrentTimeUs ()

  Get current time in usec/microseconds.
- uint64_t moetsi::ssp::CurrentTimeNs ()

  Get current time in ns/nanosecconds.
- std::string moetsi::ssp::RandomString (size_t length)

  Build a random string.
- void moetsi::ssp::SetupLogging (YAML::Node &general_parameters)

  Setup SSP logging.
- void moetsi::ssp::SetupLogging (std::string &level, std::string &file)

  Setup logging.

9.40.1 Detailed Description

Utilities.

9.40.2 Macro Definition Documentation

9.40.2.1 av_err2str

```
#define av_err2str(
              errnum )
```

Value:

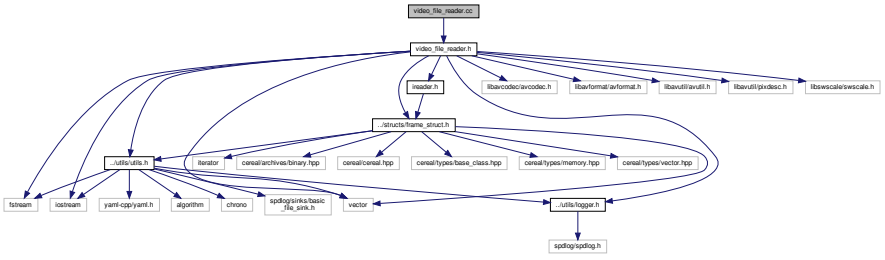
```
av_make_error_string((char *)__builtin_alloca(AV_ERROR_MAX_STRING_SIZE),     \
                     AV_ERROR_MAX_STRING_SIZE, errnum)
```

9.41 video_file_reader.cc File Reference

Video file reader.

```
#include "video_file_reader.h"
```

Include dependency graph for video_file_reader.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Enumerations

- enum moetsi::ssp::video_reader_k4a_depth_mode_t { moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_OFF, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_NFOV_2X2BINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_NFOV_UNBINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_WFOV_2X2BINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_WFOV_UNBINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_PASSIVE_IR }
- enum moetsi::ssp::video_reader_k4a_color_resolution_t { moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_OFF, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_720P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1080P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1440P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1536P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_2160P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_3072P }

9.41.1 Detailed Description

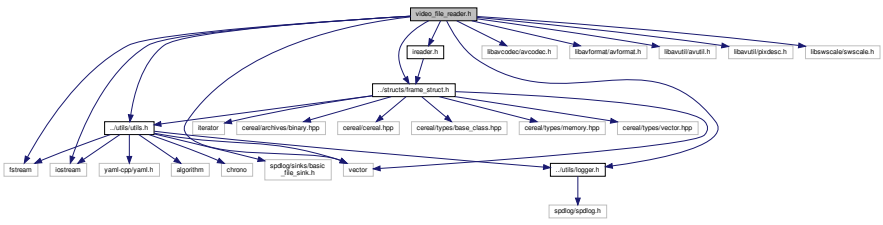
Video file reader.

9.42 video_file_reader.h File Reference

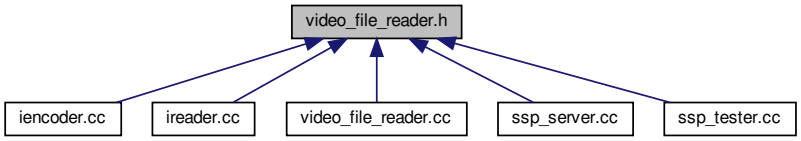
Video file reader support.

```
#include <fstream>
#include <iostream>
#include <vector>
#include "../utils/logger.h"
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../structs/frame_struct.h"
#include "../utils/utils.h"
#include "ireader.h"
```

Include dependency graph for video_file_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::VideoFileReader

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.42.1 Detailed Description

Video file reader support.

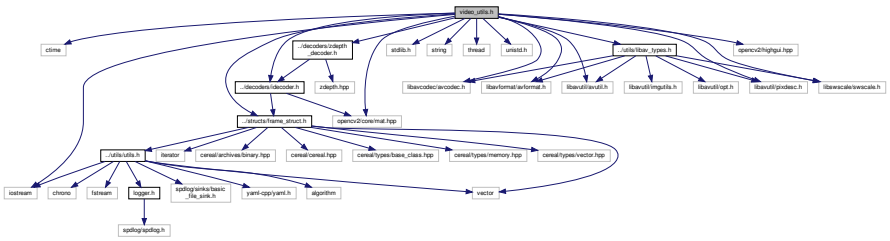
9.43 video_utils.h File Reference

Video utilities.

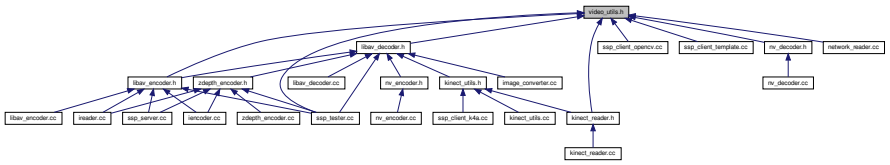
```
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <unistd.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include <opencv2/core/mat.hpp>
#include <opencv2/highgui.hpp>
#include "../decoders/idecoder.h"
#include "../decoders/zdepth_decoder.h"
#include "../structs/frame_struct.h"
```

```
#include "../utils/libav_types.h"
```

Include dependency graph for video_utils.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

Macros

- #define **MAX_DEPTH_VALUE_16_BITS** 65536
- #define **MAX_DEPTH_VALUE_14_BITS** 16384
- #define **MAX_DEPTH_VALUE_13_BITS** 8192
- #define **MAX_DEPTH_VALUE_12_BITS** 4096
- #define **MAX_DEPTH_VALUE_11_BITS** 2048
- #define **MAX_DEPTH_VALUE_8_BITS** 256

Functions

- void moetsi::ssp::AVFrameToMatYUV (AVFrameSharedP &frame, cv::Mat &image)

  Convert an AVFrame to YUV image.
- void moetsi::ssp::AVFrameToMatGray (AVFrameSharedP &frame, cv::Mat &image)

  Convert an AVFrame to grayscale image.
- AVCodecParameters * moetsi::ssp::getParams (FrameStruct &frame_struct)

  Get AVCodec parameters from a FrameStruct.
- template<typename T >
  void **moetsi::ssp::MinMaxFilter** (cv::Mat &in_mat, cv::Mat &out_mat, double min, double max)

9.43.1 Detailed Description

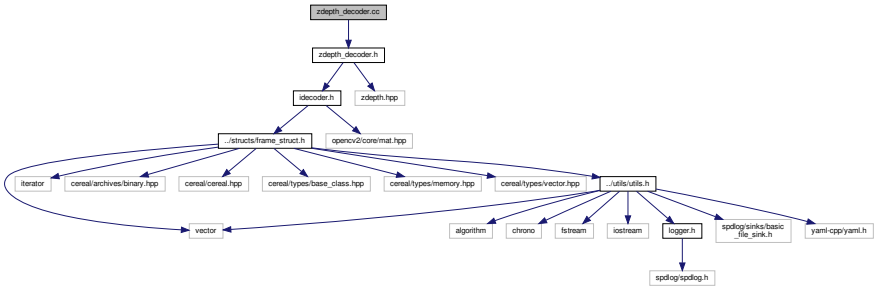
Video utilities.

9.44 zdepth_decoder.cc File Reference

ZDepth decoder.

```
#include "zdepth_decoder.h"
```

Include dependency graph for zdepth_decoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.44.1 Detailed Description

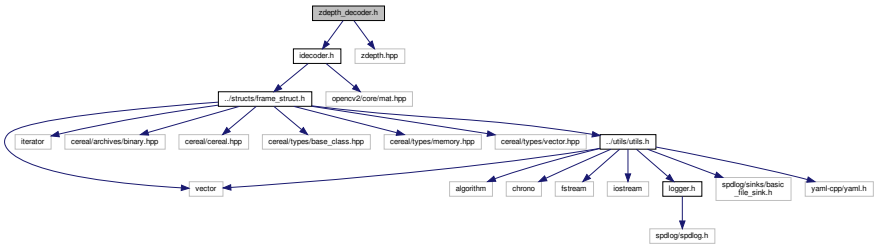
ZDepth decoder.

9.45 zdepth_decoder.h File Reference

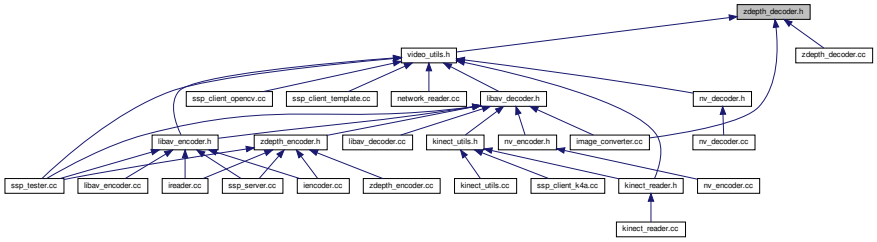
ZDepth decoder.

```
#include "idecoder.h"
#include "zdepth.hpp"
```

Include dependency graph for zdepth_decoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::ZDepthDecoder

  ZDepthDecoder ZDepth format decoder.

Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.45.1 Detailed Description

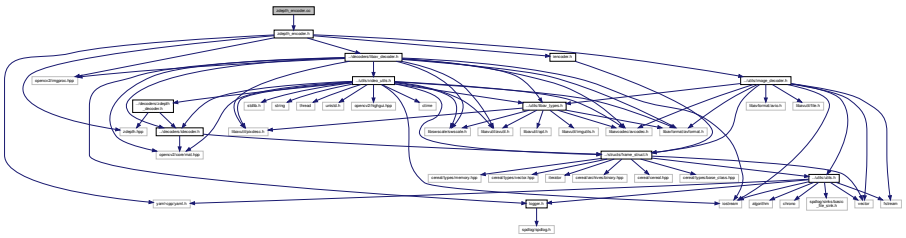
ZDepth decoder.

9.46 zdepth_encoder.cc File Reference

ZDepth encoder.

```
#include "zdepth_encoder.h"
```

Include dependency graph for zdepth_encoder.cc:



Namespaces

- moetsi::ssp

  Sensor Stream Pipe.

9.46.1 Detailed Description

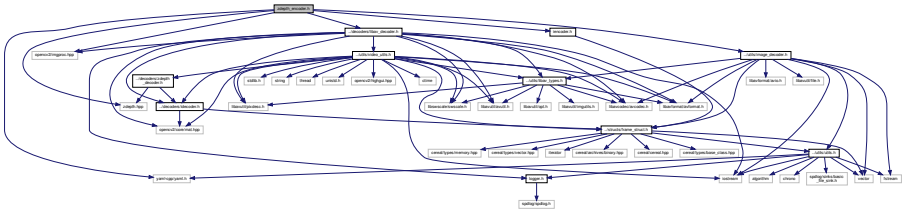
ZDepth encoder.

9.47 zdepth_encoder.h File Reference

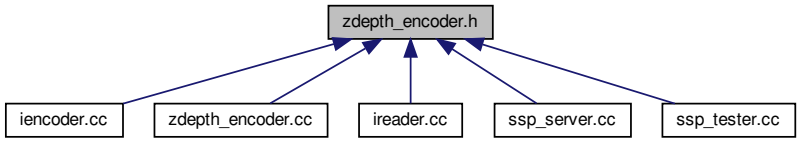
encoder

```
#include "zdepth.hpp"
#include <yaml-cpp/yaml.h>
#include <opencv2/imgproc.hpp>
#include "iencoder.h"
#include "../decoders/libav_decoder.h"
#include "../utils/image_decoder.h"
```

Include dependency graph for zdepth_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class moetsi::ssp::ZDepthEncoder
  ZDepth encoder.

Namespaces

- moetsi::ssp
  Sensor Stream Pipe.

9.47.1 Detailed Description

encoder

ZDepth