Player/Stage Plugin-Driver for Surveyor Robot SRV-1 (with ARM-7 processor)

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- Implement DIO
- Opaque interface to set program

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  Plugin Driver for Surveyor SRV-1 (with ARM-7 processor).

Chapter 6

Class Documentation

6.1 srv1_comm_t Struct Reference

Type definition that is used in the communication link between the Surveyor Driver implementation and the robot itself.

`#include <surveyor_comms.h>`

Public Attributes

- char port [PATH_MAX]

  Serial port communicating on.

- int fd

  fd if port is open. (-1 = not valid)

- double vx

  velocity in the x direction

- double va

  angular velocity

- unsigned char need_ir

  Do we need to read the IR?

- int bouncedir [4]

  0 = front, 1 = left, 2 = back, 3 = right

- unsigned char image_mode

  Mode we want images in.

- unsigned char set_image_mode

  Mode that the camera is set to.

- uint32_t frame_size

size of JPEG frame

- char * frame

  Frame that holds the actual image.

6.1.1 Detailed Description

Type definition that is used in the communication link between the Surveyor Driver implementation and the robot itself.

Definition at line 56 of file surveyor_comms.h.

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

- src/surveyor_comms.h

6.2 Surveyor Class Reference

Plugin Driver for Surveyor SRV-1 (with ARM-7 processor).

`#include <src/surveyor_driver.h>`

Public Member Functions

- Surveyor (ConfigFile *cf, int section)

  Constructor for the Surveyor multi-interface driver.

- int Setup ()

  Set up the device and start the device thread by calling StartThread(), which spawns a new thread and executes Surveyor::Main(), which contains the main loop for the driver.

- int Shutdown ()

  Shut down the device.

- int ProcessMessage (QueuePointer &resp_queue, player_msghdr *hdr, void *data)

  Message handler that sends a response if necessary using Publish(). This function is called once for each message in the incoming queue.

Private Member Functions

- virtual void Main ()

  Main "entry point" function for the driver thread created using StartThread() within the Setup() function;.

Private Attributes

- const char * portname

  Serial port.

- player_devaddr_t position_addr

  Address of the position device (wheels odometry).

- player_devaddr_t camera_addr

  Address of the camera device.

- player_devaddr_t ir_addr

  Address of the infrared (IR) beacons.

- player_devaddr_t dio_addr

  Address of the digital input/output pins (ports).

- srv1_comm_t * srvdev

  The surveyor object.

- player_position2d_cmd_vel_t position_cmd
  position2d velocity command
- player_position2d_geom_t pos_geom
  position2d geometry
- int setup_image_mode
  Desired camera size.

6.2.1 Detailed Description

Plugin Driver for Surveyor SRV-1 (with ARM-7 processor).

These robots can be controlled via ZigBee which is attached to a USB serial port on a host computer. The host computer runs the server which then communicates to the robot.

Note:

The newer SRV-1 robot (with Blackfin processor) has not yet been tested with this driver.

Compile-time dependencies

- 'pkg-config –cflags playerc++'

Provides

The surveyor driver provides the following device interfaces:

- interface_position2d
  - This interface does not return odometry data, but accepts velocity commands.
- interface_camera
  - The camera on the robot returns JPEG images.
- interface_ir
  - The robot has 4 IR beacons which can act as rudimentary range-finders
    - UNIMPLEMENTED
- interface_dio
  - The robot has 5 pins which can be used as digital in/out ports.
    - UNIMPLEMENTED

Supported configuration requests

- none

Configuration file options

- port (string)
  - Serial port used to communicate with the robot
    - Default: "/dev/ttyUSB0"
- image_size (string)
  - Size of the images returned by the camera.
    - Default: "320x240"
    - Allowed values: "320x240", "160x128", "80x64"
- plugin (string)
  - Relative or Absolute path to the location of the shared-object plugin driver.

Example

```
driver
(
  name "surveyor"
  plugin "libSurveyor_Driver.so"
  provides ["position2d:0" "camera:0"]
  port "/dev/ttyUSB0"
)
```

Bug

- Camera interface appears delayed for an arbitrary sequence of snapshots
- Camera rate is very slow - about 1fps...Could do better: at least 4fps

Todo

- Property bags to change image size on the fly
- Implement IR (IR sensors are very noisy and produce false negatives on dark and shiny obstacles)
- Implement DIO
- Opaque interface to set program

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Carlos Jaramillo (current maintainer)

Definition at line 118 of file surveyor_driver.h.

6.2.2 Constructor & Destructor Documentation

6.2.2.1 Surveyor::Surveyor (ConfigFile * *cf*, int *section*)

Constructor for the Surveyor multi-interface driver.

Constructor for the Surveyor driver. Retrieves options from the configuration file, allocates memory for each interface and then reads and adds the interfaces provided in the configuration file.

Parameters:

cf Current configuration file

section Current section in configuration file

Definition at line 42 of file surveyor_driver.cc.

References camera_addr, dio_addr, ir_addr, portname, position_addr, setup_image_mode, and srvdev.

6.2.3 Member Function Documentation

6.2.3.1 int Surveyor::ProcessMessage (QueuePointer & *resp_queue*, player_msghdr * *hdr*, void * *data*)

Message handler that sends a response if necessary using Publish(). This function is called once for each message in the incoming queue.

Parameters:

resp_queue The queue to which any response should go

hdr The message header

data The message body

Returns:

0 if the message in handled, and -1 otherwise. A NACK (Negative Acknowledgment) will be sent if a response is required.

Definition at line 232 of file surveyor_driver.cc.

References pos_geom, position_addr, position_cmd, and srvdev.

6.2.3.2 int Surveyor::Setup ()

Set up the device and start the device thread by calling StartThread(), which spawns a new thread and executes Surveyor::Main(), which contains the main loop for the driver.

Returns:

0 if things go well, and -1 otherwise.

Definition at line 105 of file surveyor_driver.cc.

References srv1_comm_t::image_mode, portname, setup_image_mode, and srvdev.

6.2.3.3 int Surveyor::Shutdown ()

Shut down the device.

Returns:

0 when the device has been completely shut down.

Definition at line 130 of file surveyor_driver.cc.

References srvdev.

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

- src/surveyor_driver.h
- src/surveyor_driver.cc

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