ns_CreateFile Class Library Manual

Ver 1.3

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Introduction

This handbook is the explanatory material for the ns_CreateFile class library. We recommend that you read this handbook after you have grasped the organization of the Neuroshare format (1).

The ns_CreateFile class library is a group of functions (hereafter “Methods”) which convert standard neurophysiological experiment data into normalized Neuroshare format data without inconsistencies. The ns_CreateFile class library can be run in Windows XP SP2 and the MATLAB 7.5 (R2007b) environment.

Moreover, for examples of data conversion using the ns_CreateFile class library on dummy data, and applications, see the m-file SampleConverter.m. For examples of concrete uses for the ns_CreateFile class library, please refer here.

(1) **Neuroshare Format:** Neurophysiological data-sharing format. Extension (.nsn). Represents neurophysiological experimental data in terms of four defined Entity types, and a combination of structure and Entity data. Please refer to <Figure 1 Neuroshare Format> and the document “Neuroshare Native File Format Specification Rev 0.9d”.
Neuroshare site: https://neuroshare.sourceforge.net/download.shtml.

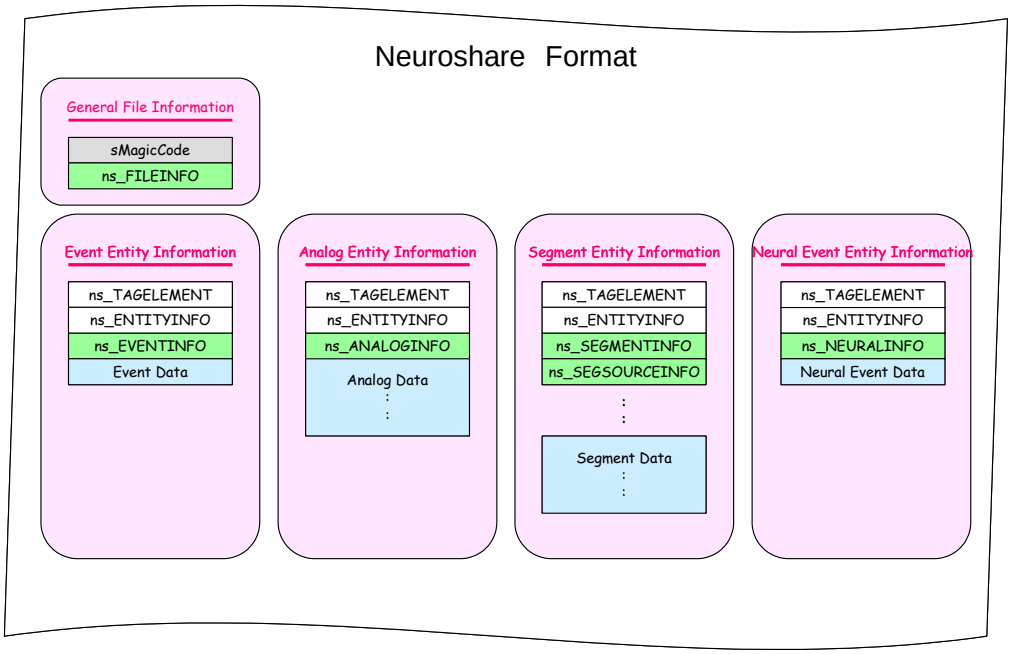


Figure 1 Neuroshare Format

Objective of the ns_CreateFile class library

This is an introduction to the objective of the ns_CreateFile class library.

The goal of the ns_CreateFile class library is

“to convert typical neurophysiological experiment data (henceforth “experiment data”), into standardized Neuroshare format data.”

Already, the ns_CreateFile class library contains functions adequate to create standardized Neuroshare data.

In this handbook, the ns_CreateFile class library methods, usable constants, Neuroshare file production procedure, file-sharing functions for various methods, and the order of specialized functions for individual methods are explained.

(1) “Conversion to correct Neuroshare format data.”

According to the ns_CreateFile class library, a file originating from experimental data is “converted to correct Neuroshare format data” when it meets the following conditions:

1. All contents recorded in the file’s general structure are compatible with the definition of Neuroshare format.
2. All contents recorded in the file’s Entity data are compatible with the definition of Neuroshare format.
3. There is no disparity between the file’s internal structure and its Entity data.

Methods Summary

The ns_CreateFile class library includes the following methods.

Method names and function summaries are stated here. For detailed functions for each method, please see <Method Details>.

[Method Name]	[Function Summary]
<Creation of Neuroshare-Format File Processing>	
ns_CreateFile	Create a Neuroshare data storage object (“nsObj”(※1))
ns_GetFileInfo	Retrieve file information structure (nsa_FILEINFO (※2)
ns_SetFileInfo	Modify nsa_FILEINFO (※2)
ns_CloseFile	Integrate all data
<Event Entity Registration Processing>	
ns_NewEventData	Generate new event data
ns_GetEventInfo	Retrieve Event information structure (nsa_EVENTINFO (※2))
ns_SetEventInfo	Modify nsa_EventInfo (※2)
ns_AddEventInfo	Add event data
<Analog Entity Registration Processing>	
ns_NewAnalogData	Generate new analog data
ns_GetAnalogInfo	Retrieve analog information structure (nsa_ANALOGINFO(※2)
ns_SetAnalogInfo	Modify nsa_ANALOGINFO(※2)
ns_AddAnalogData	Add analog data
<Segment Entity Registration Processing>	
ns_NewSegmentData	Generate new segment data

ns_GetSegmentInfo	Retrieve Segment information structure (nsa_SEGMENTINFO(※2))
ns_GetSegmentSourceInfo	Retrieve segment source information structure (nsa_SEGSOURCEINFO(※2))
ns_SetSegmentInfo	Modify nsa_SEGMENTINFO(※2)
ns_SetSegmentSourceInfo	Modify nsa_SEGMENTSOURCEINFO(※2)
ns_AddSegmentData	Add ns_SEGSOURCEINFO or segment data

<Neural Event Entity Registration Processing>

ns_NewNeuralEventData	Generate new neural event data
ns_GetNeuralInfo	Retrieve neural event information structure (nsa_NEURALINFO(※2))
ns_SetNeuralInfo	Modify nsa_NEURALINFO(※2)
ns_AddNeuralEventData	Add neural event data

<Other Functions>

display	Display present value of a structure member (Displays only locations according to the user's configuration)
display_All_Information	Display each structure member's current value (Displays all member variables)
subsasgn	(Dot) Prohibit modification of each structure member variable which utilizes an operator

(※1) An nsObj is "an object which stores Neuroshare format data." For details, see <nsObj>

(※2) An nsa_***INFO structure is "a structure containing member variables from an ns_***INFO structure which are not consistent with Entity Data format. For details, see <nsa_***INFO>

Useful Constants

Constant values used with the ns_CreateFile class library are indicated here.

Constants used with the ns_CreateFile class library are listed in the following <Table 1 Useful Constants >

The new constants used in the ns_CreateFile class library are added to the constants defined in Neuroshare Matlab API Specification Rev2.2(※1)

Table 1 Useful Constants

Constant Name	Actual Value	Meaning of the Constant
< Method Returned Values >※The orange background-color indicates constants newly created for the ns_Create File class library		
ns_OK	0	Normal termination of method processing (Includes WARNING processing time。<See "WARNING processing function")
ns_LIBERROR	-1	Library link error
ns_TYPEERROR	-2	File opening error
ns_FILEERROR	-3	File access error
ns_BADFILE	-4	File handle error
ns_BADENTITY	-5	EntityID description error
ns_BADSOURCE	-6	SourceD description error
ns_BADINDEX	-7	Index error
ns_WRONGLABEL	-101	Input argument character string specification error (Error in the EntityLabel specification indicating a file name)
ns_WRONGID	-102	Error in the SegmentSourceID specification for an input argument's EntityID
ns_WRONGHEADER	-103	Error in the content of an input argument's structure
ns_WRONGDATA	-104	Error in the content of an input argument's data
< Set values for member variables: ns_TAGELEMENT ns_ENTITYINFO >		
ns_ENTITY_UNKOWN	0	Entity type ambiguity
ns_ENTITY_EVENT	1	Event Entity
ns_ENTITY_ANALOG	2	Analog Entity
ns_ENTITY_SEGMENT	3	Segment Entity
ns_ENTITY_UNKOWN	4	Neural Event Entity
ns_INFO_FILE	5	File Information
< Set values for member variables : ns_EVENTINFO >		
ns_EVENT_TEXT	0	Character string

ns_EVENT_CSV	1	Comma-delimited values
ns_EVENT_BYTE	2	8-bit binary values
ns_EVENT_WORD	3	16-bit binary values
ns_EVENT_DWORD	4	32-bit binary values

(※1)Neuroshare Matlab API Specification Rev2.2 : A library which reads Neuroshare format files

Please see Neuroshare Matlab API Specification Rev2.2。

Neuroshare site : http://neuroshare.sourceforge.net/download.shtml

Neuroshare File Creation Flow

The following is the flow for creating a Neuroshare-format file

In a MATLAB Workspace user job, methods are arranged in a use sequence and sorted into the following 1.-10. categories (Underlined words are the method names)

After the following steps are executed, various features of nsObj can not be changed.

Please see <Figure 2 Sample Data Creation Flow[1]>,<Figure 3 Sample Data Creation Flow[2]> , and <Figure 4 Sample Data Creation Flow[3]>. For example, the place where event data is registered. (>> Input example in a Work Space)

1. ns_CreateFile ・・・ Create a Neuroshare format file
   >> [retA nsObj] = ns_CreateFile('sample.nsn');
2. ns_GetFileInfo ・・・ Retrieve an nsa_FILEINFO file
   >> [retB nsa_FILEINFO] = ns_GetFileInfo(nsObj);
3. [Modification of structure contents dependent on the user]
   >> nsa_FILEINFO.szFileComment = 'Sample';
4. ns_SetFileInfo ・・・ Update nsa_FILEINFO
   >> [retC nsObj] = ns_SetFileInfo(nsObj, nsa_FILEINFO);
5. ns_NewEventData ・・・ Generate new event data process
   >> [retD nsObj EventID] = ns_NewEventData(nsObj, 'dummy');
6. ns_GetEventInfo ・・・ Retrieve nsa_EVENTINFO
   >> [retE nsa_EVENTINFO] = ns_GetEventInfo(nsObj, EventID);
7. [Modification of structure contents dependent on the user]
   >> nsa_EVENTINFO.szCSVDesc = 'Words empty of meaning';
8. ns_SetEventInfo ・・・ Update nsa_EVENTINFO
   >> [retF nsObj] = ns_SetEventInfo(nsObj, EventID, nsa_EVENTINFO);
9. ns_AddEventData ・・・ Add to Event Info
   >> [retG nsObj] = ns_AddEventData(nsObj, EventID, 1.5, uint32(23));
10. ns_CloseFile ・・・ Integrate all data
    >> [retH] = ns_CloseFile(nsObj);

※If event data for the same EntityID is registered multiple times in a location, repeat step 9

※For a location in which multiple Event IDs are registered, repeat steps 5-9 a second time.

※Perform step 10 when finished registering all data.

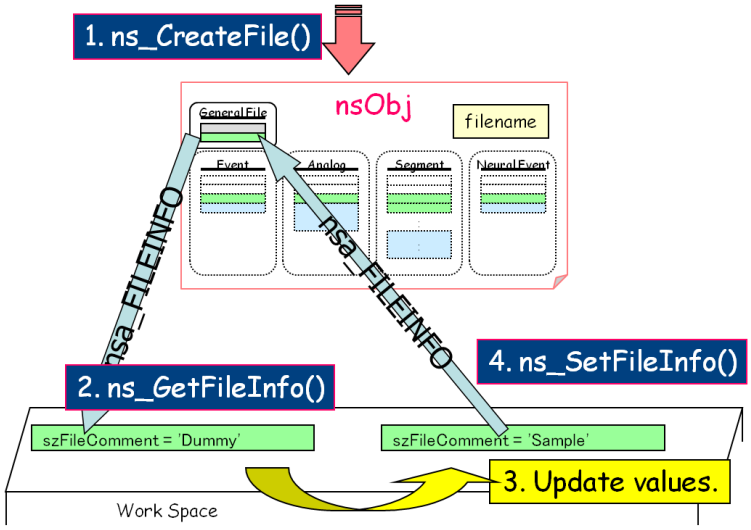


Figure 2 Sample Data Creation Flow[1]

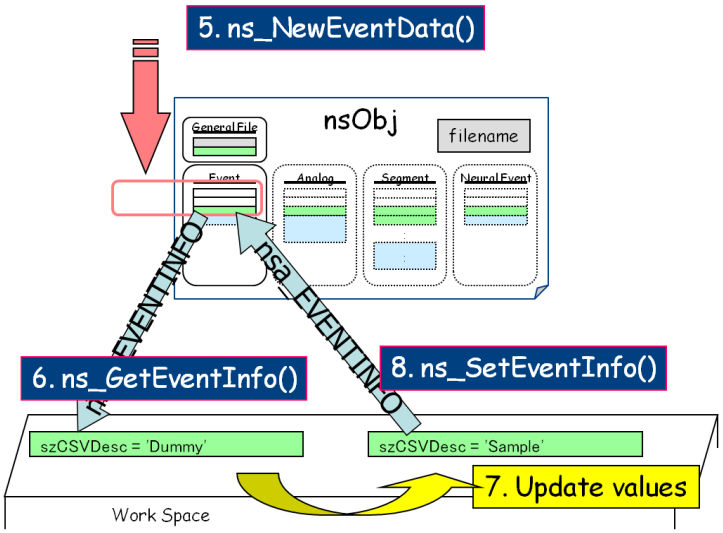


Figure 3 Sample Data Creation Flow[2]

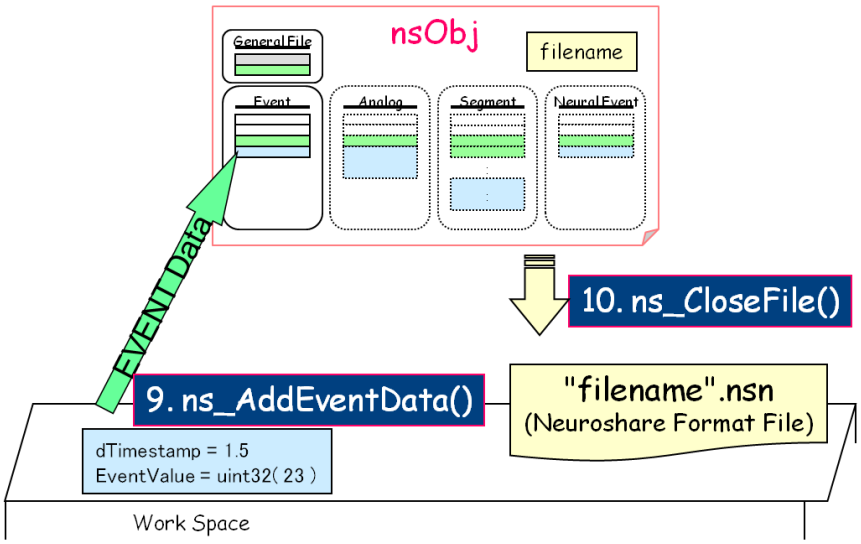


Figure 4 Sample Data Creation Flow[3]

Shared Functions

The ns_CreateFile class library sharing functions are described here.

Object Manipulation Prohibition Function

This function makes it impossible to directly modify the contents of an nsObj, an object in the ns_Create File class library (in other words, experiment data), except using a class library function.

This function prevents the contents of an nsObj in the Work Space from being directly manipulated, and prevents values which depart from Neuroshare format to be stored in an nsObj.

Futhermore, when a request is made to directly manipulate the contents of an nsObj, the following messages are output in order to prohibit the request.

[Example of the object manipulation prohibition function]

When a request is made to directly manipulate an ns_FILEINFO member variable for a given nsObj:

<< Input to Work Space >> nsObj.ns_FILEINFO.szFileType = ‘meaningless words';

【 Operation Result 】

Message： ERROR : Can not edit a member of [nsObj] without using method

Structure Automatic Update Function

This is a function which insures that when an Entity is newly created (ns_New***Data)(※1) or when Entity data is added (ns_Add***Data), consistency is maintained between the structure and Entity data, and that the values of member variables in the created or supplemented contents are updated appropriately.

This function prevents disparity between the structure and the Entity data, and prevents files including inconsistent contents from being created.

Furthermore, for a summary of the member variable for updating each method, and its value, please refer to <Table 2 Summary of Member Variables for Updating Methods>

(※1) When a new entity is created (ns_New***Data), after the structure is initialized, the automatic update function is run.

For initial values, please see <Error! Reference source not found.>

For the initialization object's structure, please reference each method's explanation.

Table 2 Summary of Member Variables for Updating Methods

Methods Name	Update Object		Update Variable ※(+*) means to add * to the present value.	Supplementation
	Structure	Member Variable		
ns_NewEventData	ns_FILEINFO	dwEntityCount	+1	
	ns_TAGELEMENT	dwElemType	ns_ENTITY_EVENT	
		dwElemLength	180	Bytes of ns_ENTITYINFO + ns_EVENTINFO
	ns_ENTITYINFO	szEntityLabel	[szEntityLabel statement character string]	New method can't be changed later
		dwEntityType	ns_ENTITY_EVENT	
	ns_EVENTINFO	dwMinDataLength	2^{32} - 1	Obtains correct minimum given the maximum initial value in uint32 form.
		dwMaxDataLength	0	Obtains correct maximum given the minimum initial value in uint32 form.
ns_NewAnalogData	ns_FILEINFO	dwEntityCount	+1	
	ns_TAGELEMENT	dwElemType	ns_ENTITY_ANALOG	
		dwElemLength	304	Amount of structure ns_ENTITYINFO + ns_ANALOGINFO
	ns_ENTITYINFO	szEntityLabel	[szEntityLabel]	New method can't be changed
		dwEntityType	ns_ENTITY_ANALOG	

	ns_ANALOGINFO	dMinVal	$2^{63} - 1$	For a given initial value's double form maximum, gives the correct minimum
		dMaxVal	-2^{63}	For a given initial value's double form minimum, gives the correct maximum.
ns_NewSegmentData	ns_FILEINFO	dwEntityCount	+1	
	ns_TAGELEMENT	dwElemType	ns_ENTITY_SEGMENT	
		dwElemLength	92	Structure ns_ENTITYINFO + ns_SEGMENTINFO amount
	ns_ENTITYINFO	szEntityLabel	[szEntityLabel statement character string]	New method cannot be changed later
		dwEntityType	ns_ENTITY_SEGMENT	
	ns_SEGMENTINFO	dwMinSampleCount	$2^{32} - 1$	Obtains correct minimum given the maximum initial value in uint32 form.
		dwMaxSampleCount	0	Obtains correct maximum given the minimum initial value in uint32 form.
ns_NewNeuralEventData	ns_FILEINFO	dwEntityCount	+1	
	ns_TAGELEMENT	dwElemType	ns_ENTITY_NEURAL	
		dwElemLength	176	Structure ns_ENTITYINFO + ns_NEURALINFO amount
	ns_ENTITYINFO	szEntityLabel	[szEntityLabel statement character string]	New method cannot be changed later
		dwEntityType	ns_ENTITY_NEURAL	
ns_AddEventData	ns_TAGELEMENT	dwElemLength	+12+[EventValue byte number]	
	ns_ENTITYINFO	dwItemCount	+1	
	ns_EVENTINFO	dwEventType	[ns_EVENT_***]	Updated depending on data contents
		dwMinDataByteSize	[Min byte size of EventValue]	Updated when the input argument value is less than the minimum until now.
		dwMaxDataByteSize	[Max byte size of EventValue]	Updated when the input argument is greater than the maximum until now.
ns_AddAnalogData	ns_TAGELEMENT	dwElemLength	+12+8*[analog data quantity]	※[…] : Agrees with the length of the vector of the input argument dData
	ns_ENTITYINFO	dwItemCount	+[Analog data quantity]	
	ns_ANALOGINFO	dMinVal	[Analaog data minimum value]	Updated when the input argument value is less than the minimum until now.
		dMaxVal	[Analog data maximum value]	Updated when the input argument is greater than the maximum until now.
ns_AddSegmentData	ns_TAGELEMENT	dwElemLength	+264+8*[Segment data quantity]	Amount of added structure ns_SEGSOURCEINF ※[…] : Agrees with the input argument dValue's vector length

	ns_ENTITYINFO	dwItemCount	+1	
	ns_SEGMENTINFO	dwSourceCount	+1	
		dwMinSampleCount	[Segment data quantity minimum value]	Updated when the input argument valueis lower than the minimum until now.
		dwMaxSampleCount	[Segment data quantity maximum]	Updated when the input value is greater than the maximum until now.
	ns_SEGSOURCEINFO	dMinVal	[Segment data minimum]	Updated when the input argument valueis lower than the minimum until now.
		dMaxVal	[Segment data maximum]	Updated when the input value is greater than the maximum until now.
ns_AddNeuralEventData	ns_TAGELEMENT	dwElemLength	+8	
	ns_ENTITYINFO	dwItemCount	+1	

Input Value Revision Function[double natural number→uint32]

This is a function which revises double natural number(※1) to uint32 if input needs unsigned integer value.

This function allows user to input even double natural value if the value is saved as uint32. User should not worry about the type of value is double or uint32.

In MATLAB, the default type of num is double. So this function is activated.

(※1)Double natural number : Its type is Double, and its value is equal to integer casted itself. Exam : <double> 5.0 . The system treats this as <uint32> 5.

Input Value Revision Function[modify length of character]

This is a function which modifies length of character if input needs char[x] value.

This function modifies length of character properly. If strings A ‘s length was shorter than x, this function fills several blanks. And if it was longer than x, this function cut over length of strings A.

User doesn’t have to care about length of strings.

ERROR Function

This is a function which prevents setting wrong value and displays error message on MATLAB Command Window.

For preventing it, system does not create the wrong formatted Neuroshare file.

If user set wrong value, methods which have this function return a ns_Result value below table.

Table 3 Summary of ns_Result if ERROR occured

ns_Result [value]		ERROR message	Reason of ERROR
ns_FILEERROR	3	FILE MANIPULATION ERROR	File I/O occur.
ns_WRONGLABEL	101	WRONG DATA_TYPE :LABEL	Wrong type is set.
		WRONG NAME OF OUTPUT_FILE	Wrong output file name is typed.
ns_WRONGID	102	WRONG ID_TYPE	Wrong id type
		WRONG ID_VALUE	Wrong id value. The entity does not exist.
ns_WRONGHEADER	103	WRONG INFO :ns_****INFO :This is not correct structure	Wrong structure. The structure does not have enough members.
		WRONG INFO :ns_****INFO.***(The Member doesn't exist)	Wrong structure. The structure has an undefined member.
ns_WRONGDATA	104	WRONG DATA_TYPE :****Data :******	Wrong type is set.

[Example of the error function]

When a request is made to set an wrong type of value as Entity ID:

<< Input to Work Space >> [ns_Result , nsa_EVENTINFO] = ns_GetEventInfo(nsObj, 3.2)

【 Operation Result 】

Message : ERROR : WRONG ID_TYPE : ID (MUST BE 0 or Positive Integer[scalar(1*1)]) : Stop Sequence.

ns_Result : -102 (ns_WRONGID)

nsObj : Nothing to be modified.

WARNING Function

This is a function which prevents setting wrong value and displays worning message on MATLAB Command Window.

Even warning, system creates the Neuroshare file. But warning members are not updated.

If user set wrong value, methods which have this function return a ns_Result value below table.

Table 4 Summary of ns_Result if WARNING occured

ns_Result[Value]		WARNING message	Reason of WARNING
ns_OK	0	WRONG INFO_TYPE : ns_****INFO.***	Wrong type is set.
		WRONG INFO_VALUE : ns_****INFO.***	Wrong value is set. See Table 5 Summary of region.

[Example of the warning function]

When a request is made to set an wrong type of value as dwTime_Day:

<<Input to Work Space>>[ns_Result , nsa_FILEINFO] = ns_GetFileInfo(nsObj);

<<Input to Work Space>>nsa_FILEINFO.dwTime_Month = 12;

<<Input to Work Space>>nsa_FILEINFO.dwTime_Day = 32;

<<Input to Work Space>>[ns_Result,nsObj] = ns_SetFileInfo(nsObj , nsa_FILEINFO);

【 Operation Result 】

Message : WARNING : WRONG INFO_VALUE :ns_FILEINFO.dwTime_Day(MUST BE [1-31]) :This is not updated

ns_Result : 0 (ns_OK)

nsObj : dwTime_Month is 12, dwTime_Day is not 32.

Method Details

This is a description about methods of the ns_CreateFile class library.

Neuroshare file creation processing

This is a description about methods when you create Neuroshare file.

[Methods]

- ns_CreateFile
  - Create the object to restore Neuroshare data.
  - Create filename, sMagicCode, ns_FILEINFO. Initialize(*1) them.
  - When input argument (filename) is wrong, then returns error value [ns_WRONGLABEL].

- ns_GetFileInfo
  - Get nsa_FILEINFO(*2) data.

- ns_SetFileInfo
  - Update nsa_FILEINFO data.
  - When input argument (nsa_FILEINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_CloseFile
  - Integrate all Neuroshare data, Create the Neuroshare file.
  - When file i/o error occurs, then returns error value [ns_FILEERROR].

(*1) See <Table 6 nsObj's contents> about Intial values.

(*2) See <Table 6 nsObj's contents> about members of nsa_***INFO.

[How to use]

You can input command below like (Sample) on MATLAB Work Space.

1. ns_CreateFile

   (Sample) [retA nsObj] = ns_CreateFile('dummy');

2. ns_GetFileInfo

   (Sample) [retB nsa_FILEINFO] = ns_GetFileInfo(nsObj);

3. Modify members of the structure.

   (Sample) nsa_FILEINFO.szFileComment = 'Words empty of meaning';

4. ns_SetFileInfo

   (Sample) [retC nsObj] = ns_SetFileInfo(nsObj, nsa_FILEINFO);

5. Register entities if you need.

6. ns_CloseFile

   (Sample) [retD] = ns_CloseFile(nsObj);

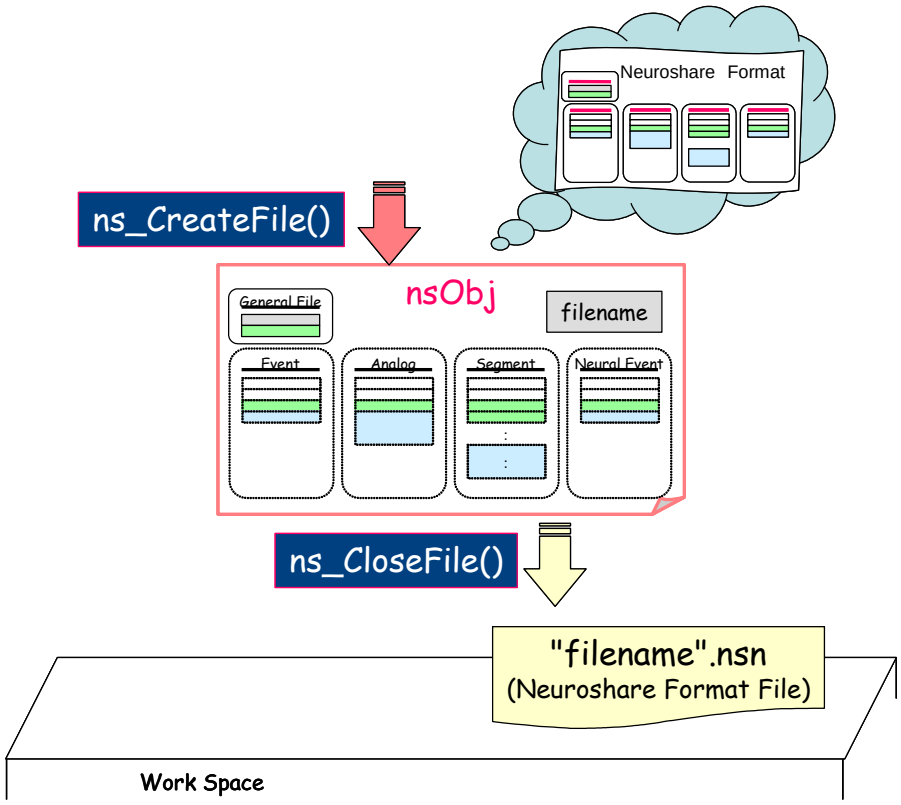


Figure 5 ns_CreateFile, ns_CloseFile

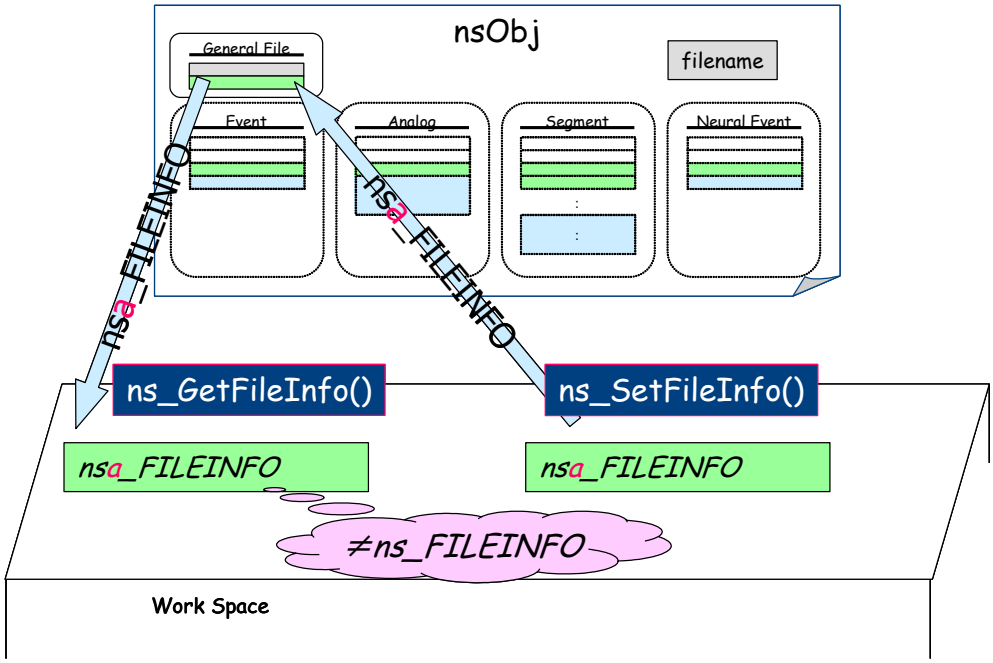


Figure 6 ns_GetFileInfo, ns_SetFileInfo

ns_CreateFile

Create the object to restore Neuroshare data.

[How to call]

[ns_Result nsObj] = ns_CreateFile(filename)

[Summary]

This method creates the object to restore Neuroshare data,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

filename	-[char]	the Neuroshare file name(*1).

Output :

ns_Result	-[double]	ns_OK or ns_WRONGLABEL.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object. [When ns_Result is not ns_OK] “”(blank)

[Note]

(*1) There are some notes to set filename below.

1. The filename will be the output file name of the Neuroshare.
2. The extension of filename must be ’nsn’ or ‘’[nothing].
   If it was wrong, then ERROR occur.
   (exam.) [OK]testfile.nsn, testfile
   [NG]testfile.abc
3. If you wanted to set file arbitrarily, set it with absolute/relative path.

ns_GetFileInfo

Get the struct to restore ns_FILEINFO.

[How to call]

[ns_Result nsa_FILEINFO] = ns_GetFileInfo(nsObj)

[Summary]

This method gets the struct to restore ns_FILEINFO,
then returns the result data (ns_Result) and the struct (nsa_FILEINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.

Output :

ns_Result	-[double] ns_OK.	
nsa_FILEINFO	-[struct]	the struct to restore nsa_FILEINFO.

ns_SetFileInfo

Update the struct to restore ns_FILEINFO.

[How to call]

[ns_Result nsObj] = ns_SetFileInfo(nsObj, nsa_FILEINFO)

[Summary]

This method updates the struct to restore ns_FILEINFO,

then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
nsa_FILEINFO	-[struct]	the struct to restore nsa_FILEINFO(*1).

Output :

ns_Result	-[double] ns_OK or ns_WRONGHEADER.	
nsObj	-[struct]	the object to restore Neuroshare data.
		[When ns_Result is ns_OK]
		the object which of the ns_FILEINFO is updated.
		[When ns_Result is not ns_OK]
		“”(blank)

[Note]

(*1) There are range-limitation of setting members of this struct.

See below table.

Table 5 Range that can be set

Update		Range that can be set	Note
Struct name	Member name	※[0…2]means "It is OK to set from 0 to2.	
ns_FILEINFO	dwTime_Month	[1…12]	January – December
	dwTime_DayOfWeek	[0…6]	0 : Sunday 6 : Saturday
	dwTime_Day	[1…31]	Day
	dwTime_Hour	[0…23]	Hour
	dwTime_Min	[0…59]	Minutes
	dwTime_Sec	[0…59]	Second
	dwTime_MilliSec	[0…1000]	Millisecond

ns_CloseFile

Integrate all data.

[How to call]

[ns_Result] = ns_CloseFile(nsObj)

[Summary]

This method integrates the object which restores Neuroshare data and all entities data, creates Neuroshare file(*1). And then, this deletes all intermediate files and returns the result data (ns_Result).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.

Output :

ns_Result	-[double] ns_OK or ns_FILEERROR.

[Note]

(*1) The entity's order which the Neuroshare file has obey rule below.

1. Event entities.
2. Analog entities.
3. Segment entities.
4. Neural Event entities.

Event Entity registration processing

This is a description about methods when you register/add event entity.

[Methods]

- ns_NewEventData
  - Create new event entity to restore Event data.
  - Create ns_TAGELEMENT, ns_ENTITYINFO, ns_EVENTINFO. Initialize(*1) them.
  - Create ID number to identify event entity data.(*2)
  - Create the intermediate file to restore Event data.
  - Update structs(*3).
  - When input argument (szEntityLabel) is wrong, then returns error value [ns_WRONGLABEL].

- ns_GetEventInfo
  - Get nsa_EVENTINFO(*4) data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].

- ns_SetEventInfo
  - Update nsa_EVENTINFO data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (nsa_EVENTINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_AddEventData
  - Write dTimestamp, dwDataByteSize, EventValue to the intermediate file.
  - Update structs(*3).
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (EventValue) is wrong, then returns error value [ns_WRONGDATA].

(*1) See <Table 6 nsObj's contents> about Intial values.

(*2) Get,Set,Add methods use this ID number to identify event entities.

(*3) See <Table 2 Summary of Member Variables for Updating Methods>about members which are updated.

(*4) See <Table 6 nsObj's contents> about Gettable/Settable member.

[How to use]

You can input command below like (Sample) on MATLAB Work Space.

1. ns_NewEventData

   (Sample) [retD nsObj EventID] = ns_NewEventData(nsObj, 'dummy');

2. ns_GetEventInfo

   (Sample) [retE nsa_EVENTINFO] = ns_GetEventInfo(nsObj, EventID);

3. Modify members of the structure.

   (Sample) nsa_EVENTINFO.szCSVDesc = 'no meaning string';

4. ns_SetEventInfo

   (Sample) [retF nsObj] = ns_SetEventInfo(nsObj, EventID, nsa_EVENTINFO);

5. ns_AddEventData

   (Sample) [retG nsObj] = ns_AddEventData(nsObj, EventID, 1.5, uint32(23));

[Notes]

It doesn't correspond to Comma Separated Value. See <Ver1.0>

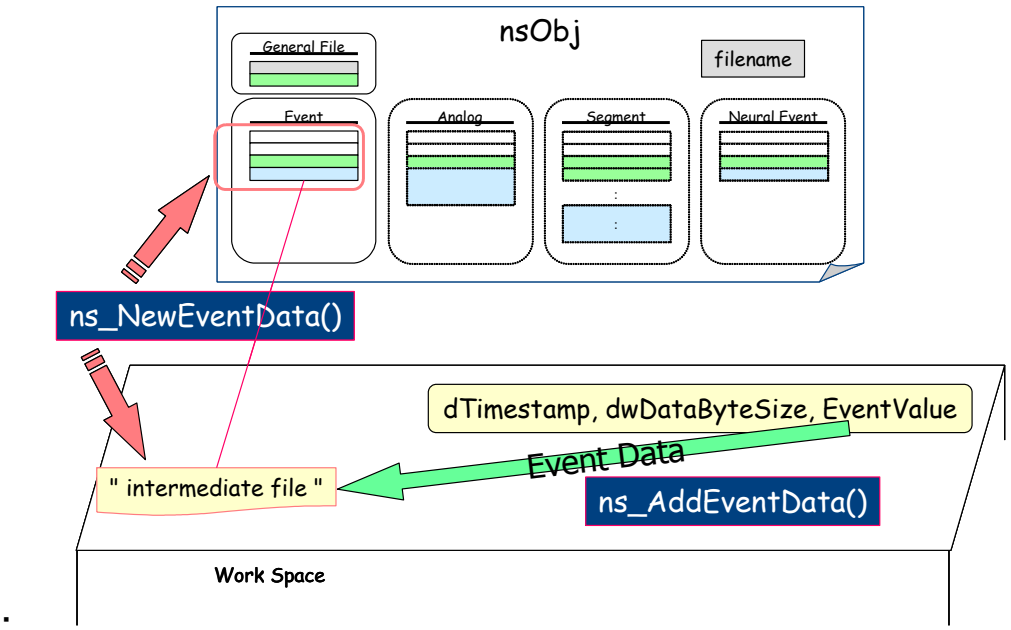


Figure 7 ns_NewEventData, ns_AddEventData

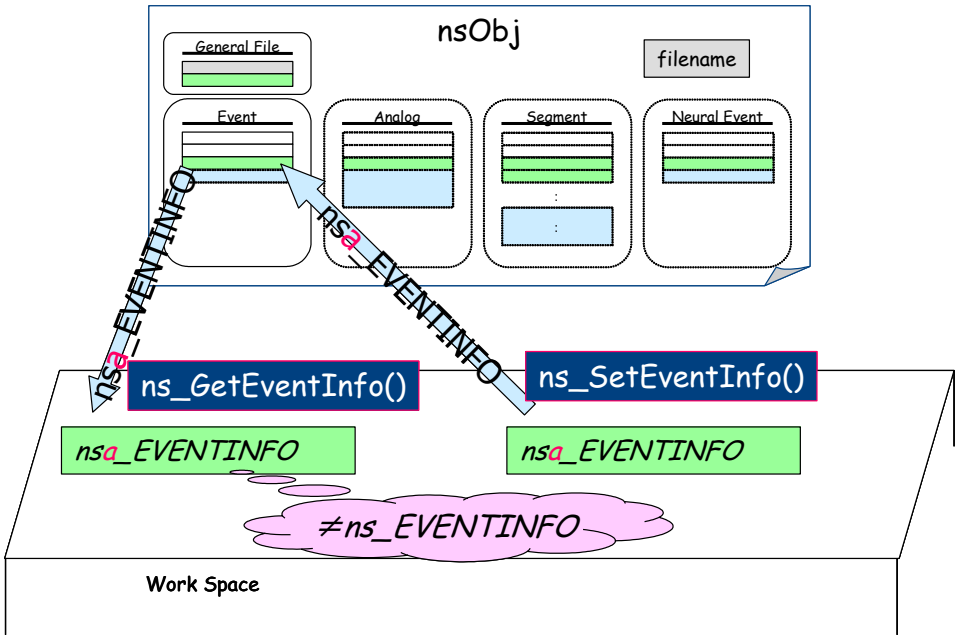


Figure 8 ns_GetEventInfo, ns_SetEventInfo

ns_NewEventData

Create new event entity to restore Event data.

[How to call]

[ns_Result nsObj ID] = ns_NewEventData(nsObj, szEntityLabel)

[Summary]

This method creates the intermediate file to restore Event data,
then returns the result data (ns_Result), the object (nsObj) and the identification number (ID).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
szEntityLabel	-[char]	the label of this entity (*1).

Output :

ns_Result	-[double] ns_OK or ns_WRONGLABEL.	
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated(*2). [When ns_Result is not ns_OK] the object which is NOT updated.
ID	-[uint32]	the identification number of event data. [When ns_Result is ns_OK] the identification number(*3). [When ns_Result is not ns_OK] “”(blank)

[Note]

(*1) It is option to input szEntityLabel. If you omitted it, the label will be set as ‘’(blank).

(*2) See <Table 6 nsObj's contents> about members which are updated.

(*3) It is the order of the Event entity.

ns_GetEventInfo

Get the struct to restore ns_EVENTINFO.

[How to call]

[ns_Result nsa_EVENTINFO] = ns_GetEventInfo(nsObj, ID)

[Summary]

This method gets the struct to restore ns_EVENTINFO,
then returns the result data (ns_Result) and the struct (nsa_EVENTINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of event data.

Output :

ns_Result	-[double]	ns_OK or ns_WRONGID.
nsa_EVENTINFO	-[struct]	the struct to restore nsa_EVENTINFO. [When ns_Result is ns_OK] the struct which is identified by ID. [When ns_Result is not ns_OK] “”(blank)

ns_SetEventInfo

Update the struct to restore ns_EVENTINFO.

[How to call]

[ns_Result nsObj] = ns_SetEventInfo(nsObj, ID, nsa_EVENTINFO)

[Summary]

This method updates the struct to restore ns_EVENTINFO,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of event data.
nsa_EVENTINFO	-[struct]	the struct to restore nsa_EVENTINFO(*1).

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGHEADER.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which of the ns_EVENTINFO is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

ns_AddEventData

Add new event data to the event entity.

[How to call]

[ns_Result nsObj] = ns_AddEventData(nsObj, ID, dTimestamp, EventValue)

[Summary]

This method adds(*1) event data (dTimestamp and EventValue) to the event entity which is identified by nsObj and ID. Then it returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of event data.
dTimestamp	-[double]	the timestamp value.
EventValue	-[(u)int8,(u)int16,(u)int32 or char]	the event value.(*2)(*3)

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGDATA.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

[Note]

(*1) Add means to write contents below to the intermediate file.

1. dTimestamp
2. dwDataByteSize (It is byte size of the EventValue)
3. EventValue

(*2) It is necessary to set same type of EventValue in the one event ID.

(*3) It doesn't correspond to Comma Separated Value.

Analog Entity registration processing

This is a description about methods when you register/add analog entity.

[Methods]

- ns_NewAnalogData
  - Create new analog entity to restore Analog data.
  - Create ns_TAGELEMENT, ns_ENTITYINFO, ns_ANALOGINFO. Initialize(*1) them.
  - Create ID number to identify analog entity data.(*2)
  - Create the intermediate file to restore Analog data.
  - Update structs(*3).
  - When input argument (szEntityLabel) is wrong, then returns error value [ns_WRONGLABEL].

- ns_GetAnalogInfo
  - Get nsa_ANALOGINFO(*4) data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].

- ns_SetAnalogInfo
  - Update nsa_ANALOGINFO data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (nsa_ANALOGINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_AddAnalogData
  - Write dTime, dwDataCount, dData to the intermediate file.
  - Update structs(*3).
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (dTime, dData) is wrong, then returns error value [ns_WRONGDATA].

(*1) See <Table 6 nsObj's contents> about Intial values.

(*2) Get,Set,Add methods use this ID number to identify analog entities.

(*3) See <Table 2 Summary of Member Variables for Updating Methods> about members which are updated.

(*4) See <Table 6 nsObj's contents> about Gettable/Settable member.

[How to use]

You can input command below like (Sample) on MATLAB Work Space.

1. ns_NewAnalogData
   (Sample) [retI nsObj AnalogID] = ns_NewAnalogData(nsObj, 'dummy');

2. ns_GetAnalogInfo
   (Sample) [retJ nsa_ANALOGINFO] = ns_GetAnalogInfo(nsObj, AnalogID);

3. Modify members of the structure.
   (Sample) nsa_ANALOGINFO.szProbeInfo = 'no meaning string';

4. ns_SetAnalogInfo
   (Sample) [retK nsObj] = ns_SetAnalogInfo(nsObj, AnalogID, nsa_ANALOGINFO);

5. ns_AddAnalogData
   (Sample) [retL nsObj] = ns_AddAnalogData(nsObj, AnalogID, 1.5, [5.6 4.5 3.4]);

[Notes]

- Nothing.

.

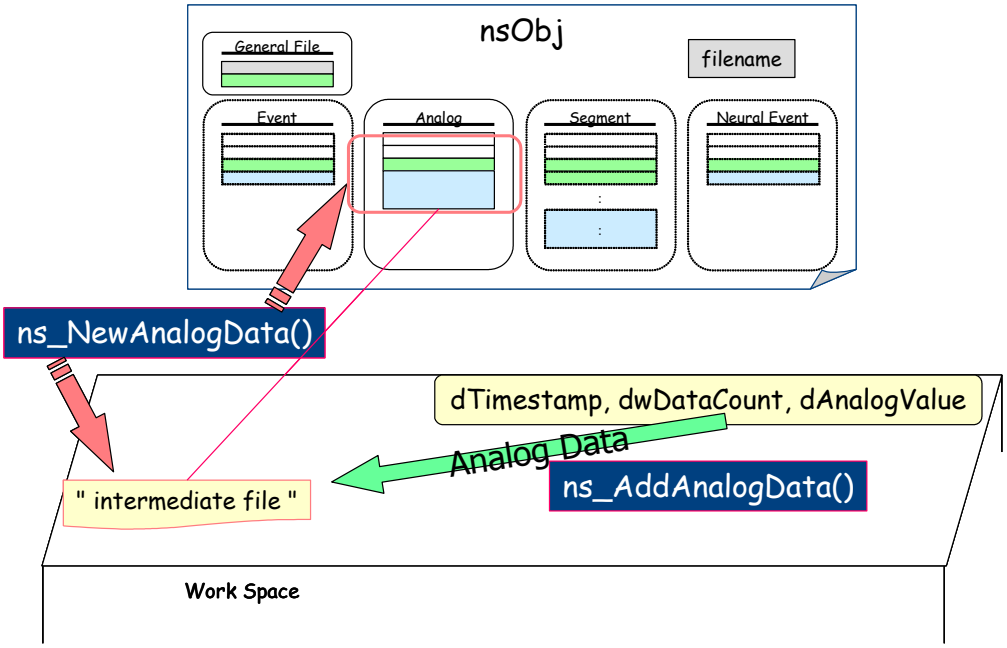


Figure 9 ns_NewAnalogData, ns_AddAnalogData

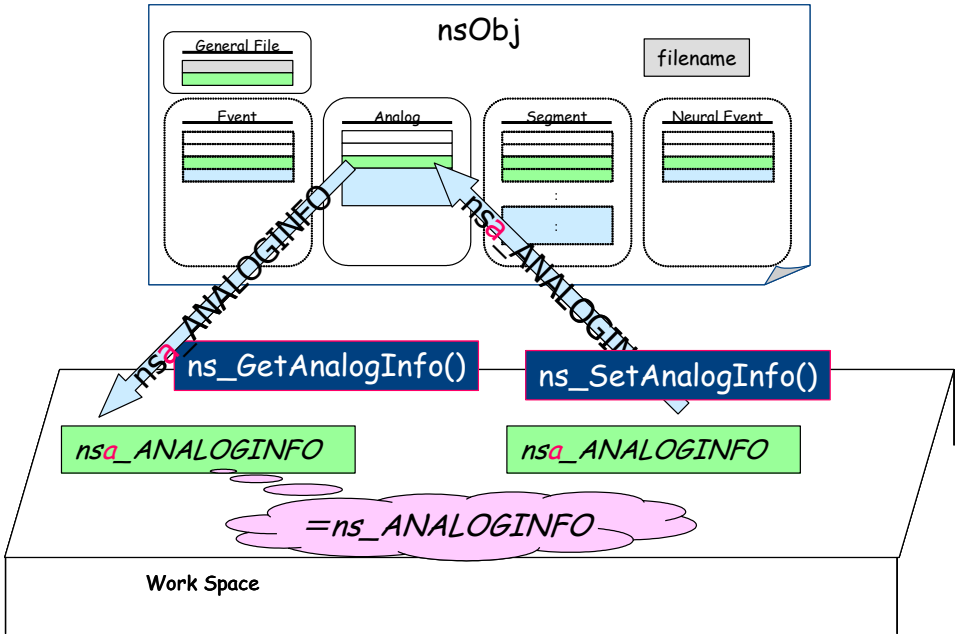


Figure 10 ns_GetAnalogInfo, ns_SetAnalogInfo

ns_NewAnalogData

Create new analog entity to restore Analog data.

[How to call]

[ns_Result nsObj ID] = ns_NewAnalogData(nsObj, szEntityLabel)

[Summary]

This method creates the intermediate file to restore Analog data,
then returns the result data (ns_Result), the object (nsObj) and the identification number (ID).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
szEntityLabel	-[char]	the label of this entity(*1).

Output :

ns_Result	-[double] ns_OK or ns_WRONGLABEL.	
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated(*2). [When ns_Result is not ns_OK] the object which is NOT updated.
ID	-[uint32]	the identification number of analog data. [When ns_Result is ns_OK] the identification number(*3). [When ns_Result is not ns_OK] “”(blank)

[Note]

(*1) It is option to input szEntityLabel. If you omitted it, the label will be set as ‘’(blank).

(*2) See <Table 6 nsObj's contents> about members which are updated.

(*3) It is the order of the Analog entity.

ns_GetAnalogInfo

Get the struct to restore ns_ANALOGINFO.

[How to call]

[ns_Result nsa_ANALOGINFO] = ns_GetAnalogInfo(nsObj, ID)

[Summary]

This method gets the struct to restore ns_ANALOGINFO,
then returns the result data (ns_Result) and the struct (nsa_ANALOGINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of analog data.

Output :

ns_Result	-[double]	ns_OK or ns_WRONGID.
nsa_ANALOGINFO	-[struct]	the struct to restore nsa_ANALOGINFO. [When ns_Result is ns_OK] the struct which is identified by ID. [When ns_Result is not ns_OK] “”(blank)

ns_SetAnalogInfo

Update the struct to restore ns_ANALOGINFO.

[How to call]

[ns_Result nsObj] = ns_SetAnalogInfo(nsObj, ID, nsa_ANALOGINFO)

[Summary]

This method updates the struct to restore ns_ANALOGINFO,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of analog data.
nsa_ANALOGINFO	-[struct]	the struct to restore nsa_ANALOGINFO(*1).

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGHEADER.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which of the ns_ANALOGINFO is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

ns_AddAnalogData

Add new analog data to the analog entity.

[How to call]

[ns_Result nsObj] = ns_AddAnalogData(nsObj, ID, dTime, dData)

[Summary]

This method adds(*1) analog data (dTime and dData) to the analog entity which is identified by nsObj and ID. Then it returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of analog data.
dTime	-[double]	the timestamp value.
dData	-[double]	the analog value.(vector 1*n)

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGDATA.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

[Note]

(*1) Add means to write contents below to the intermediate file.

1. dTime
2. dwDataCount (It is number of the dData)
3. dData (dAnalogValue[0]…dAnalogValue[dwDataCount - 1])

Segment Entity registration processing

This is a description about methods when you register/add segment entity.

[Methods]

- ns_NewSegmentData
  - Create new segment entity to restore Segment data.
  - Create ns_TAGELEMENT, ns_ENTITYINFO, ns_SEGMENTINFO, ns_SEGSOURCEINFO(*5). Initialize(*1) them.
  - Create SEGID number to identify segment entity data.(*2)
  - Create the intermediate file to restore Segment data.
  - Update structs(*3).
  - When input argument (szEntityLabel) is wrong, then returns error value [ns_WRONGLABEL].

- ns_GetSegmentInfo
  - Get nsa_SEGMENTINFO(*4) data.
  - When input argument (SEGID) is wrong, then returns error value [ns_WRONGID].

- ns_GetSegmentSourceInfo
  - Get nsa_SEGSOURCEINFO(*4) data.
  - When input argument (SEGID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (SEGSOURCEID) is wrong, then returns error value [ns_WRONGID].

- ns_SetSegmentInfo
  - Update nsa_SEGMENTINFO data.
  - When input argument (SEGID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (nsa_SEGMENTINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_SetSegmentSourceInfo
  - Update nsa_SEGSOURCEINFO data.
  - When input argument (SEGID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (SEGSOURCEID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (nsa_SEGSOURCEINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_AddSegmentData

- Write dwSampleCount, dTimestamp, dwUnitID, dValue to the intermediate file.
- ~~Create new SEGSOURCEID and add new ns_SEGSOURCEINFO to nsObj.~~ (*5)
- Update structs(*3).
- When input argument (SEGID) is wrong, then returns error value [ns_WRONGID].
- When input argument (dTimestamp, dwUnitID, dValue) is wrong, then returns error value [ns_WRONGDATA].

(*1) See <Table 6 nsObj's contents> about Intial values.

(*2) Get,Set,Add methods use this ID number to identify segment entities/sources.

(*3) See <Table 2 Summary of Member Variables for Updating Methods> about members which are updated.

(*4) See <Table 6 nsObj's contents> about Gettable/Settable member.

(*5) In Ver 1.3[1 Segmenet Entity : 1 SegSourceInfo Header.], ns_SEGSOURCEINFO is unique and created by ns_NewSegmentData(). (Not ns_AddSegmentData())

[How to use]

You can input command below like (Sample) on MATLAB Work Space.

1. ns_NewSegmentData
   (Sample) [retM nsObj SEGID] = ns_NewSegmentData(nsObj, 'dummy');

2. ns_GetSegmentInfo
   (Sample) [retN nsa_SEGMENTINFO] = ns_GetSegmentInfo(nsObj, SegmentID);

3. Modify members of the structure.
   (Sample) nsa_SEGMENTINFO.szUnits = 'no meaning';

4. ns_SetSegmentInfo
   (Sample) [retO nsObj] = ns_SetSegmentInfo(nsObj, SEGID, nsa_SEGMENTINFO);

5. ns_GetSegmentSourceInfo
   (Sample) [retQ nsa_SEGSOURCEINFO] = ns_GetSegmentSourceInfo(nsObj, SEGID, SEGSOURCEID);

6. Modify members of the structure.
   (Sample) nsa_SEGSOURCEINFO.szProbeInfo = 'no meaning string';

7. ns_SetSegmentInfo
   (Sample) [retR nsObj] = ns_SetSegmentSourceInfo(nsObj, SEGID, SEGSOURCEINFO,

nsa_SEGMENTINFO);

8. ns_AddSegmentData

   (Sample) [retP nsObj ~~SEGSOURCEID~~] = ns_AddSegmentData(nsObj, SEGID, 1.5, 3, [5.6 4.5 3.4]);

[Notes]

- ~~It is impossible to call methods ns_GetSegmentSourceinfo and ns_SetSegmentSourceInfo before call the method ns_AddSegmentData().~~
  ~~Because SEGSOURCEID and ns_SEGSOURCEINFO are created when you call the method ns_AddSegmentData().~~
  ns_SEGSOURCEINFO is unique. So, if you call ns_GetSegmentSourceInfo(nsObj, SEGID, 2), ERROR will be occurred.

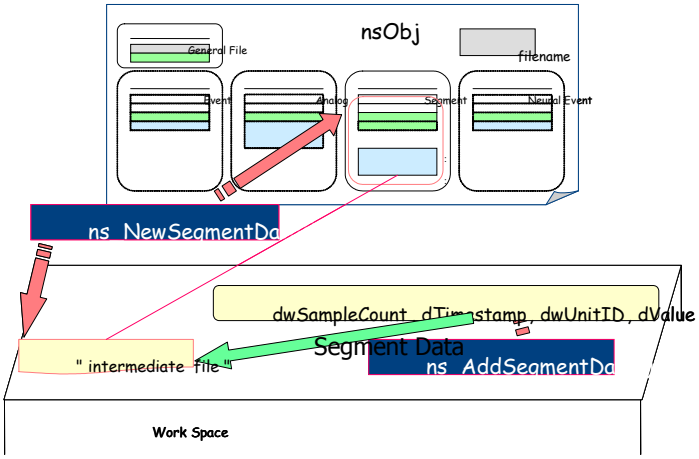


Figure 11 ns_NewSegmentData, ns_AddSegmentData

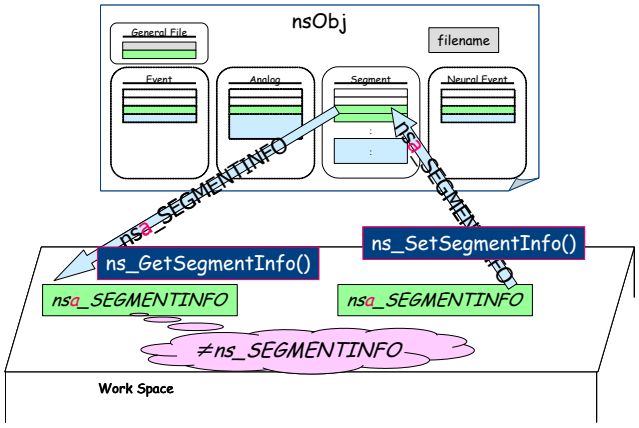


Figure 12 ns_GetSegmentInfo, ns_SetSegmentInfo

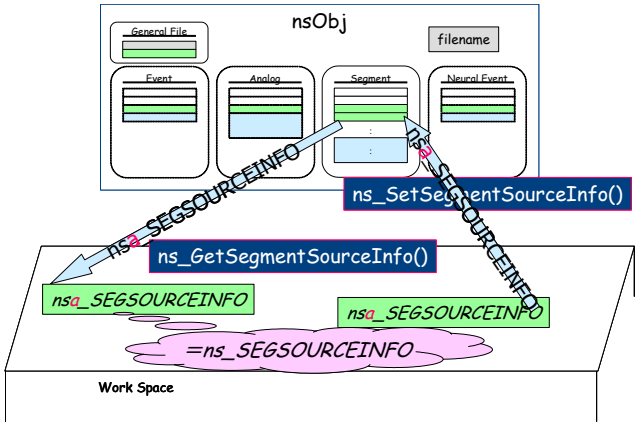


Figure 13 ns_GetSegmentSourceInfo, ns_SetSegmentSourceInfo

ns_NewSegmentData

Create new segment entity to restore Segment data.

[How to call]

[ns_Result nsObj SEGID] = ns_NewSegmentData(nsObj, szEntityLabel)

[Summary]

This method creates the intermediate file to restore Segment data and ns_SEGSOURCEINFO(*4), then returns the result data (ns_Result), the object (nsObj) and the identification number (SEGID).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
szEntityLabel	-[char]	the label of this entity(*1).

Output :

ns_Result	-[double] ns_OK or ns_WRONGLABEL.	
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated(*2). [When ns_Result is not ns_OK] the object which is NOT updated.
SEGID	-[uint32]	the identification number of analog data. [When ns_Result is ns_OK] the identification number(*3). [When ns_Result is not ns_OK] “”(blank)

[Note]

(*1) It is option to input szEntityLabel. If you omitted it, the label will be set as ‘’(blank).

(*2) Refer Table 6 about members which are updated.

(*3) It is the order of the Segment entity.

(*4) From Ver 1.3

ns_GetSegmentInfo

Get the struct to restore ns_SEGMENTINFO.

[How to call]

[ns_Result nsa_SEGMENTINFO] = ns_GetSegmentInfo(nsObj, SEGID)

[Summary]

This method gets the struct to restore ns_SEGMENTINFO,
then returns the result data (ns_Result) and the struct (nsa_SEGMENTINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
SEGID	-[uint32]	the identification number of segment data.

Output :

ns_Result	-[double]	ns_OK or ns_WRONGID.
nsa_SEGMENTINFO	-[struct]	the struct to restore nsa_SEGMENTINFO. [When ns_Result is ns_OK] the struct which is identified by SEGID. [When ns_Result is not ns_OK] “”(blank)

ns_GetSegmentSourceInfo

Get the struct to restore ns_SEGSOURCEINFO.

[How to call]

[ns_Result nsa_SEGSOURCEINFO] = ns_GetSegmentSourceInfo(nsObj, SEGID, SEGSOURCEID)

[Summary]

This method gets the struct to restore ns_SEGSOURCEINFO,
then returns the result data (ns_Result) and the struct (nsa_SEGMENTINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
SEGID	-[uint32]	the identification number of segment data.
SEGSOURCEID	-[uint32]	the identification number of segment source.

Output :

ns_Result	-[double]	ns_OK or ns_WRONGID.
nsa_SEGSOURCEINFO	-[struct]	the struct to restore nsa_SEGSOURCEINFO. [When ns_Result is ns_OK] the struct which is identified by SEGID and SEGSOURCEID. [When ns_Result is not ns_OK] “”(blank)

ns_SetSegmentInfo

Update the struct to restore ns_SEGMENTINFO.

[How to call]

[ns_Result nsObj] = ns_SetSegmentInfo(nsObj, SEGID, nsa_SEGMENTINFO)

[Summary]

This method updates the struct to restore ns_SEGMENTINFO,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
SEGID	-[uint32]	the identification number of segment data.
nsa_SEGMENTINFO	-[struct]	the struct to restore nsa_SEGMENTINFO(*1).

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGHEADER.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which of the ns_SEGMENTINFO is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

ns_SetSegmentSourceInfo

Update the struct to restore ns_SEGSOURCEINFO.

[How to call]

[ns_Result nsObj] = ns_SetSegmentSourceInfo(nsObj, SEGID, SEGSOURCEID, nsa_SEGSOURCEINFO)

[Summary]

This method updates the struct to restore ns_SEGSOURCEINFO,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
SEGID	-[uint32]	the identification number of segment data.
SEGSOURCEID	-[uint32]	the identification number of segment source.
nsa_SEGSOURCEINFO	-[struct]	the struct to restore nsa_SEGSOURCEINFO(*1).

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGHEADER.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which of the ns_SEGSOURCEINFO is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

ns_AddSegmentData

Add new segment data to the segment entity.

[How to call]

~~[ns_Result nsObj SEGSOURCEID] = ns_AddSegmentData(nsObj, SEGID, dTimestamp, dwUnitID, dValue)~~ (*3)

[ns_Result nsObj] = ns_AddSegmentData(nsObj, SEGID, dTimestamp, dwUnitID, dValue)

[Summary]

This method adds ~~new ns_SEGSOURCEINFO(identified by SEGSOURCEID)(*1)~~ (*4)segment data (dTimestamp, dwUnitId and dValue)(*2) to the segment entity which is identified by nsObj and SEGID. Then it returns the result data (ns_Result) ,the object (nsObj) and the new identified number(SEGSOURCEID).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
SEGID	-[uint32]	the identification number of segment data.
dTimestamp	-[double]	the timestamp value.
dUnitID	-[uint32]	the Classification ID.
dValue	-[double]	the segment value.(vector 1*n)

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGDATA.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated. [When ns_Result is not ns_OK] the object which is NOT updated.
~~SEGSOURCEID~~	~~[uint32]~~	~~the identification number of segment source.~~ ~~[When ns_Result is ns_OK]~~ ~~the identification number(*3).~~ ~~[When ns_Result is not ns_OK]~~ ~~“”(blank)~~ (*3)

[Note]

(*1) It causes the consistency between the record number of this entity and the number of ns_SEGSOURCEINFO that creating new ns_SEGSOURCEINFO when adding a segment data.

(*2) Add means to write contents below to the intermediate file.

1. dwSampleCount (It is number of the dValue)
2. dTimestamp
3. dwUnitID
4. dValue (dValue[0]…dAnalogValue[dwSampleCount - 1])

(*3) I/F was modified.[Ver. 1.3]

(*4) It moved to the ns_NewSegmentData().[Ver. 1.3]

Neural Event Entity registration processing

This is a description about methods when you register/add neural event entity.

[Methods]

- ns_NewNeuralEventData
  - Create new neural event entity to restore Neural Event data.
  - Create ns_TAGELEMENT, ns_ENTITYINFO, ns_NEURALINFO. Initialize(*1) them.
  - Create ID number to identify neural event entity data.(*2)
  - Create the intermediate file to restore Neural Event data.
  - Update structs(*3).
  - When input argument (szEntityLabel) is wrong, then returns error value [ns_WRONGLABEL].

- ns_GetNeuralInfo
  - Get nsa_NEURALINFO(*4) data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].

- ns_SetNeuralInfo
  - Update nsa_NEURALINFO data.
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (nsa_NEURALINFO) is wrong, then returns error value [ns_WRONGHEADER], or returns ok value [ns_OK] with displaying WARNING MESSAGE.

- ns_AddNeuralEventData
  - Write dTimestamp to the intermediate file.
  - Update structs(*3).
  - When input argument (ID) is wrong, then returns error value [ns_WRONGID].
  - When input argument (dTimestamp) is wrong, then returns error value [ns_WRONGDATA].

(*1) See <Table 6 nsObj's contents> about Intial values.

(*2) Get,Set,Add methods use this ID number to identify neural event entities.

(*3) See <Table 2 Summary of Member Variables for Updating Methods> about members which are updated.

(*4) See <Table 6 nsObj's contents> about Gettable/Settable member.

[How to use]

You can input command below like (Sample) on MATLAB Work Space.

1. ns_NewNeuralEventData
   (Sample) [retS nsObj NeuralID] = ns_NewNeuralEventData(nsObj, 'dummy');

2. ns_GetNeuralInfo
   (Sample) [retT nsa_NEURALINFO] = ns_GetNeuralInfo(nsObj, NeuralID);

3. Modify members of the structure.
   (Sample) nsa_NEURALINFO.szProbeInfo = 'no meaning string';

4. ns_SetNeuralInfo
   (Sample) [retU nsObj] = ns_SetNeuralInfo(nsObj, NeuralID, nsa_NEURALINFO);

5. ns_AddNeuralEventData
   (Sample) [retV nsObj] = ns_AddNeuralEventData(nsObj, NeuralID, 1.5);

[Notes]

- You have to know how many entities are included in the Neuroshare file if you wanted to set ns_NEURALINFO correctly. See <Ver 1.0>.

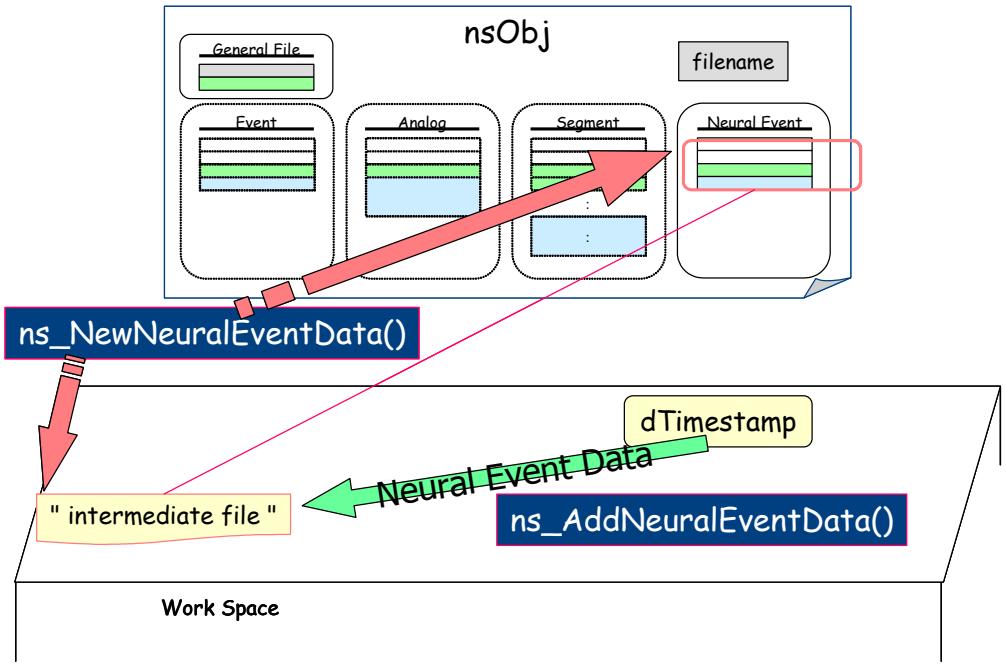


Figure 14 ns_NewNeuralEventData, ns_AddNeuralEventData

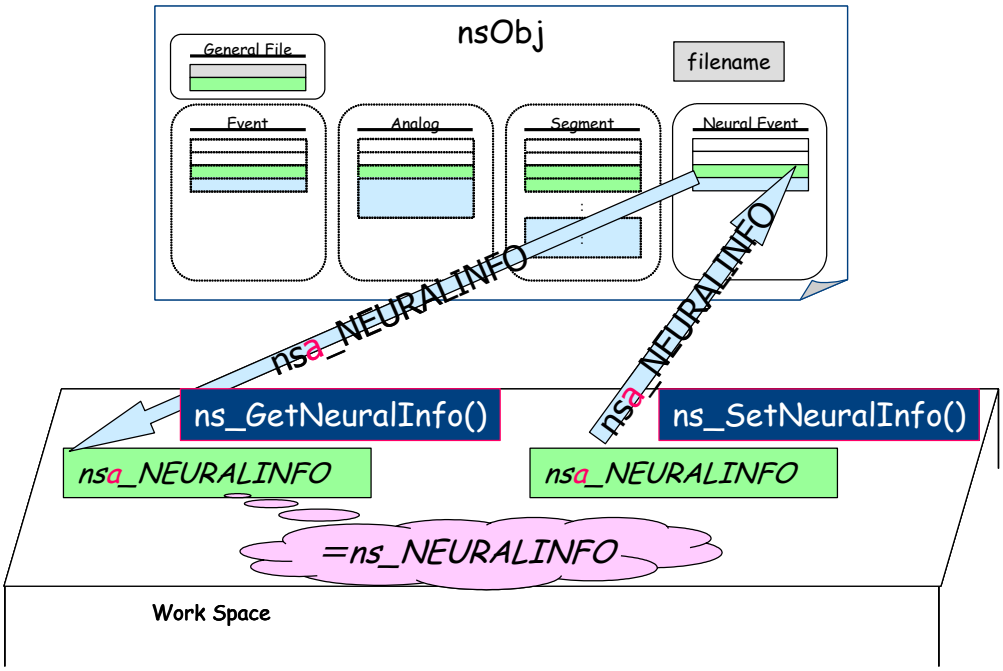


Figure 15 ns_GetNeuralInfo, ns_SetNeuralInfo

ns_NewNeuralEventData

Create new neural event entity to restore Neural Event data.

[How to call]

[ns_Result nsObj ID] = ns_NewNeuralEventData(nsObj, szEntityLabel)

[Summary]

This method creates the intermediate file to restore Neural Event data,
then returns the result data (ns_Result), the object (nsObj) and the identification number (ID).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
szEntityLabel	-[char]	the label of this entity(*1).

Output :

ns_Result	-[double] ns_OK or ns_WRONGLABEL.	
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated(*2). [When ns_Result is not ns_OK] the object which is NOT updated.
ID	-[uint32]	the identification number of neural event data. [When ns_Result is ns_OK] the identification number(*3). [When ns_Result is not ns_OK] “”(blank)

[Note]

(*1) It is option to input szEntityLabel. If you omitted it, the label will be set as ‘’(blank).

(*2) See <Table 6 nsObj's contents> about members which are updated.

(*3) It is the order of the Neural Event entity.

ns_GetNeuralInfo

Get the struct to restore ns_NEURALINFO.

[How to call]

[ns_Result nsa_NEURALINFO] = ns_GetNeuralInfo(nsObj, ID)

[Summary]

This method gets the struct to restore ns_NEURALINFO,
then returns the result data (ns_Result) and the struct (nsa_NEURALINFO).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of neural event data.

Output :

ns_Result	-[double]	ns_OK or ns_WRONGID.
nsa_NEURALINFO	-[struct]	the struct to restore nsa_NEURALINFO. [When ns_Result is ns_OK] the struct which is identified by ID. [When ns_Result is not ns_OK] “”(blank)

ns_SetNeuralInfo

Update the struct to restore ns_NEURALINFO.

[How to call]

[ns_Result nsObj] = ns_SetNeuralInfo(nsObj, ID, nsa_NEURALINFO)

[Summary]

This method updates the struct to restore ns_NEURALINFO,
then returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of neural event data.
nsa_NEURALINFO	-[struct]	the struct to restore nsa_NEURALINFO(*1).

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGHEADER.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which of the ns_NEURALINFO is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

ns_AddNeuralEventData

Add new neural event data to the neutal event entity.

[How to call]

[ns_Result nsObj] = ns_AddNeuralEventData(nsObj, ID, dTime)

[Summary]

This method adds(*1) neural event data (dTime) to the neural event entity which is identified by nsObj and ID. Then it returns the result data (ns_Result) and the object (nsObj).

[Arguments]

Input :

nsObj	-[struct]	the object to restore Neuroshare data.
ID	-[uint32]	the identification number of neural event data.
dTime	-[double]	the timestamp value.

Output :

ns_Result	-[double]	ns_OK/ns_WRONGID/ns_WRONGDATA.
nsObj	-[struct]	the object to restore Neuroshare data. [When ns_Result is ns_OK] the object which is updated. [When ns_Result is not ns_OK] the object which is NOT updated.

[Note]

(*1) Add means to write contents below to the intermediate file.

1. dTime

Terminology Supplement

nsObj

nsObj is the object of ns_CreateFile class library and stores the nessesary information to create the Neuroshare file. See <Figure 16 Format of nsObj> and <Table 6 nsObj's contents>.

nsa_***INFO

nsa_***INFO is the struct which includes some members of ns_***INFO. nsa_***INFO only has modifiable members from ns_***INFO. See <Table 6 nsObj's contents>.

You can only modify nsa_***INFO members. The reason of it is to avoid unconsistency with header data and real data. For example, in ns_FILEINFO, the member dwEntityCount is unmodifiable. The meaning of dwEntityCount indicates the number of entities which the Neuroshare file has. If the value was modifiable, it causes unconsistency between ns_FILEINFO(i.e. header data) and real data.

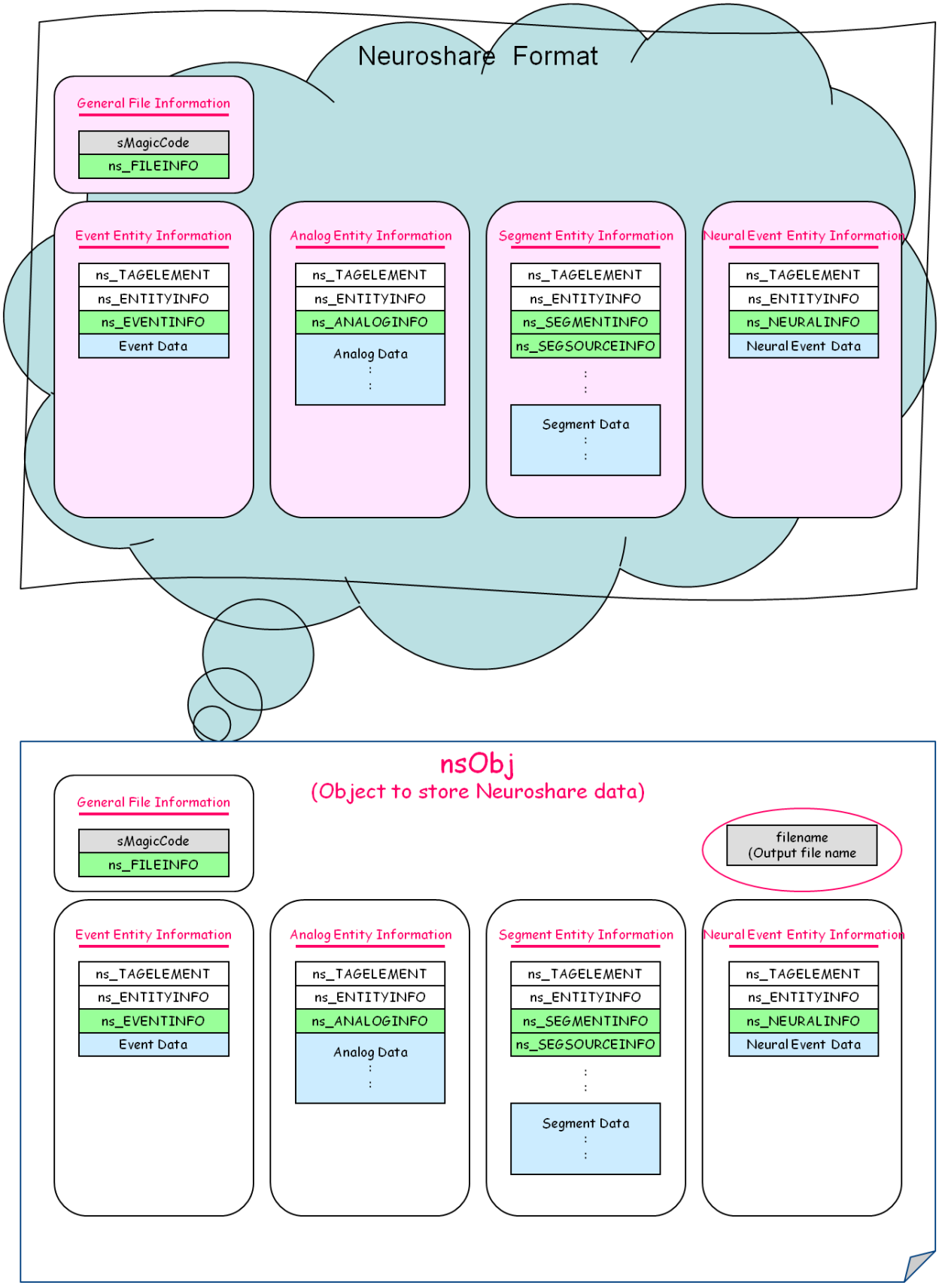


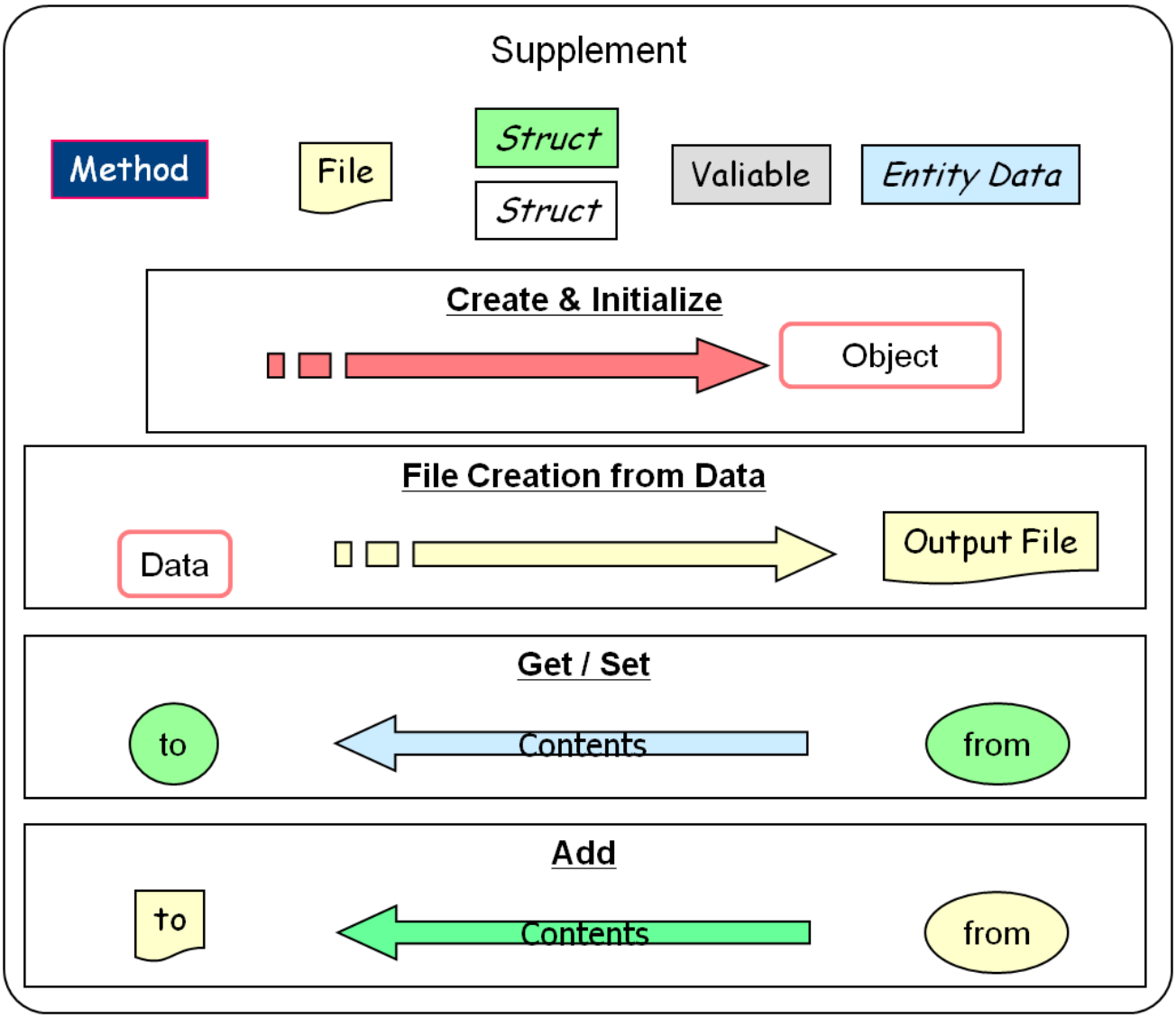
Figure 16 Format of nsObj

Table 6 nsObj's contents

Struct name	Member name	Type	Default Value	Comment	Modifiable of not with using Getter/Setter *○:modifiable ×:unmodifiable
	sMagicCode	char[16]	'NSN ver000000010'	Document type identifier	×
	filename	char	Nothing	The Neuroshare file name. You have to set it when use class.	×
ns_FILEINFO	szFileType	char[32]	"(blank)		○
	dwEntityCount	uint32	0	Entity number.	×
	dTimeStampResolution	double	0		○
	dTimeSpan	double	0		○
	szAppName	char[64]	"(blank)		○
	dwTime_Year	uint32	1900	Treat Jan/1/1900 Mon 00:00:00:0000 as default value.	○
	dwTime_Month	uint32	1		○
	dwTime_DayOfWeek	uint32	1		○
	dwTime_Day	uint32	1		○
	dwTime_Hour	uint32	0		○
	dwTime_Min	uint32	0		○
	dwTime_Sec	uint32	0		○
	dwTime_MilliSec	uint32	0		○
	szFileComment	char[256]	"(blank)		○
ns_TAGELEMENT	dwElemType	uint32	nsObj.CONST.ns_ENTITY_UNKNOWN	Type of entity. Default is unknown.	×
	dwElemLength	uint32	0		×
ns_ENTITYINFO	szEntityLabel	char[32]	"(blank)		×
	dwEntityType	uint32	nsObj.CONST.ns_ENTITY_UNKNOWN	Type of entity. Default is unknown.	×
	dwItemCount	uint32	0		×
ns_EVENTINFO	dwEventType	uint32	nsObj.CONST.ns_EVENT_TEXT	Type of Event Data. Dafault is Text.	×
	dwMinDataLength	uint32	0		×
	dwMaxDataLength	uint32	0		×
	szCSVDesc	char[128]	"(blank)		○
ns_ANALOGINFO	dSampleRate	double	0		○
	dMinVal	double	0		○
	dMaxVal	double	0		○
	szUnits	char[16]	"(blank)		○
	dResolution	double	0		○
	dLocationX	double	0		○
	dLocationY	double	0		○

	dLocationZ	double	0		○
	dLocationUser	double	0		○
	dHighFreqCorner	double	0		○
	dwHighFreqOrder	uint32	0		○
	szHighFilterType	char[16]	"(blank)		○
	dLowFreqCorner	double	0		○
	dwLowFreqOrder	uint32	0		○
	szLowFilterType	char[16]	"(blank)		○
	szProbeInfo	char[128]	"(blank)		○
ns_SEGMENTINFO	dwSourceCount	uint32	0		×
	dwMinSampleCount	uint32	0		×
	dwMaxSampleCount	uint32	0		×
	dSampleRate	double	0		○
	szUnits	char[32]	0		○
ns_SEGSOURCEINFO	dMinVal	double	0		○
	dMaxVal	double	0		○
	dResolution	double	0		○
	dSubSampleShift	double	0		○
	dLocationX	double	0		○
	dLocationY	double	0		○
	dLocationZ	double	0		○
	dLocationUser	double	0		○
	dHighFreqCorner	double	0		○
	dwHighFreqOrder	uint32	0		○
	szHighFilterType	char[16]	"(blank)		○
	dLowFreqCorner	double	0		○
	dwLowFreqOrder	uint32	0		○
	szLowFilterType	char[16]	"(blank)		○
	szProbeInfo	char[128]	"(blank)		○
ns_NEURALINFO	dwSourceEntityID	uint32	0		○
	dwSourceUnitID	uint32	0		○
	szProbeInfo	char[128]	"(blank)		○

Chart Supplement



Notice Points

Ver 1.0

- About ns_NEURALINFO.dwSourceEntityID and ns_NEURALINFO.dwSourceUnitID.
  If you wanted to set these members correctly, you have to realize how many entities exitst in the Neuroshare file. The reason of it is that this library creates the Neuroshare file with the order (Event, Analog, Segment, NeuralEvent).
- About CSV data format.
  The method ns_AddEventData() doesn't correspond to the input of Comma Separated Value.

Ver 1.3

- 1 Segmenet Entity : 1 SegSourceInfo Header.
  In Ver 1.3, we defined the relationship num of SegSourceInfo and SegmentData as 1:N.
  So, you can register “ONE” SegSourceInfo header per one Segment entity.

  Old :
  Num of Segment Entity : Num of SegSourceInfo : Num of SegmentData records = 1:N:N
  New :
  Num of Segment Entity : Num of SegSourceInfo : Num of SegmentData records = 1:1:N

  Then, two methods were modified. ns_NewSegmentData() and ns_AddSegmentData().
  See docs if you want to know more.

Update Log

Ver 1.0 Date : 2009/06/25

New Creation with referring site below.

POMU-LAB site : http://www2.bpe.es.osaka-u.ac.jp/multineuron/POMU-Lab/index.html

Ver 1.3 Date : 2011/03/04

Modified for Ver 1.3.

Acknowledgment

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