Remote Control SDK user manual

Amy Robotics

Table of content

Version history：

Version	Comment	Date	PIC
V1.0	Initial commit	2019-02-19	mudeyu
V1.1	Correct Names & params	2019-02-22	mudeyu zhongjianhui
V1.2	English translation & minor corrections	2019-02-22	zyu

1. Summary

Remote Control SDK documentation for all AmyRobotics robots.

2. Environment requirements

2.1. Install develop environment

Install JDK with version number >= 1.7

2.2. Import libraries into project

Import library “AmyRobotRemoteClientLib.jar” into project.

Import dependent libraries:

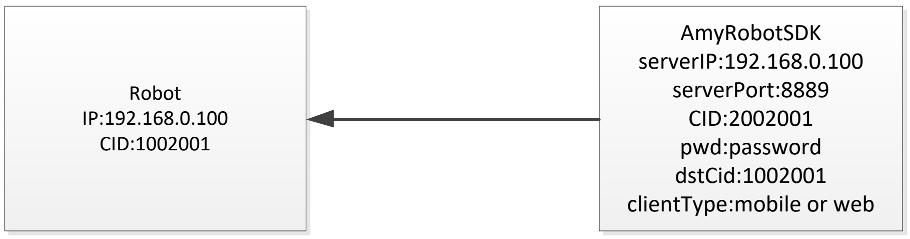
```
<dependency>
    <groupId>com.googlecode.protobuf-java-format</groupId>
    <artifactId>protobuf-java-format</artifactId>
    <version>1.2</version>
</dependency>

<dependency>
    <groupId>com.google.protobuf</groupId>
    <artifactId>protobuf-java</artifactId>
    <version>3.0.0</version>
</dependency>

<dependency>
    <groupId>com.alibaba</groupId>
    <artifactId>fastjson</artifactId>
    <version>1.2.18</version>
</dependency>

<dependency>
    <groupId>io.netty</groupId>
    <artifactId>netty-all</artifactId>
    <version>4.1.27.Final</version>
</dependency>
```

2.3. Start remote control server on robot

Start remote control service on robot and make sure version number is >= 1.21.1.

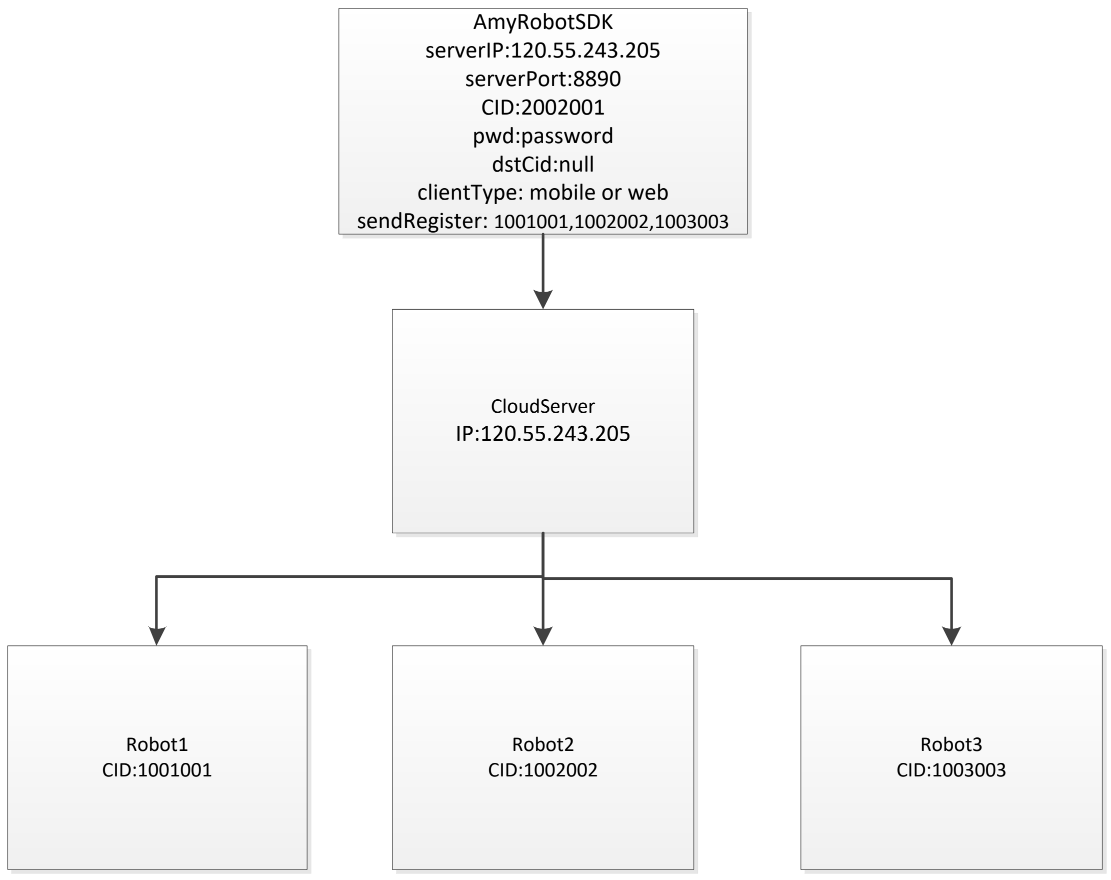
2.4. Remote control over LAN

Use sendAction method to send commands after successful connection and registration



2.5. Remote control over cloud

dstcid set to null, use sendRegister to send registration after successful connection, use sendAction method to send commands



3. Remote control class

3.1. Create remote control management object

RobotClientMgr mRobotClientMgr = RobotClientMgr.getInstance();
RobotClientMgr provides methods for server and robot communication. See following sections.

3.2. Initialization

Name: setClientType(String clientType)
Description: setup client type, incorrect type will not get through
Parameters:

Name	Type	Comment
CLIENT_TYPE_WEB	String	Web client
CLIENT_TYPE_MOBILE	String	Mobile client

Example:
mRobotClientMgr.setClientType(RemoteClientType.CLIENT_TYPE_WEB);

Name: init (serverIP, serverPort, userName, cid, dstCid, passwd)

Description: initialize server IP addres,s, port etc.

Parameters:

Name	Type	Required	Comment
serverIP	String	Y	Server IP
serverPort	String	Y	Server port
userName	String	N	User name
cid	String	Y	Sender id
dstCid	String	Y	Robot id
passwd	String	Y	password

3.3. Setup map parameters

Name: setUseMapDir (String mapRootDir);

Description: set map save path

Parameters:

Name	Type	Required	Comment
mapRootDir	String	Y	Map save path. Can be relative or absolute.

Example:

String mapRootDir= "amyrobot//map/";

mRobotClientMgr.setUseMapDir(mapRootDir);

Name: String getUseMapDir(String mapRootDir);

Description: get map saving path

Return: return map saving path

3.4. Register

Name: void sendRegister(String cid, String pwd);

Description: Send registration

Name	Type	Required	Comment
cid	String	Y	Robot id
pwd	String	Y	password

Return:

Will call onRegisterResult() from RobotEventListener class

3.5. Connection listening event

Name:

addDataClientListener (String obj, RobotEventListener listener);
removeDataClientListener(String obj);

Description：

addDataClientListener adds event listener
removeDataClientListener removes event listener

Name	Type	Required	Comment
obj	String	Y	String object, used to differentiate multiple different listeners
listener	RobotEventListener	Y	Event callback, see RobotEventListener for detail

RobotEventListener interface description：

Name	Description
onConnected	Callback for successful connection
onRegisterResult	Callback for registration results **srcCId** registration cid **code** error code：200 means success, error for otherwise **errInfo** return error info in case of error
onDisconnected	Callback for disconnection
onError	Callback for error

Example：

```
String DATA_HANDLER_CALLBACK_ID = "10000";
mRobotClientMgr.addDataClientListener(DATA_HANDLER_CALLBACK_ID, new
BaseDataClientListener() {
            @Override
            public void onConnected() {
                LogUtils.d(TAG, "onConnected");
            }

            @Override
            public void onRegisterResult(String srcCId, int code, String errInfo) {
                LogUtils.d(TAG, "onRegisterResult: " + srcCId + ", " + code + ", " + errInfo);
                handleRegisterResult(srcCId, code, errInfo);
            }

            @Override
            public void onDisconnected() {
                LogUtils.d(TAG, "onDisconnected");
            }

            @Override
            public void onError(Throwable e) {
```

```
                        LogUtils.e(TAG, "onError", e);
                    }

                });
```

3.6. Log setup

Name: setDebug (boolean enable)

Description: enable / disable debug printing to console

Description:

Name	Type	Required	Comment
enable	boolean	Y	Enable debug logging

Name: setLogLevel (int level)

Description: set logger level

Description:

Name	Type	Required	Comment
level	int	Y	LOG_LEVEL_VERBOSE everything LOG_LEVEL_DEBUG debug LOG_LEVEL_INFO info LOG_LEVEL_WARN warning LOG_LEVEL_ERROR error

3.7. Send action

Name:

boolean sendAction(String action, Map<String, String> params, ActionEventCallback requestCallback);

boolean sendAction(String dstId, String action, Map<String, String> params, ActionEventCallback requestCallback);

boolean sendAction(String srcId, String dstId, String action, Map<String, String> params, ActionEventCallback requestCallback);

Action description: send action

Description

Name	Type	Required	Comment
srcId	String	Y	Sender ID
dstCid	String	Y	Receiver ID
action	String	Y	different actions entitle different names
params	Map<String, String>	N	Send parameters according to

			correspondent action, use **null** if not needed
requestCallback	ActionEventCallback	N	Callback success: onSuccess(RobotEvent robotEvent); Use **resultCode** for correspondent action, see error code description; robotEvent.resultCode == CODE_OK Callback on failure: onFailed(int code, String msg, Throwable e);

Return： return results according to correspondent actions

Example：

```
String srcId = "200100";
String dstCid = "200101";
String action = "robot.startNavigation"; //bring up nav
Map<String, String> params = new HashMap<>();
params.put("mapId", "069a6c1d-e0fb-4d5b-a8fa-5b4c9a0b2cf5");

mRobotClientMgr.sendAction(srcId, dstCid, action, params, new ActionEventCallback() {
        @Override
        public void onSuccess(RobotEvent robotEvent) {
                if(robotEvent.resultCode == RobotNotifyCode.CODE_OK) {
                        LogUtils.e(TAG, "ok " + robotEvent.resultCode + ", " + robotEvent.notifyInfo);
                } else {
                        LogUtils.e(TAG, "error " + robotEvent.resultCode + ", " + robotEvent.notifyInfo);
                }
        }

        @Override
        public void onFailed(int code, String msg, Throwable e) {
                LogUtils.e(TAG, "error " + code + ", " + msg + ", " + e);
        }
});
```

3.8. Listen to robot event

Name： setRobotEventListener(RobotEventListener listener)

Description: setup robot event listener

Description:

Name	Type	Required	Comment
listener	RobotEventListener	Y	RobotEvent see following

RobotEvent Description:

Name	Type	Required	Comment
cid	String	Y	Robot id
notifyAction	String	Y	Action name
resultCode	int	Y	Return error code, 200 means success, otherwise means failure; See error code description for detail.
notifyInfo	String	N	Correspondent error info for actions.
notifyParams	String	N	Return
notifyPktId	String	Y	Event notification ID
data	Object	N	Extra data for extension.

Example:

```
mRobotClientMgr.setRobotEventListener(new RobotEventListener() {
                @Override
                public void onRobotEvent(RobotEvent robotEvent) {
                      handleRobotEvent(robotEvent);
                }
          });
```

3.9. Service start or stop

Name: start();

Description: start service, automatically connect to server according to server configuration and listen to events

Name: stop();

Description: stop service

Name: boolean isConnected ();

Description: check server connection

4. Navigation

4.1. bring up navigation

Name: robot.startNavigation

Action description: bring up navigation. Only after bringing up the navigation can nav task be executed

Description：

Name	Type	Required	Comment	Value
mapId	String	Y	Map ID	
useDefault	String	N	Use default map when set to 1	

Return：

Name	Type	Comment
cid	String	Robot ID
notifyAction	String	robot.startNavigation
resultCode	int	Error code, 200 means success, otherwise see error code description for more information. Common error: CODE_ERROR_STOP_SWITCH_IS_OPEN, bring up nav failed, E-stop has been pressed CODE_ERROR, useMap failed, use map failed, correspondent map file doesn't exist or map file format error. See notifyInfo
notifyInfo	String	Error info
notifyParams	String	Bring up navigation success

Note:

Make sure E-stop hasn't been pressed when bringing up navigation and robot should be moved to pre-defined starting location

4.2. Stop navigation

Name: robot. stopNavigation

Action description：stop navigation

Description: N/A

Return：

Name	Type	Comment

cid	String	Robot id
notifyAction	String	robot. stopNavigation
resultCode	int	Error code, 200 means success, otherwise see error code description
notifyInfo	String	Error info
notifyParams	String	

Note:
Robot should be put to starting location after navigation restarts

4.3. Get navigation status

Name: robot. getNavState
Action description: get navigation status
Description: N/A
Return:

Name	Type	Comment
cid	String	Robot ID
notifyAction	String	robot. getNavState
resultCode	int	Error code, 200 means success, otherwise see error code description
notifyInfo	String	Error info
notifyParams	String	See navigation status

Navigation status:

Name	Value	Type	Comment
NAVI_START	#NAV02	String	Nav bring up
NAVI_STOP	#NAV07	String	Nav stop

Note:
Robot should be put to starting location after navigation restarts

4.4. Navigate to point

Name: robot.navToPoint
Action description: navigate to marked point
Description:

Name	Type	Required	Comment
x	String	Y	X coordinate Float converted to String;
y	String	Y	y coordinate

			Float converted to String;
z	String	Y	Z coordinate Float converted to String;
name	String	Y	Point name for logging

Return:

Name	Type	Comment
cid	String	Robot ID
notifyAction	String	robot.navToPoint
resultCode	int	Error code, 200 means success, otherwise see error code description
notifyInfo	String	Error info
notifyParams	String	See navigation status

4.5. Navigation status

Navigation status is defined in IPCResponse class:

Name	Value	Type	Comment
NAVI_ARRIVE	#NAV01	String	Arrival
NAVI_START	#NAV02	String	Bring up
NAVI_LOST	#NAV03	String	Lost
NAVI_GIVEUP	#NAV04	String	Aborted
NAVI_TIMEOUT	#NAV05	String	Timeout
NAVI_CANCLE_SUCCESS	#NAV06	String	Cancel
NAVI_STOP	#NAV07	String	Stop

4.6. Cancel navigation

Name: robot.cancelGoal

Action description: cancel navigation to point

Description: N/A

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.cancelGoal
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

4.7. Set default navigation map ID

Name： robot.setDefaultNavMap

Action description： set default navigation map ID

Description：

Name	Type	Required	Comment
mapId	String	Y	map ID

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.setDefaultNavMap
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	N/A

5. Map management

5.1. Acquire map list

Name： robot. getMapList

Action description： acquire map list

Description： N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. getMapList
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	Map info list, json string, List<MarkPointEntity>

MapListEntity：

Name	Type	Comment
mapFileInfoList	List<MapFileInfo>	Map info list
defaultNavMapId	String	Default map, null means no default map exists

MapFileInfo：

Name	Type	Comment

id	String	Map id
name	String	Name
desc	String	Description
createTime	String	Date
width	Int	Width
height	Int	Height
ratio	Double	Resolution, pixel to meter ratio
x	Double	Initial location X
y	Double	Initial location Y
z	Double	Initial location Z

5.2. Delete map

Name： robot.deleteMap

Action description： delete map

Description：

Name	Type	Required	Comment
mapId	String	Y	map ID

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.deleteMap
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	N/A

5.3. Edit map info

Name： robot.modifyMap

Action description： edit map info, currently support “name”

Description：

Name	Type	Required	Comment
mapId	String	Y	map ID
newMapName	String	Y	Name after edit

Return：

Name	Type	Comment
cid	String	robot ID

notifyAction	String	robot.modifyMap
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

5.4. Acquire map data

Name: robot.getMapData
Action description: acquire map data, will save map to path after acquisition command sent
setUseMapDir() set map saving path, e.g.
String mapRootDir= "amyrobot/map/";
mRobotClientMgr.setUseMapDir(mapRootDir);

Description:

Name	Type	Required	Comment
mapId	String	Y	map ID
mapLastModifiedTime	long	Y	Last modification time

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.getMapData.Complete Map received
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	map ID

5.5. Acquire mark list

Name: robot.getMarkPointList
Action description: acquire mark list
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.getMarkPointList
resultCode	int	error code, 200 means success, otherwise see error code

		description;
notifyInfo	String	Error info
notifyParams	String	json, List<MarkPointEntity>

MarkPointEntity:

Name	Type	Comment
text	String	Mark name for overlap check
desc	String	Mark description
name2	String	Alias
x	float	Map coordinate X
y	float	Map coordinate Y
realX	float	Actual coordinatex
realY	float	Actual coordinateY
realAngle	float	Actual posture
isStartpoint	boolean	Check if it is starting point; starting point can't be deleted
angle	float	Posture in degree
radian	float	Posture in rad

5.6. Save mark list

Name: robot.saveMarkPoint

Action description: save mark list

Description:

Name	Type	Required	Comment
mapId	String	Y	map ID
markPointList	String	Y	json， List<MarkPointEntity> see MarkPointEntity

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. saveMarkPoint
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

6. Task management

6.1. Acquirement task list

Name： robot.getTaskList
Action description： **acquire task list**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.roamTaskList
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	Task entity list see RoamTaskListEntity

RoamTaskListEntity：

Name	Type	Comment
taskEntityList	List<RoamTaskEntity>	Task entity object list
isTaskRun	boolean	If task is running
runTaskId	String	Running task ID
defaultTaskId	String	Default task ID

RoamTaskEntity：

Name	Type	Comment
taskId	String	Task id
name	String	Task name
mapId	String	Task correspondent map ID
mapName	String	Map name
roamPointEntityList	List<RoamPointEntity>	Task point list
cycleTime	Int	Repetition time, -1 means infinite loop
arriveDo	boolean	Whether action needs to be taken on arrival
params	Map<String, String>	Add extension params

RoamPointEntity

Name	Type	Comment
pointName	String	Task point name
action	String	Action on task point arrival; Null or empty indicates default (broadcast); For others see TaskActions
strVal	String	String param

Params	Map<String, String>	Extended param
paramList	Int	List parma
actionPreDelayMs	Int	Pre-Action delay in ms
actionDelayMs	boolean	Post-Action delay in ms
childAction	List<TaskActionEntity>	Child action: parent action execution will start child action; when parent action finishes, stop child action

Action TaskActionEntity：

Name	Type	Comment
action	String	Action name
strVal	String	Action param
params	Map<String, String>	Extended param
paramList	List<String>	List param

TaskActions

```
public class TaskActions {
        //No action
        public static final String TASK_ACTION_NONE = "none";

        //Broadcast
        public static final String TASK_ACTION_VOICE = "voice";

        //Play audio
        public static final String TASK_ACTION_AUDIO = "audio";

        //Play video
        public static final String TASK_ACTION_VIDEO = "video";

        //Voice recognition
        public static final String TASK_ACTION_SPEECH_RECOGNITION = "speech.recognition";

        //Recharge
        public static final String TASK_ACTION_BACK_CHARGE = "robot.backCharge";

        //Slide show
        public static final String TASK_ACTION_SHOW_PICS = "showPics";

        //Task confirmation
        public static final String TASK_ACTION_TASK_CONFIRM = "taskConfirm";

        //Extended command
        public static final String TASK_ACTION_EXT_CMD = "ext.cmd";
```

```
    //Stop all current task and start a new one
    public static final String TASK_ACTION_START_TASK = "robot.startTask";

}
```

6.2. Create or edit task

Name： robot.taskSave
Action description： save task
Description： N/A

Name	Type	Required	Comment
mode	String	Y	Create; or modify
taskEntity	String	Y	TaskEntity

RoamTaskEntity class：

```
public class RoamTaskEntity implements Serializable {
    public static final int TASK_CYCLE_INFINITE = -1; //infinite loop

    public String taskId; //Task id

    public String name; //Task name

    public String mapId; //Task map Id

    public String mapName; //Map name

    public List<RoamPointEntity> roamPointEntityList; //Task point list

    public int cycleTimes; //Nb of repetition,   -1 means infinite loop

    public boolean arriveDo; //condition for action on arrival; if false, action will be executed
even though navigation is interrupted.

    public Map<String, String> params; //add extended command params
}

public class RoamPointEntity implements Serializable {
    public String pointName; //task point name

    public String action; //action to be executed, null or empty means default action

    public String strVal; //string paramter
```

    public Map<String, String> params; //extended param

    public List<String> paramList; //list param

    public int actionPreDelayMs; //pre-action execution delay in ms

    public int actionDelayMs; //post-action execution delay in ms

    public List<TaskActionEntity> childActions; //child action, parent action execution will start child action and stops child action when it finishes.

}

```
public class TaskActionEntity implements Serializable {
    public String action; //action name

    public String strVal; //action param

    public Map<String, String> params; //extended param

    public List<String> paramList; //list param
}
```

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskSave
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

6.3. Delete task

Name: robot. taskDelete
Action description: delete
Description:

Name	Type	Required	Comment
taskId	String	Y	Task Id

Return:

Name	Type	Comment
cid	String	robot ID

notifyAction	String	robot. taskDelete
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

6.4. Start / stop task

Name： robot. taskStart

Action description： start task; will recover task if paused; if task is already be executed, it will return directly; current task should be stopped before new task execution.

Description：

Name	Type	Required	Comment
taskId	String	是	Task Id
useDefault	String	否	Use default task 1 will start default task if task id is empty 0 will not start default task
index	int	是	Start from which step; default is 0;
isJumpStep	Int	是	Jump to other step If isJumpStep=0, whatever the index is, task will be recovered; If isJumpStep=1, task will start again from index

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskStart
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

6.5. Stop task

Name： robot. taskStop

Action description： stop task

Description： N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskStop
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

6.6. Pause task

Name: robot. taskPause
Action description: pause task
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskPause
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

6.7. Execute next step

Name: robot. taskNextStep
Action description: execute next step
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskNextStep
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

6.8. Execute last step

Name: robot. taskPrevStep

Action description：　execute last step

Description：　N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. taskPrevStep
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

6.9. Set default task

Name： robot. setDefaultTask

Action description：　set default task

Description：

Name	Type	Required	Comment
taskId	String	Y	Task Id

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. setDefaultTask
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

6.10. Task test switch

Name： robot.taskTest

Action description：　set task test switch; If task test switch is on, nav will not be brought up by starting task, only actions are to be executed.

Description：

Name	Type	Required	Comment
taskTest	Int	Y	1 means on, 0 means off；

Return：

Name	Type	Comment

cid	String	robot ID
notifyAction	String	robot. taskTest
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info

7. Robot control command

7.1. Go forward

Name: robot.goForward
Action description: go forward
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot.goForward
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info

7.2. Go backward

Name: robot. moveBack
Action description: go backward
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. moveBack
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

7.3. Turn left

Name： robot. turnLeft
Action description： **turn left**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnLeft
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.4. Turn right

Name： robot. turnRight
Action description： turn right
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnRight
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.5. Stop walking

Name： robot. stopWalking
Action description： stop walking
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. stopWalking
resultCode	int	error code, 200 means success, otherwise see error code description；

notifyInfo	String	Error info
notifyParams	String	

7.6. Stop all

Name： robot. stopAll
Action description： stop everything（walking, nav, sing, dance, task）
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. stopAll
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.7. Dancing

Name： robot. dance
Action description： Dancing
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. dance
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.8. Stop dancing

Name： robot. stopDance
Action description： stop dancing
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. stopDance

resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.9. Move

Name： robot.move
Action description： move
Description：

Name	Type	Required	Comment
linearVelocity	String	Y	Linear velocity； Pass Float converted String
angularVelocity	String	Y	Angular velocity; Pass Float converted String

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. move
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.10. Turn head right

Name： robot. turnHeadRight
Action description： **turn head right**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnHeadRight
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.11. Turn head left

Name: robot. turnHeadLeft
Action description: **turn head left**
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnHeadLeft
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

7.12. Turn head up

Name: robot. turnHeadUp
Action description: **turn head up**
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnHeadUp
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

7.13. Turn head down

Name: robot. turnHeadDown
Action description: **Turn head down**
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnHeadDown
resultCode	int	error code, 200 means success, otherwise see error code description;

notifyInfo	String	Error info
notifyParams	String	

7.14. Head reset

Name： robot. turnHeadReset
Action description： **Head reset**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. turnHeadReset
resultCode	Int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.15. Nod

Name： robot. headUpDown
Action description： nod
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. headUpDown
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.16. Shake

Name： robot. headLeftRight
Action description： **shake**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID

notifyAction	String	robot. headLeftRight
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

7.17. Set LED ring

Name： robot. light

Action description： set LED ring

Description：

Name	Type	Required	Comment
type	String	Y	LED mode: lightNormal Normal lightTalking Talking lightThinking Thinking lightSinging Singing

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. light
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8. System command

8.1. Acquire media volume

Name： sys.getMusicVolume

Action description： acquire media volume

Description： N/A

Return：

Name	Type	Comment
cid	String	robot ID

notifyAction	String	sys.getMusicVolume
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.2. Set media volume

Name: sys.setMusicVolume
Action description: set media volume
Description:

Name	Type	Required	Comment
volume	Int	Y	Volume

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.setMusicVolume
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.3. Volume up

Name: sys.setVolumeAdd
Action description: volume up
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.setVolumeAdd
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.4. Volume down

Name： sys. setVolumeDec
Action description： **volume down**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.setVolumeDec
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.5. Talk / stop talking

Name： sys.say
Action description： **send speech text**; send punctuation to stop, e.g. “,”
Description：

Name	Type	Comment
words	String	Text for speech

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.say
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.6. Sing

Name： robot. singsong
Action description： sing a song
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. singsong
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.7. Stop singing

Name: robot. stopSing
Action description: stop singing
Description: N/A
Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	robot. stopSing
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.8. Music-play music

Name: sys.player.music.play
Action description: play music
Description:

Name	Type	Comment
url	String	Music file path or url

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.music.play
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

8.9. Music-pause music

Name： sys.player.music. pause
Action description： **pause music**
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.music. pause
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.10. Music-resume

Name： sys.player.music. resume
Action description： resume play
Description： **N/A**

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.music. resume
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.11. Music-stop

Name： sys.player.music. stop
Action description： **stop playing**
Description：

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.music. stop

resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.12. Video-play

Name： sys.player.video.play

Action description： play video

Description：

Name	Type	Comment
url	String	Video file path or url

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.video.play
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.13. Video-pause

Name： sys.player.video. pause

Action description： pause video

Description： N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.video. pause
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.14. Video-resume

Name： sys.player.video. resume

Action description：resume video

Description：N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.video. resume
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.15. Video-stop

Name： sys.player.video. stop

Action description：stop video

Description：N/A

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.player.video. stop
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.16. Show face

Name： sys.showFace

Action description：show robot face

Description：

Name	Type	Comment
faceType	String	faceTalk faceSmile

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.showFace
resultCode	int	error code, 200 means success, otherwise see error code

		description；
notifyInfo	String	Error info
notifyParams	String	

8.17. Hide face

Name： sys.hideFace
Action description：hide robot face
Description： N/A
Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys. hideFace
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.18. Slide show-start

Name： sys.showpics.start
Action description： start slide show
Description：

Name	Type	Comment
picList	List<String>	List of picture path

Return：

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.showpics.start
resultCode	int	error code, 200 means success, otherwise see error code description；
notifyInfo	String	Error info
notifyParams	String	

8.19. Slide show-stop

Name： sys.showpics.stop
Action description：stop slideshow

Description: N/A

Return:

Name	Type	Comment
cid	String	robot ID
notifyAction	String	sys.showpics.stop
resultCode	int	error code, 200 means success, otherwise see error code description;
notifyInfo	String	Error info
notifyParams	String	

9. Error code description

Name	Value	Comment
CODE_OK	200	success
CODE_ERROR	400	Common error, see notifyInfo
CODE_ERROR_TIMEOUT	401	Time out
CODE_ERROR_IO	402	File r/w error
CODE_ERR_NAME_EMPTY	403	Name can't be empty
CODE_ERR_NAME_DUPLICATE	405	Overlapped name
CODE_ERROR_INVALID_PARAMS	406	Invalid param
CODE_ERROR_STOP_SWITCH_IS_OPEN	407	E-stop has been pressed
CODE_ERROR_INVALID_CMD	408	Invalid command
CODE_ERROR_RESULT_EMPTY	409	Result is empty
CODE_ERROR_ALREADY_START	410	Already started, should be stopped first