

Allow the Matlab to connect to (more than) 2 Lego Mindstorms EV3 robots by bluetooth at the same time

Using the “MATLAB Support Package for LEGO MINDSTORMS EV3 Hardware” provided by mathworks, you cannot connect two EV3 robots at the same time through bluetooth. For example, if you connect a EV3, say EV3_001, using the following command:

```
mylego1 = legoev3('bluetooth','/dev/tty.EV3_001-SerialPort')
```

You will succeed and get the following information in the command window of Matlab:

```
mylego1 =
```

```
legoev3 with properties:
```

```
FirmwareVersion: 'V1.07H'  
HardwareID: []  
IPAddress: []  
CommunicationType: 'Bluetooth'  
BatteryLevel: 100  
ConnectedSensors: {'touch' 'gyro' 'color' 'sonic'}
```

However, if then you try to connect another EV3, say EV3_002, through the bluetooth at the meantime,

```
mylego2 = legoev3('bluetooth','/dev/tty.EV3_002-SerialPort')
```

You will get the following error in the command window:

Conversion to cell from char is not possible.

Error in realtime.internal.trackCOM (line 20)
tracker(end + 1) = port;

Error in legoev3 (line 209)
realtime.internal.trackCOM('save', comPort);

Then we first debug and track this error to

```

legoGetStarted.m x legoev3.m x trackCOM.m x +
181 -         switch type
182 -             case 'bluetooth'
183 -                 if realtime.internal.trackCOM('check', comPort)
184 -                     error(message('legoev3io:build:Legoev3BluetoothAlreadyConr
185 -                 end
186 -
187 -             try
188 -                 obj.CommHandle = realtime.internal.CommSerial(comPort);
189 -
190 -                 obj.FirmwareVersion = obj.readFirmwareVersion;
191 -             catch
192 -                 error(message('legoev3io:build:Legoev3BluetoothFailed'));
193 -             end
194 -
195 -             if ~realtime.internal.isValidFirmwareVersion(obj.FirmwareVersi
196 -                 error(message('legoev3io:build:Legoev3InvalidFirmware'));
197 -             end
198 -
199 -             try
200 -                 obj.BatteryLevel = obj.readBatteryLevel;
201 -                 obj.ConnectedSensors = obj.readInputDeviceList;
202 -                 obj.CommunicationType = 'Bluetooth';
203 -             catch
204 -                 error(message('legoev3io:build:Legoev3BluetoothFailed'));
205 -             end
206 -
207 -             setpref('MathWorks_LEGO_EV3', 'LAST_CONNECTION', 'bluetooth');
208 -             setpref('MathWorks_LEGO_EV3', 'DEFAULT_COM_PORT', comPort);
209 -             realtime.internal.trackCOM('save', comPort);
210 -
Command Window
209 realtime.internal.trackCOM('save', comPort, '/dev/tty.EV3_001-SerialPort')
fx K>>

```

Then go a further step in the debugging and get this,

```

legoGetStarted.m x legoev3.m x trackCOM.m x +
4 % Copyright 2014 The MathWorks, Inc.
5
6 persistent tracker;
7
8 port = lower(port);
9 switch mode
10 case 'check' % check
11     if isempty(tracker)
12         result = false;
13     else
14         result = ismember(port, tracker);
15     end
16 case 'save' % set
17     if isempty(tracker)
18         tracker = {port};
19     else
20         tracker(end + 1) = port;
21     end
22 case 'remove' % remove
23     if ~isempty(tracker)
24         [~, loc] = ismember(port, tracker);

```

and

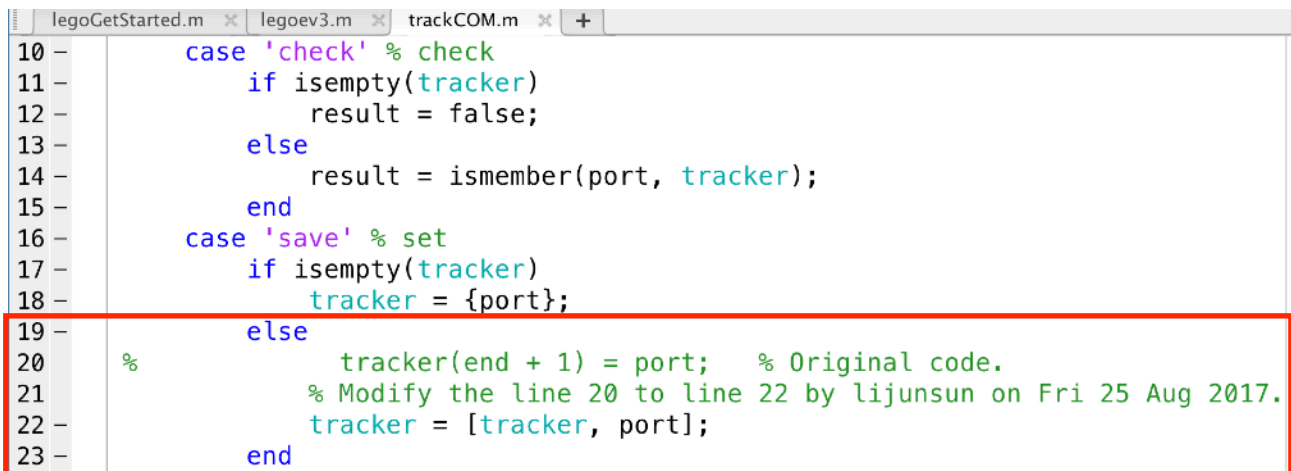
```
19 -         else
20 -             tracker(end + 1) = port;
21 -         end
22 -     case 'remove' % remove
23 -         if ~isempty(tracker)
24 -             [~ loc] = ismember(port, tracker);
```

port: 1x27 char =
/dev/tty.ev3_002-serialport

Finally, we find the reason caused the error. The codes here try to give a char to a cell. Furthermore, the index “end + 1” is wrong:

```
K>> tracker(end + 1)
Index exceeds matrix dimensions.
```

We can try to figure the meaning of the programmer/codes and modify the codes in the “trackCOM.m” as this,



```
10 -     case 'check' % check
11 -         if isempty(tracker)
12 -             result = false;
13 -         else
14 -             result = ismember(port, tracker);
15 -         end
16 -     case 'save' % set
17 -         if isempty(tracker)
18 -             tracker = {port};
19 -         else
20 -             % tracker(end + 1) = port; % Original code.
21 -             % Modify the line 20 to line 22 by lijunsun on Fri 25 Aug 2017.
22 -             tracker = [tracker, port];
23 -         end
```

Save the changes we made and test the validation of it:

```
>> mylego1 = legoev3('bluetooth','/dev/tty.EV3_001-SerialPort')  
mylego2 = legoev3('bluetooth','/dev/tty.EV3_002-SerialPort')
```

```
mylego1 =
```

legoev3 with properties:

```
    FirmwareVersion: 'V1.07H'  
        HardwareID: []  
        IPAddress: []  
CommunicationType: 'Bluetooth'  
        BatteryLevel: 100  
ConnectedSensors: {'touch' 'gyro' 'color' 'sonic'}
```

```
mylego2 =
```

legoev3 with properties:

```
    FirmwareVersion: 'V1.07H'  
        HardwareID: []  
        IPAddress: []  
CommunicationType: 'Bluetooth'  
        BatteryLevel: 100  
ConnectedSensors: {'' '' '' 'sonic'}
```

```
>> clear
```

```
fx >> |
```

References:

<https://cn.mathworks.com/help/supportpkg/legomindstormsev3io/index.html>