

Uses of robotics to improve the instrumental skills of students with Autism Spectrum Disorder through the development of new inclusive contexts (DivInTech)

Code of Teacher Control App

1 Teacher's interface

File 1: ControlPane.cs

```
1 using System.Collections;
2 using System.Collections.Generic;
3 using UnityEngine;
4 using UnityEngine.UI;
5 using System;
6 using TMPro;
7 using UnityEngine.SceneManagement;
8 using System.Net;
9 using System.Net.Sockets;
10 using System.Text;
11 using System.IO;
12 using System.Threading;
13 using System.Linq;
14
15
16 public class ControlPane : MonoBehaviour
17 {
18     private string GameIP = "GAMEIP";
19
20     private string robot_message;
21
22     //Variables de la interficie
23     public TMP_InputField InputField_RobotMessage;
24     public Button Button_PressedButton;
25     public Button Button_LowVoice;
```

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```
26 public Button Button_HighVoice ;
27 public Button Button_Repeat ;
28 public Button Button_NotAnswer ;
29 public Button Button_OKAnswer ;
30 public Button Button_KO_Answer ;
31 public Button Button_SendMessage ;
32 public Button Button_Finish ;
33 public Button Button_Clue ;
34
35 //SOCKET
36 TcpClient mySocket ;
37 public NetworkStream theStream ;
38 StreamWriter theWriter ;
39 StreamReader theReader ;
40
41 int message_recieved_activity ;
42
43 //Thread
44 private Thread t1 ;
45
46 // Start is called before the first frame update
47 void Start ()
48 {
49
50     //Socket
51     this.message_recieved_activity = -1 ;
52     String ip = PlayerPrefs.GetString (GameIP) ;
53     this.mySocket = new TcpClient (ip , 9090) ;
54     this.theStream = mySocket.GetStream () ;
55     this.theWriter = new StreamWriter (theStream) ;
56     this.theReader = new StreamReader (theStream) ;
57
58     // Crear thread
59     this.t1= new Thread (SocketListener) {Name = "Socket
60         Listener" } ;
61     this.t1.Start () ;
62     // Inicializar variables
63     this.robot_message = "" ;
64 }
65
66 //Thread that listens to socket packages
67 private void SocketListener () {
68     string ascii = "" ;
69     while (ascii != "\0") {
70         ascii = receive_message_from_activity () ;
71         this.message_recieved_activity = int.Parse (ascii) ;
72     }
73     Debug.Log ("Comunicación con actividad terminada.") ;
```

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```
74
75
76     }
77
78     private string receive_message_from_activity () {
79         List<byte> byteList = new List<byte>();
80         byte[] buffer = new byte[2]; // Leemos de a un byte
           para encontrar el fin del mensaje
81
82         while (true) {
83             this.theStream.Read(buffer, 0, 2); // Leer un byte
           a la vez
84
85             string hexhex = BitConverter.ToString(buffer).
           Replace("-", string.Empty).ToLower();
86
87             string asci = convert_hex_to_ascii(
           convert_hex_to_ascii(hexhex));
88
89             if (asci == "\0") {
90                 byteList.Add(buffer[0]);
91                 byteList.Add(buffer[1]);
92                 break; // Si encontramos '\0', terminamos la
           lectura
93             }
94             byteList.Add(buffer[0]);
95             byteList.Add(buffer[1]);
96         }
97
98         byte[] myReadBuffer = byteList.ToArray();
99
100        string hexhex_message = BitConverter.ToString(
           myReadBuffer).Replace("-", string.Empty).ToLower();
101
102        string asci = convert_hex_to_ascii(convert_hex_to_ascii
           (hexhex_message));
103
104        Debug.Log(asci);
105
106        return asci;
107
108    }
109
110
111    private static byte[] StringToByteArray(string hex) {
112        return Enumerable.Range(0, hex.Length)
113            .Where(x => x % 2 == 0)
114            .Select(x => Convert.ToByte(hex.Substring(x
           , 2), 16))
```

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```
115         .ToArray() ;
116     }
117
118     private string convert_hex_to_ascii(string hex_message) {
119
120         string ascii = string.Empty;
121
122         byte[] bytes = StringToByteArray(hex_message);
123         ascii = Encoding.UTF8.GetString(bytes);
124         return ascii;
125     }
126 }
127
128
129 // Update is called once per frame
130 void Update()
131 {
132     if (this.message_recieved_activity != 0) {
133         EnableDisableButtons(this.message_recieved_activity)
134         ;
135         this.message_recieved_activity = -1;
136     }
137     else {
138         SceneManager.LoadScene("IP_Config");
139     }
140 }
141
142 private void send_text_2_socket(string message) {
143     byte[] bytes = Encoding.UTF8.GetBytes(message);
144     string hex_message = BitConverter.ToString(bytes).
145         Replace("-", string.Empty).ToLower();
146     this.theWriter.Write(hex_message);
147     this.theWriter.Flush();
148 }
149
150 private void EnableDisableButtons(int buttons_case) {
151     switch (buttons_case) {
152     case 1:
153         this.Button_PressedButton.interactable = true;
154         this.Button_LowVoice.interactable = false;
155         this.Button_HighVoice.interactable = false;
156         this.Button_Repeat.interactable = false;
157         this.Button_NotAnswer.interactable = false;
158         this.Button_OKAnswer.interactable = false;
159         this.Button_KO_Answer.interactable = false;
160         this.Button_SendMessage.interactable = false;
161         this.Button_Finish.interactable = true;
162         this.Button_Clue.interactable = false;
163         break;
```

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```
162         case 2:
163             this.Button_PressedButton.interactable = true;
164             this.Button_LowVoice.interactable = false;
165             this.Button_HighVoice.interactable = false;
166             this.Button_Repeat.interactable = true;
167             this.Button_NotAnswer.interactable = false;
168             this.Button_OKAnswer.interactable = false;
169             this.Button_KO_Answer.interactable = false;
170             this.Button_SendMessage.interactable = true;
171             this.Button_Finish.interactable = true;
172             this.Button_Clue.interactable = false;
173         break;
174         case 3:
175             this.Button_PressedButton.interactable = false;
176             this.Button_LowVoice.interactable = true;
177             this.Button_HighVoice.interactable = true;
178             this.Button_Repeat.interactable = true;
179             this.Button_NotAnswer.interactable = true;
180             this.Button_OKAnswer.interactable = true;
181             this.Button_KO_Answer.interactable = false;
182             this.Button_SendMessage.interactable = true;
183             this.Button_Finish.interactable = true;
184             this.Button_Clue.interactable = false;
185         break;
186
187         case 4:
188             this.Button_PressedButton.interactable = false;
189             this.Button_LowVoice.interactable = true;
190             this.Button_HighVoice.interactable = true;
191             this.Button_Repeat.interactable = true;
192             this.Button_NotAnswer.interactable = true;
193             this.Button_OKAnswer.interactable = true;
194             this.Button_KO_Answer.interactable = true;
195             this.Button_SendMessage.interactable = true;
196             this.Button_Finish.interactable = true;
197             this.Button_Clue.interactable = false;
198         break;
199
200         case 5:
201             this.Button_PressedButton.interactable = false;
202             this.Button_LowVoice.interactable = true;
203             this.Button_HighVoice.interactable = true;
204             this.Button_Repeat.interactable = true;
205             this.Button_NotAnswer.interactable = true;
206             this.Button_OKAnswer.interactable = true;
207             this.Button_KO_Answer.interactable = true;
208             this.Button_SendMessage.interactable = true;
209             this.Button_Finish.interactable = true;
210             this.Button_Clue.interactable = true;
```

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```
211         break ;
212
213     case 6:
214         this.Button_PressedButton.interactable = false ;
215         this.Button_LowVoice.interactable = true ;
216         this.Button_HighVoice.interactable = true ;
217         this.Button_Repeat.interactable = true ;
218         this.Button_NotAnswer.interactable = true ;
219         this.Button_OKAnswer.interactable = true ;
220         this.Button_KO_Answer.interactable = false ;
221         this.Button_SendMessage.interactable = true ;
222         this.Button_Finish.interactable = true ;
223         this.Button_Clue.interactable = true ;
224         break ;
225
226     case 7:
227         this.Button_PressedButton.interactable = false ;
228         this.Button_LowVoice.interactable = false ;
229         this.Button_HighVoice.interactable = false ;
230         this.Button_Repeat.interactable = true ;
231         this.Button_NotAnswer.interactable = true ;
232         this.Button_OKAnswer.interactable = false ;
233         this.Button_KO_Answer.interactable = false ;
234         this.Button_SendMessage.interactable = false ;
235         this.Button_Finish.interactable = false ;
236         this.Button_Clue.interactable = false ;
237         break ;
238
239     case 8:
240         this.Button_PressedButton.interactable = false ;
241         this.Button_LowVoice.interactable = false ;
242         this.Button_HighVoice.interactable = false ;
243         this.Button_Repeat.interactable = false ;
244         this.Button_NotAnswer.interactable = false ;
245         this.Button_OKAnswer.interactable = false ;
246         this.Button_KO_Answer.interactable = false ;
247         this.Button_SendMessage.interactable = false ;
248         this.Button_Finish.interactable = true ;
249         this.Button_Clue.interactable = false ;
250         break ;
251
252     case 9:
253         this.Button_PressedButton.interactable = false ;
254         this.Button_LowVoice.interactable = false ;
255         this.Button_HighVoice.interactable = false ;
256         this.Button_Repeat.interactable = true ;
257         this.Button_NotAnswer.interactable = false ;
258         this.Button_OKAnswer.interactable = false ;
259         this.Button_KO_Answer.interactable = false ;
```

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```
260         this.Button_SendMessage.interactable = true;
261         this.Button_Finish.interactable = true;
262         this.Button_Clue.interactable = false;
263         break;
264
265     case 10:
266         this.Button_PressedButton.interactable = false;
267         this.Button_LowVoice.interactable = false;
268         this.Button_HighVoice.interactable = false;
269         this.Button_Repeat.interactable = true;
270         this.Button_NotAnswer.interactable = true;
271         this.Button_OKAnswer.interactable = false;
272         this.Button_KO_Answer.interactable = false;
273         this.Button_SendMessage.interactable = true;
274         this.Button_Finish.interactable = true;
275         this.Button_Clue.interactable = false;
276         break;
277
278     }
279 }
280
281 //-----
282 //CALLBACK FUNCTIONS
283 //-----
284 public void CallbackFrase(string s) {
285     Debug.Log("Escrit: " + s);
286     this.robot_message = s;
287 }
288 //-----
289 //BUTTONS FUNCTIONS
290 //-----
291 public void Terminar() {
292     Debug.Log("terminar");
293     this.send_text_2_socket("F");
294 }
295
296 public void PulsadorPulsado() {
297     Debug.Log("Pulsador pulsado");
298     this.send_text_2_socket("B");
299 }
300
301 public void RepetirFrase() {
302     Debug.Log("repetir");
303     this.send_text_2_socket("R");
304 }
305
306 public void RespuestaCorrecta() {
307     Debug.Log("correcta");
308     this.send_text_2_socket("C");
```

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```
309     }
310
311     public void RespuestaIncorrecta () {
312         Debug.Log("incorrecta");
313         this.send_text_2_socket("I");
314     }
315
316     public void NoResponde () {
317         Debug.Log("no responde");
318         this.send_text_2_socket("M");
319     }
320
321     public void VozBaja () {
322         Debug.Log("voz baja");
323         this.send_text_2_socket("L");
324     }
325
326     public void VozAlta () {
327         Debug.Log("voz alta");
328         this.send_text_2_socket("H");
329     }
330
331     public void EnviarFrase () {
332         if (this.robot_message == "") {
333             this.InputField_RobotMessage.image.color = Color.red
334             ;
335         }
336         else {
337             this.InputField_RobotMessage.image.color = Color.
338             white;
339             Debug.Log("enviar");
340             this.send_text_2_socket("S"+this.robot_message);
341         }
342     }
343
344     public void DarPista () {
345         Debug.Log("darPista");
346         this.send_text_2_socket("P");
347     }
348 }
```

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File 2: IP_Config.cs

```
1 using System.Collections;
2 using System.Collections.Generic;
3 using UnityEngine;
4 using UnityEngine.UI;
5 using System;
6 using TMPro;
7 using UnityEngine.SceneManagement;
8 using System.Net;
9 using System.Net.Sockets;
10 using System.Text;
11 using System.IO;
12
13 public class IP_Config : MonoBehaviour
14 {
15     private string GameIP = "GAMEIP";
16
17     public TMP_InputField InputField_GameIp;
18
19     private string game_ip;
20
21
22
23     // Start is called before the first frame update
24     void Start()
25     {
26         this.game_ip = "192.168.31.119";
27     }
28
29     // Update is called once per frame
30     void Update()
31     {
32
33     }
34
35     public void CallbackGameIP(string s) {
36         this.game_ip = s;
37     }
38
39     //-----
40     //BUTTONS FUNCTIONS
41     //-----
42     public void Continuar() {
43         if (this.game_ip == "") {
44             this.InputField_GameIp.image.color = Color.red;
45         }
46         else {
47             PlayerPrefs.SetString(GameIP, this.game_ip);
```

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```
48     SceneManager.LoadScene("DesignControlPanel");
49     }
50 }
51
52 public void Salir() {
53     Application.Quit();
54 }
55 }
```

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