Visvesvaraya National Institute of Technology (VNIT), Nagpur

Embedded Systems (ECL403)

End Sem Task Report

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Semester 5

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The Ultimate task : To develop ATM machine using ESP32.

Aim:: To develop an ATM machine using ESP32 kit.

Requirements:: ESP32 development board,Arduino IDE, telegram bot

Concept::

- Aim is to develop a automated teller machine using esp32.
- A telgram bot is created with username Lalithyasai and with token ID and chat ID. The user gives the inputs through telegram bot interface.
- The inputs are whether the user wants to deposit amount into the bank or withdrawal from the bank or check the available balance.Here we are assuming the inputs are multiples of 100.
- The transactions are visible on the serial monitor also along with the bot.At the start the user enters his passcode and login ID and if both of them are matching it displays successful else the user has to reenter the credentials. After this step it asks user whether user wants to withdrawdeposit or check current balance .
- Depending on the text the amount is displayed.The results are also displayed on the serial monitor.

Simulation Code with Comments:

```
#include <WiFi.h>
//We have imported Wifi module from library for working of ...
    esp32(board) over wifi
#include <WiFiClientSecure.h>
//This is used for connnecting the development board to
// client station
#include <UniversalTelegramBot.h>
//This library is installed for connecting the telegram bot ...
    serever to
// the our board
#include <ArduinoJson.h>


WiFiClient client1;
//client is created


```

```
16 #include <HTTPClient.h>
17 const char* sname = "https://api.thingspeak.com/update";
18 String apiKey = "4O7XNU21FK4CPXW8";
19 //thingspeak apikey which is from account of thingspeak
20
21 int i,k=1,m1=1,m3=1,m4=1,m5=1;
22
23
24 const char* connection = "BT20ECE061";
25 //This is the username and password of the wifi we are connecting
26 //we are initializing the variables to store the password and ...
      username
27 const char* passcode = "lalihannu";
28 // same here.we are storing the passcode in a variable
29
30
31
32 #define IOg "5966804348:AAGDfo6NfHDJeCTdgkRqoVcQbZQQP0DdVgo"
33 //bottoken
34
35 #define CHAT_iD "5983606473"
36 // chatid
37
38
39
40 WiFiClientSecure client;
41 UniversalTelegramBot bot(IOg, client);
42 //a tele bot with unique token is created with unique ID with the
43 //wifi client
44
45
46
47 int botRequestDelay = 800;
48 //botdelay
49 unsigned long lastTimeBotRan;
50
51 void handlewMessages(int numNewMessages)
52 {
53   Serial.println("handleNewMessages");
54   Serial.println(String(numNewMessages));
55   String t2 = bot.messages[i].text;
56   Serial.println(t2);
57   for (int i = 0; i < numNewMessages; i++) {
58
59     String text_ratio = "Current ratio: ";
60
61
62     String chat_id = String(bot.messages[i].chat_id);
63     if ( chat_id != CHAT_iD )
```

```
64      {
65        bot.sendMessage(chat_id, "Wrong Chat id", "");
66
67      }
68      else
69      {
70        if (k==1){
71        bot.sendMessage(chat_id, "Please Enter login id", "");
72        //to enter login id of the user in the bot
73        k=2;
74        }
75        String test = bot.messages[i].text;
76        Serial.println(test);
77        if (test=="lalithya"){
78          bot.sendMessage(chat_id, "Please enter Your Password", "");
79          m1=2;
80          //if the correct login is pressed then go for password and ...
                set m1 as 2
81          //so again that please enter login id is not displayed.
82
83        }
84        if (test=="1234"){
85          bot.sendMessage(chat_id, "Sucessful", "");
86          m4=2;
87          m3=2;
88          plag();
89          //if both the credentials are correct it displays
90          // sucessful and call the function plag
91        }
92        if (test!="1234" && test!="lalithya" && test!="/begin"){
93          if (m1==1){
94          bot.sendMessage(chat_id, "Please enter correct login id", ...
                "");
95          }
96          //if incorrect credntials is given
97
98          else{
99            bot.sendMessage(chat_id, "Please enter correct ...
                  Password", "");
100
101         }
102
103       }
104
105
106     }
107   }
108 }
109 int bot_delay = 1000;
```

```
110
111 int amount = 15000;
112 int  convertr(String test)
113 {
114       int n=test.length();
115       int sum=0;
116       for(int i=0;i<n;i++)
117          sum=sum*10+(test[i]-'0');
118       return sum;
119       // function defined to convert the
120       //string format to int for further arithmetic operations
121 }
122 void lalithya()
123 // lalithya function for the withdrawal amount
124 {
125
126     bot.sendMessage(CHAT_iD,"entre the amount to be debited","");
127
128     delay(8000);
129     int n=bot.getUpdates(bot.last_message_received+1);
130     for(int i=0;i<n;i++)
131     {
132          String test=bot.messages[i].text;
133          if(test!="" && m5!=2)
134          {
135               int k=convertr(test);
136               if (k>amount){
137                bot.sendMessage(CHAT_iD,"The Money in our account is ...
                      not enough for payment","");
138                // when the amount to withdraw is more than the ...
                      current
139                // available balance and calling plag function
140                plag();
141               }
142               amount -=k;
143               bot.sendMessage(CHAT_iD,"debit successful","");
144               // when amount to withdraw is available and calling
145               //plag function
146
147               plag();
148          }
149     }
150 }
151 void lalithya2()
152 // lalithya2 function for the
153 // credditing amount
154 {
155     bot.sendMessage(CHAT_iD,"entre deposit amount","");
156     delay(8000);
```

```
157     int n=bot.getUpdates(bot.last_message_received+1);
158     for(int i=0;i<n;i++)
159     {
160          String test=bot.messages[i].text;
161          if(test!="")
162          {
163              int k=convertr(test);
164              amount +=k;
165              bot.sendMessage(CHAT_iD,"deposit successful","");
166              //after credditing the amount send
167              //amount creddited succesfully and call plag function
168              plag();
169          }
170     }
171 }
172
173 void plag() {
174   //this function to ask whether the user
175   //wants to check his current balance or wants to put money into ...
        his
176   //account or to take money out of the bank.
177   if (m5==1){
178       bot.sendMessage(CHAT_iD,"type balance for balance ,type ...
            debit for debit,type credit for credit , quit for quit ...
            ","");
179       delay(9000);
180       int n=bot.getUpdates(bot.last_message_received+1);
181
182       for(int i=0;i<n;i++)
183       {
184            String test=bot.messages[i].text;
185
186            if(test=="balance"){
187               bot.sendMessage(CHAT_iD,String(amount),"");
188               //if user types balance
189               //current is balance is displayed
190               Serial.println("your Balance is ");
191               Serial.print(amount);
192               Serial.println("");
193
194               plag();
195               }
196
197            if(test=="debit" && m5==1 )
198
199            {
200              Serial.println("Inside debit");
201              //inside debit is used to differentiate
202              //between the credit and debit amount and to
```

```
203               //acknowledge the amount is debitted amount
204                  lalithya();
205
206             }
207             if(test=="credit")
208             {
209               lalithya2();
210
211             }
212             if (test=="quit"){
213               bot.sendMessage(CHAT_iD,"Thank you","");
214               //atlast if user wants to quit
215               m5=2;
216
217             }
218         }
219
220 }
221 }
222
223
224
225 void setup() {
226   Serial.begin(115200);
227
228
229
230   Serial.print("Connecting Wifi: ");
231   Serial.println(connection);
232
233   WiFi.mode(WIFI_STA);
234   WiFi.begin(connection, passcode);
235   client.setCACert(TELEGRAM_CERTIFICATE_ROOT);
236
237   while (WiFi.status() != WL_CONNECTED) {
238     Serial.println("*");
239     delay(500);
240   }
241
242   Serial.println("");
243   Serial.println("WiFi connected");
244
245
246   bot.sendMessage(CHAT_iD, "Bot was started up", "");
247   //when the wifi is connected to the board
248   //it displays this message in the bot
249
250 }
251
```

```
252 void loop() {
253   //thingspeak
254 
255           if (millis() > lastTimeBotRan + botRequestDelay)  {
256     int numwMessages = bot.getUpdates(bot.last_message_received + ...
          1);
257       while(numwMessages) {
258       if(WiFi.status()==WL_CONNECTED){
259           HTTPClient http;
260           http.begin(sname);
261 
262           String DataSent = ...
              "api_key="+apiKey+"&field2="+String(amount);
263           int d1 = http.POST(DataSent);
264           http.end();
265 
266 
267     }
268       Serial.println("got response");
269       if (m4==1){
270       handlewMessages(numwMessages);
271       }
272       if (m4==2){
273         plag();
274       }
275       numwMessages = bot.getUpdates(bot.last_message_received + 1);
276       if(WiFi.status()==WL_CONNECTED){
277           HTTPClient http;
278           http.begin(sname);
279           String st = "api_key="+apiKey+"&field2="+String(amount);
280           int d1 = http.POST(st);
281           http.end();
282 
283 
284     }
285 
286 
287 }
288 
289           }
290 
291 }
```

Output:

- The results of the bot.

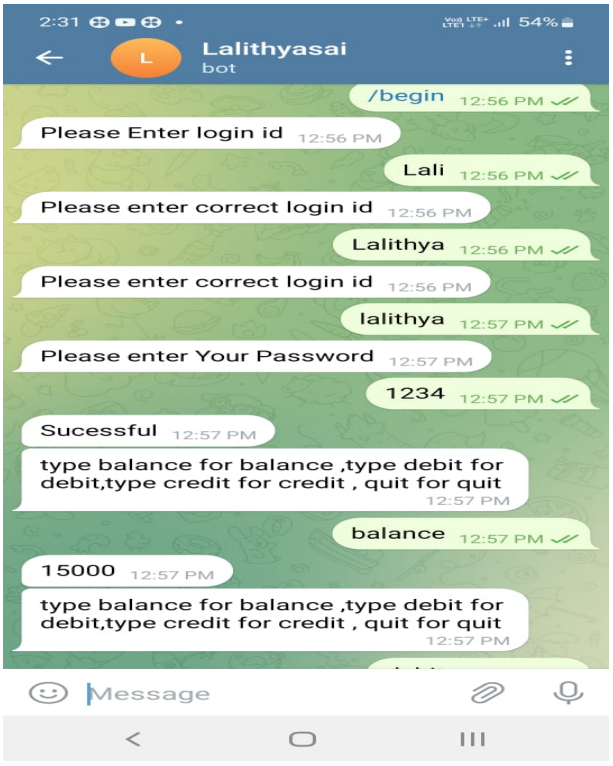

Figure 1: Result

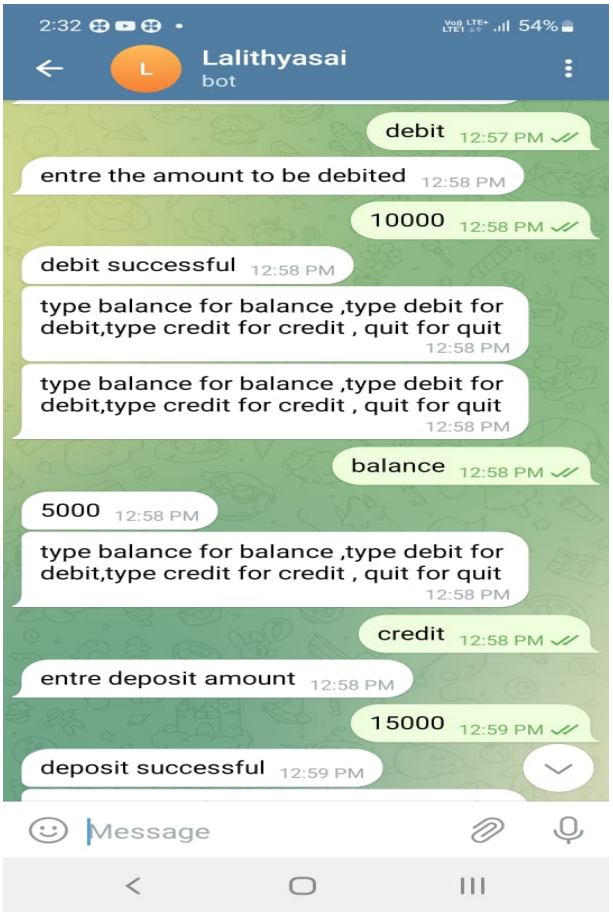

Figure 2: Result

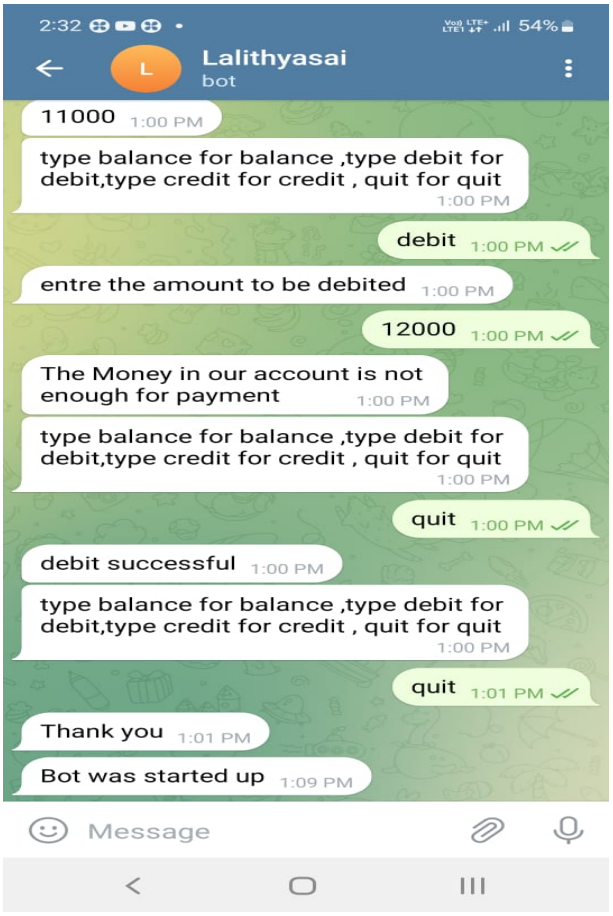

Figure 3: Result

Observations and Discussions:

- The transactions are observed in the bot and are also displayed in the serial monitor.

Problems Faced (if any):

- Telegram bot creating was not a problem.But developing the app script to upload the transactions on google spreadsheet was very tricky part in which I was not successful.

Additional features:

- I have used thingSpeak which is used to plot the data taken from sensor and plots it against time. The balance data is taken and sent to the thingspeak

server and graph is plotted.