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Voice Controlled Home and Industrial Appliances With Additional Wireless Controls

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Abstract— Automation is the main domain now days. Automation for homes, institution, organizations, and industries are highly demanded these days. Our project is a system of software controlled hardware system. In our system the mode of device control is based on speech, button and online. For short range control we can use voice commands and buttons through computer .If we are out of town we can use net connected screen sharing app to control home appliances. We can control appliances by using our voice. The main aim of this project is to control light, fan, computer etc. by using human voice. The physically handicapped person does not capable to operate home appliances by using their hands. They are capable to operate home appliances by using their Voice. In this system we are using voice recognition module to recognize their voice. When we speak one then first device will be on and remaining devices will be off. When we speak two then second device will be on and remaining devices off and so on. The prototype of the Switchboard is built using a micro-controller, chosen for its low cost, in addition to its versatility and performance in mathematical operations and communication with other electronic devices. The system has been designed and implemented in a cost effective way so that if our project is commercialized the needy users in developing countries will benefit from it and the Graphical User Interface can be designed using Visual Basics (VB) or MATLAB.

Index Terms— VB, MATLAB, GUI.

I. INTRODUCTION

Speech is the most natural way to communicate for humans. While this has been true since the dawn of civilization, the invention and widespread use of the telephone, audio-phonic storage media, radio, and television has given even further importance to speech communication and speech processing. The advances in digital signal processing technology has led the use of speech processing in many different application areas like speech compression, enhancement, synthesis, and recognition. The concept of a machine than can recognize the human voice has long been an accepted feature in Science Fiction. From „Star Trek to George Orwell's „1984 - "Actually he was not used to writing by hand. Apart from very short notes, it was usual to dictate everything into the speak writer." - It has been commonly assumed that one day it will be possible to converse naturally with an advanced computer-based system.

Fig.1: Voice to corresponding frequency waves

The voice recognition technology enables the severely deaf or hearing impaired people, who cannot recognize by the aids. This is expected to be a remarkable innovation for the life quality of the hearing-impaired. Lowering the gate length from the current size of voice merely by amplifying the sound, to see the words recognized 40nm to 10nm in the semiconductor process technology within the next 20 years will bring about a reduction in the size of the hearing aids. The theory was so simple that a voice was generated through the trachea and the speech was decoded in the brain. Even the voice spectrogram was not considered. We introduce here the

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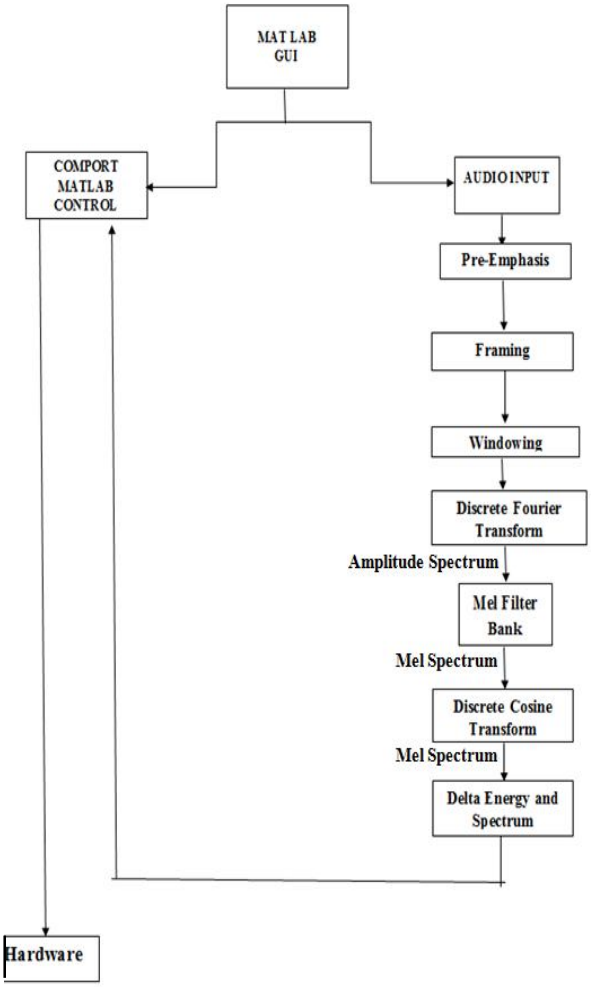
system which is the combination of Voice Control, Long Distance Control using Internet and Computer Control.

II. BLOCK DIAGRAM FOR OUR PROJECT



MFCC Algorithm Steps

Pre–emphasis: This process will increase the energy of signal at higher frequency.

$Y[n] = X[n] - 0.95\,X[n-1]$

Framing: The voice signal is divided into frames of N samples. Adjacent frames are being separated by M (M<N)

Hamming windowing: Hamming window is used as window shape by considering the next block in feature extraction processing chain and integrates all the closest frequency lines.

$Y(n) = X(n) \times W(n)$

Fast Fourier Transform:

$Y(w) = FFT[h(t) * X(t)] = H()w * X(w)$

Mel Filter Bank Processing: After that the following equation is used to compute the Mel for given frequency f in HZ:

$F(Mel) = [2595 * \log 10[\,]1 + f\,700\,]$

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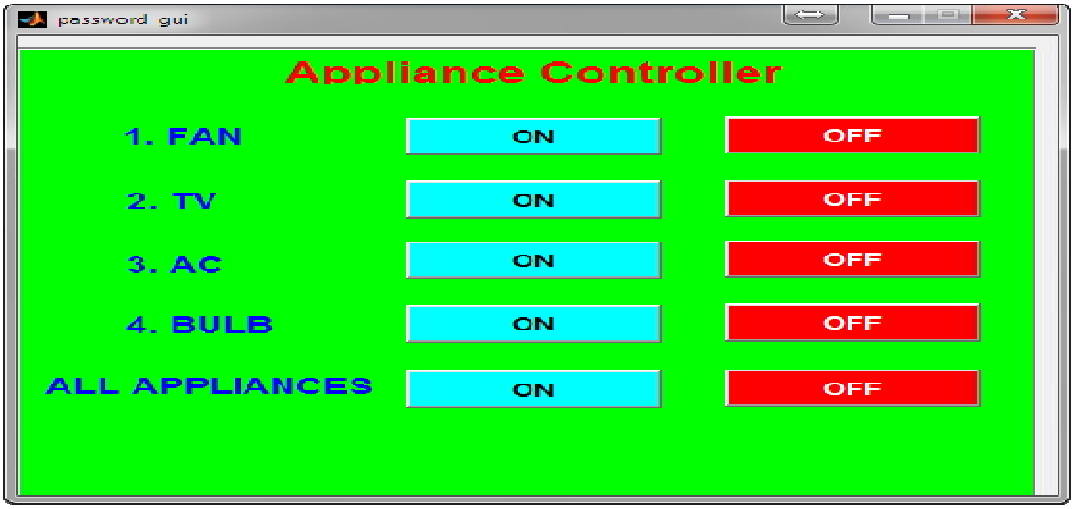
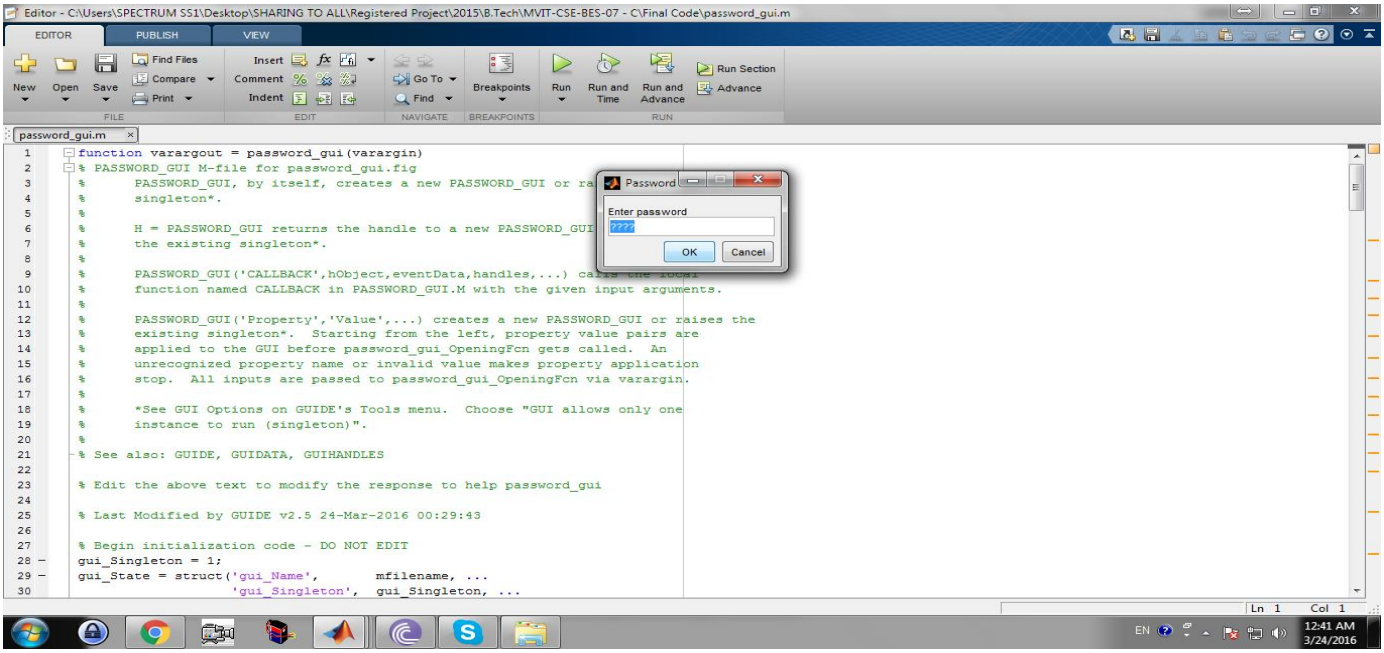
III. WORKING OPERATION

The working procedure of our project starts with manual control of appliances using Graphical User Interface (GUI). We extend our project to voice control by providing speech to recognize device to be switched on and off. The main operation to recognize voice is identified by MFCC Algorithm. The long distance control is possible using the internet.

IV. OUTPUT

A. *Graphical User Interface (GUI)*





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V. CODING

```
% question for password
%c = cell(1)
password='mit';
prompt = {'Enter password'};
dlg_title = 'Password';
num_lines = 1;
def = {'????','hsv'};
answer_x = inputdlg(prompt,dlg_title,num_lines,def);
answer_xx=cell2struct(answer_x, 'word',1);
answer=answer_xx.word;

if answer==password
   set(gcf, 'visible','off')
else
   close all
end

% UIWAIT makes password_gui wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = password_gui_OutputFcn(hObject, eventdata, handles)
handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;


% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'A');
fclose(tep);
disp('Fan On')
beep
beep
sapi('Fan On')
msgbox('Fan On')
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'B');
fclose(tep);
```

```
disp('Fan off')
beep
beep
sapi('Fan off')

% --- Executes on button press in pushbutton11.
function pushbutton11_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton11 (see GCBO)
% eventdata  reserved - to be defined in a
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'A');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'C');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'E');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'G');
fclose(tep);
disp('All Appliances On')
beep
beep
sapi('All Appliances On')
% --- Executes on button press in pushbutton12.
function pushbutton12_Callback(hObject, eventdata, handles)
% hObject    handle
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'B');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'D');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'F');
fclose(tep);
tep=serial('COM1', 'BaudRate', 9600);
fopen(tep);
fprintf(tep,'H');
fclose(tep);
```

```
disp('All Appliances Off')
beep
beep
sapi('All Appliances Off')
```

VI. CONCLUSION

Thus we develop a system which is the hybrid of short range and long range control of home/industrial appliances. It uses software interfacing to control appliances through Voice Command and online control for long range. It can also be controlled by internet connection through mobile or remote PC.The system is efficient and provides the accurate output. It is sensitive to voice .In our future enhancement we will use the executable files so that there will not be any problem to install the software and common men can use it easily.

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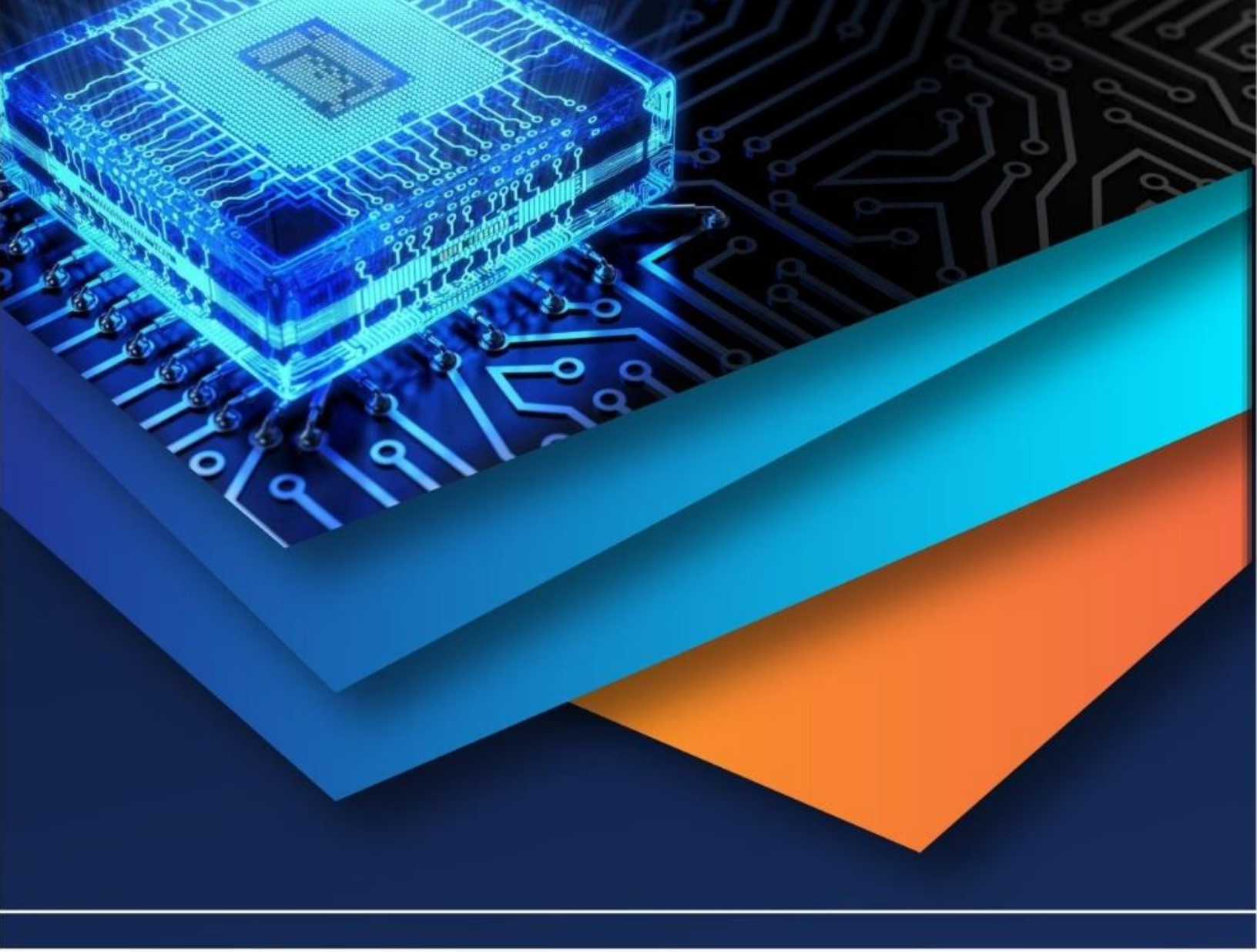

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