Source coding

Gautham Medusi
194145

Aim:

we have to do the source coding for the string 'this is communication lab' using MATLAB coding.

Tool used:

MATLAB

Theory:

Source coding is a mapping from (a sequence of) symbol from an information source to a sequence of alphabets symbol (usually bits) such that the source symbols can be exactly recovered from the binary bits (lossless source coding) or recovered within some distortion (lossy source coding).

Ex:

this is communication lab

	Frequency	Probability	No of bits ($\log_2 1/P$)
' '	3	3/25	4
'a'	2	2/25	4
'b'	1	1/25	5
'c'	2	2/25	4
'h'	1	1/25	5
'i'	4	4/25	3
'l'	1	1/25	5
'm'	2	2/25	4
'n'	2	2/25	4
'o'	2	2/25	4
's'	2	2/25	4
't'	2	1/25	5
'u'	1		

```
string='this is communication lab';
w=[];
for i=1:length(string)
    w(i)=string(i);
end
c=unique(w);
% x=num2str(w);
z=[];
for j=1:length(c)
z(j)=0;
for i=1:length(w)
if (w(i)==c(j))
z(j)=z(j)+1;
end
end
end
v=char(c);
h=25./z;
f=log2(h);
g=ceil(f);
T=table([],[]);
T.Properties.VariableNames=["Character","Source Code"];
% T=[T;{[12],[13],[12,13]}];

for i=1:length(g)
    r=randi([2^(g(i)-1),2^g(i)]);
    f1=de2bi(r);
    f1=num2str(f1);
    T=[T;{v(i),f1}];

end
disp(T);
```

Command Window

```
>> sourcecoding1
    Character       Source Code

    _________    ____________________

      {' '}      {'0  0  0  0  1'}
      {'a'}      {'0  0  1  1'   }
      {'b'}      {'0  1  0  0  1'}
      {'c'}      {'1  0  0  1'   }
      {'h'}      {'0  0  1  0  1'}
      {'i'}      {'0  0  0  1'   }
      {'l'}      {'0  0  1  0  1'}
      {'m'}      {'1  1  1  1'   }
      {'n'}      {'0  1  0  1'   }
      {'o'}      {'0  0  0  0  1'}
      {'s'}      {'1  1  0  1'   }
      {'t'}      {'1  0  0  1'   }
      {'u'}      {'0  0  1  0  1'}

fx >>
```

Gowtham Meduri
194145

Result :-

we success fully coded the given string. using the source coding in the MATLAB