The nature of information

The distinction between text, signal, image, etc is circumstantial from a mathematical point of view. These are only different representations using different alphabets of some relation R of observations Y defined over a lattice $(X, \preccurlyeq)$. Let's see an example:

```
sText = ['Dale limosna mujer,        '; ...
         'que no hay en la vida nada,'; ...
         'como la pena de ser,       '; ...
         'ciego en Granada.          '];
```

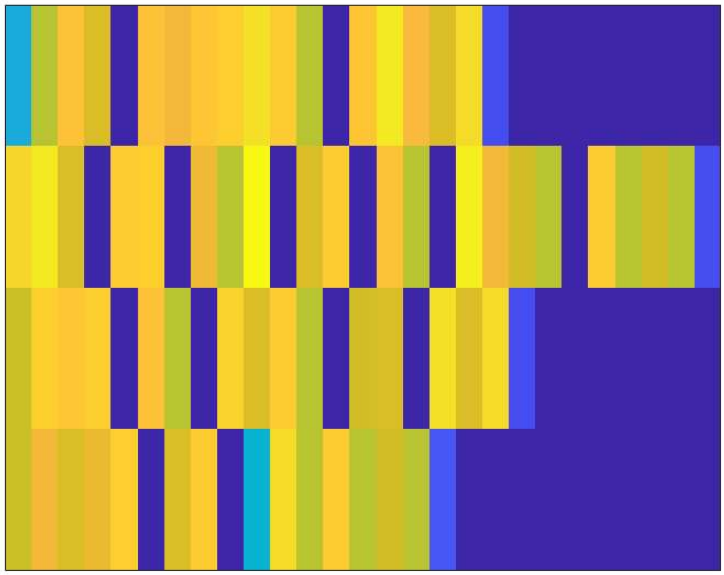
This is nothing more than a matrix (rank 2 tensor) of numbers:

```
sInt = int8(sText)
```

```
sInt = 4×27 int8 matrix
    68    97   108   101    32   108   105   109   111   115   110    97    32   109   117   106   101   114    44    32
   113   117   101    32   110   111    32   104    97   121    32   101   110    32   108    97    32   118   105   100
    99   111   109   111    32   108    97    32   112   101   110    97    32   100   101    32   115   101   114    44
    99   105   101   103   111    32   101   110    32    71   114    97   110    97   100    97    46    32    32    32
```

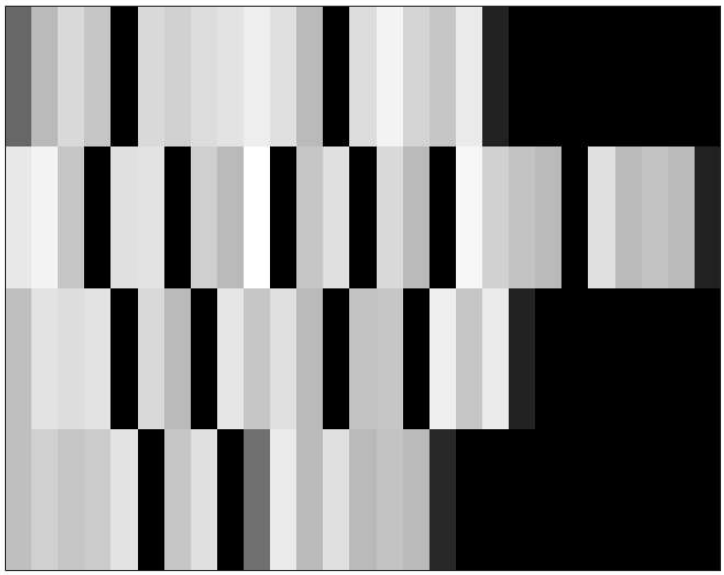
which can of course be seen as an image:

```
figure
imagesc(sInt)
set(gca,'XTick',[])
set(gca,'YTick',[])
```



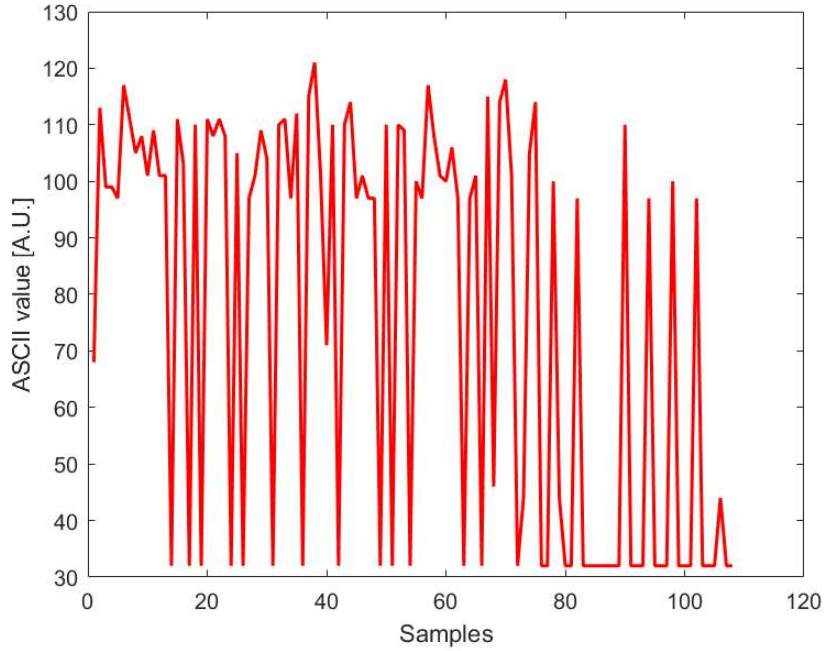
With the colour being an arbitrary choice

```
figure
imagesc(sInt)
colormap gray
set(gca,'XTick',[])
set(gca,'YTick',[])
```



Or perhaps you want to see it as a "time trace"

```
figure
plot(reshape(sInt,1,numel(sInt)),'r-','LineWidth',1.5)
xlabel(gca,'Samples')
ylabel('ASCII value [A.U.]')
```

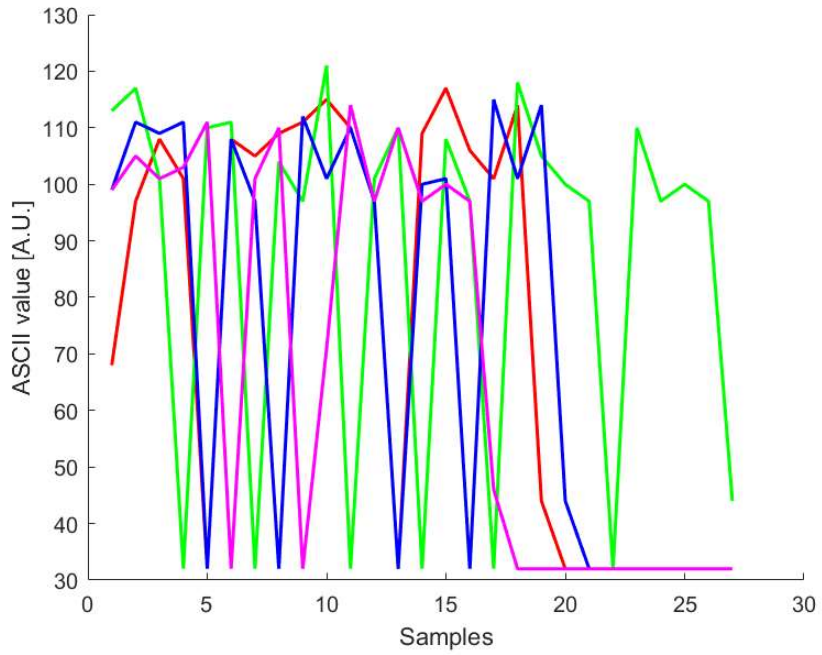


Ey! But with that I lost the "verses"...

No, you haven't!

```
t = 1:size(sInt,2);
figure, hold on
plot(t,sInt(1,:),'r-','LineWidth',1.5)
plot(t,sInt(2,:),'g-','LineWidth',1.5)
plot(t,sInt(3,:),'b-','LineWidth',1.5)
plot(t,sInt(4,:),'m-','LineWidth',1.5)
```

```
xlabel(gca,'Samples')
ylabel('ASCII value [A.U.]')
```



Surely, but I am working with sound...

So what? still the same for maths!

```
tmpBackToText = reshape(double(sInt),numel(sInt),1); %Requires casting to double and column vector
soundsc(tmpBackToText);
    %Note that this line intentionally departs from the numeric array to
    %emphasize that you did not have to depart from text originally.
```

No! That is not what I meant. I mean voice synthetization.

Well...just another point of view of the same mathematical information.

```
tmpBackToText = char(reshape(sInt',1,numel(sInt))) %Does not require casting to double, and it is a row vector
```

```
tmpBackToText = 'Dale limosna mujer,        que no hay en la vida nada,como la pena de ser,       ciego e
```

```
    %Note that this line above, again intentionally departs from the numeric array to
    %emphasize that you did not have to depart from text originally.
NET.addAssembly('System.Speech');
obj = System.Speech.Synthesis.SpeechSynthesizer;
obj.Volume = 100;
%obj.SelectVoice('Microsoft David Desktop') %English
obj.SelectVoice('Microsoft Sabina Desktop') %Spanish
obj.Speak(tmpBackToText);
```

In all of the above, the information remains the same. Only the alphabet of symbols used has changed. Humans may find one representation or other easier to deal with, and some domains are naturally more easily appreciated in some representation, but do not confuse convenience for human manipulation with some mathematical limitation. From a mathematical point of view, they are all the same. The semantics is added by the human.