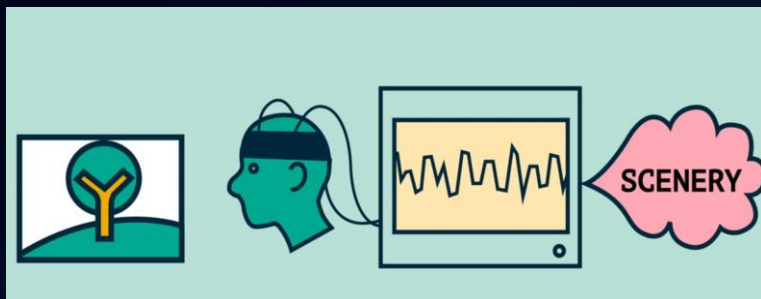
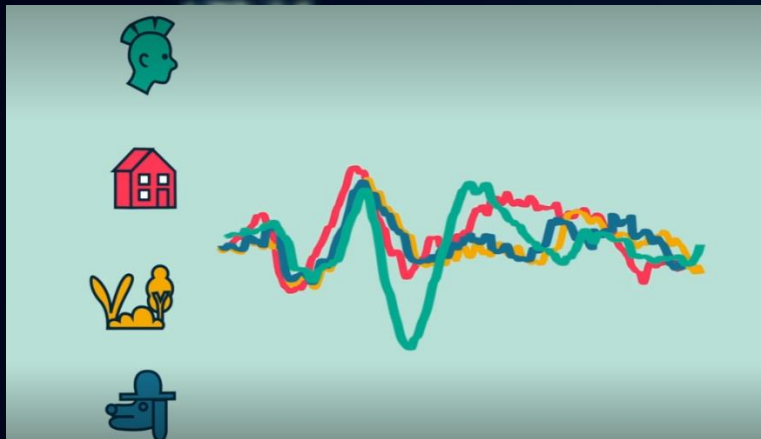


This Computer is Learning to Read your Mind

Hey everyone! Hope you are all enjoying the course and are excited for reading break. Today I would just like to share with you this Ted Talk video called ‘This computer is learning to read your mind’ presented by Gregg Gage. As we move from learning how to use different python commands to analyze general data into using these same commands on Neuroscience specific data, I thought this video was a great segue into explaining EEG and machine learning! As well in so many Sci-Fi movies or TV shows there was always this mind reading machine that seemed so cool, but growing up, we all probably thought it was impossible to create. But the advancements in technologies have shown it can be possible for a machine to read your mind!



Machine learning has endless possibilities. The video described an experiment Gregg, and his team were doing to try to see if a computer can determine what images you are looking at based on live EEG readings. EEGs work by reading the electrical signals sent by neurons to each other and combining them into an electrical wave that can be seen on a monitor. The participant was shown 4 different categories of images; houses, faces, sceneries, and weird images.

Looking at EEG waves are difficult and trying to differentiate them are even more challenging, but by averaging them out and using a machine to identify patterns; there are slight differences (especially when looking at faces) in the EEG readings. Just like we had to do in assignments in projects the research team needed to use a coding software to combine and average these readings to identify patterns. Going into these units for us we will need to use python for the EEG data given, to try and interpret the meaning behind the readings.

```
36 testTargets2 = class2(round(length(inputs)*ratio)+1:end);
37 class3 = targets;
38 class3(class3~=3) = 0;
39 class3(class3==3) = 1;
40 trainingTargets3 = class3(1:length(class3)*ratio);
41 testTargets3 = class3(round(length(inputs)*ratio)+1:end);
42 class4 = targets;
43 class4(class4~=1) = 0;
44 class4(class4==4) = 1;
45 trainingTargets4 = class4(1:length(class4)*ratio);
46 testTargets4 = class4(round(length(inputs)*ratio)+1:end);
47
48 testFace = [];
49 testHouse = [];
50 testScene = [];
51 testWeird = [];
52 for k=1:length(testData)
53     if testData(1,k)==1
54         testFace = [testFace testData(:,k)];
55     elseif testData(1,k)==2
```

With further coding it was possible to use this continuous stream of EEG data to try to see if a computer can determine what images you were looking at. The more data collected the more accurate the computer got at identifying the correct image category. It's just so surreal to see a computers capability with the correct code behind it to determine what you're thinking essentially. Obviously, there are many drawbacks in that the code behind the computer must be perfect and must account for many things (Gage in his experiment had to simplify to 2 different categories so that the computer can significantly (statistically) determine the viewed image).



With continuous advancements it is possible for computers to identify more than just what we are thinking but maybe what our future thoughts are, and these computers possibly could save lives. Machine learning will always grow, and it really can be implemented into everything whether it be at kiosks at grocery stores or identifying possible tumors in CT or MRI scans. Machine learning is the future, and it is both cool and scary to think of!