
Biomedical Imaging

Homework #12 - MRI 3

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DUE : *14th December 2020*

1 TASK 1

The region of the positive and negative activity in the brain is shown in Figure 1.1 and 1.2.

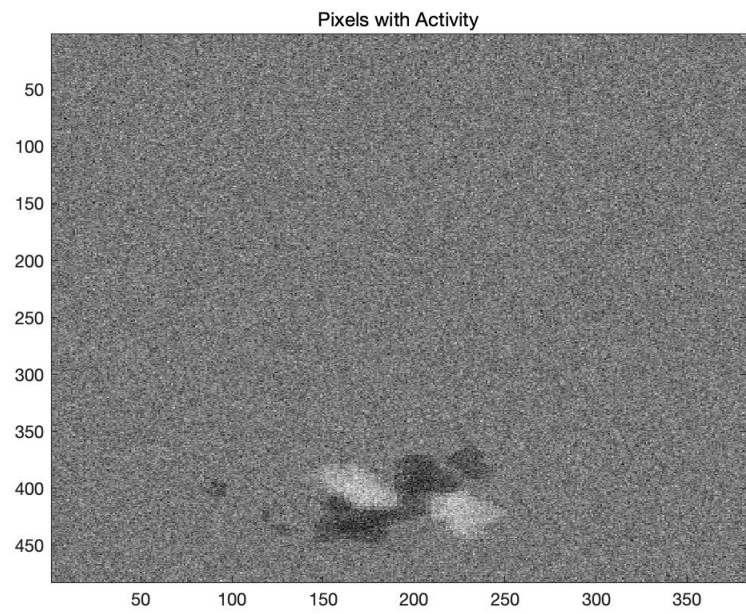


Figure 1.1: Pixel with Positive Activity

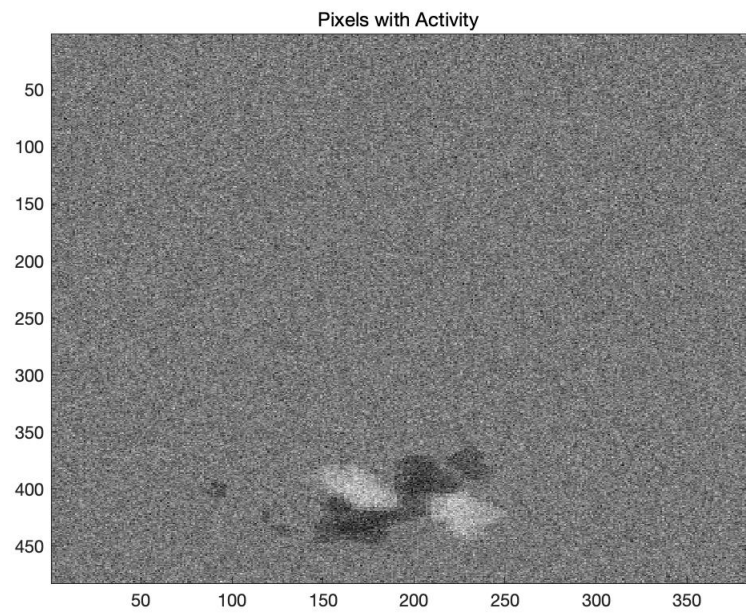


Figure 1.2: Pixel with Negative Activity

The temporal fluctuation resembling the paradigm is shown in Figure 1.3.

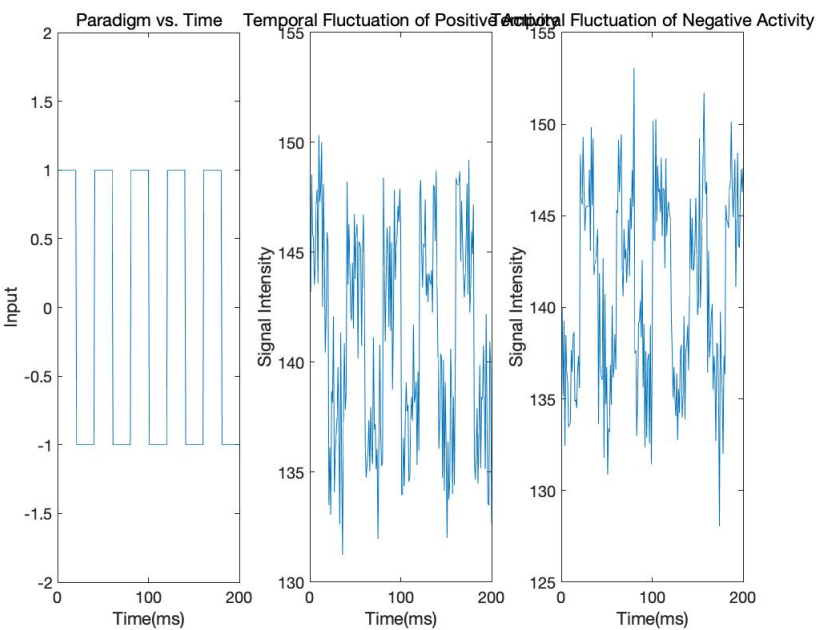


Figure 1.3: Sampling Only Every Second Horizontal Line

2 TASK 2

By calculating the scalar product for all pixels of the pixel time series and the paradigm, we obtained the activation map shown in Figure 2.1.

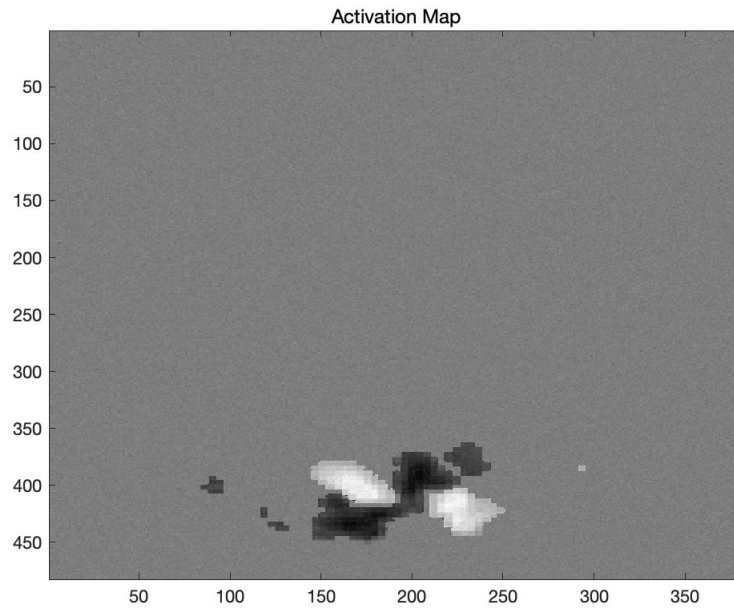


Figure 2.1: Activation Map

3 TASK 3

Calculate the temporal standard deviation of the time series and we obtained the standard deviation map as is shown in Figure 3.1.

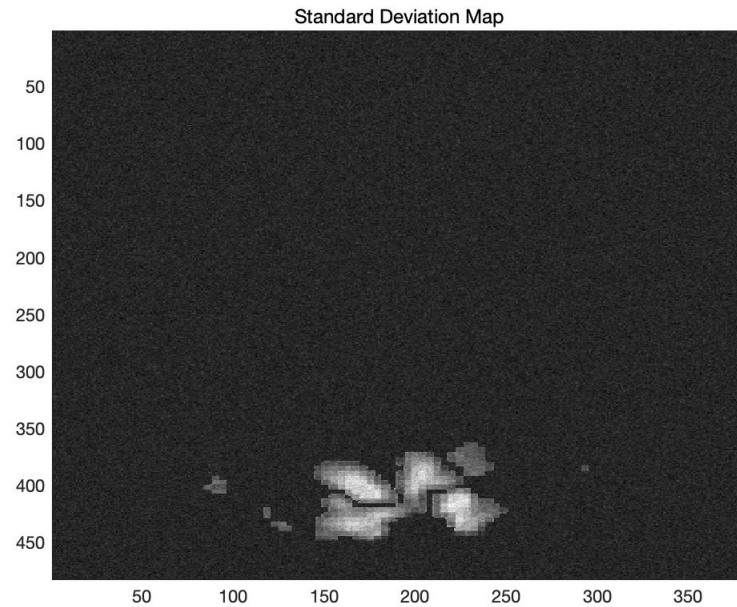


Figure 3.1: Standard Deviation Map

The estimates thermal noise level from the area without activation is 2.4776.

4 TASK 4

The masked activation map with a threshold of 200 is shown in Figure 4.1.

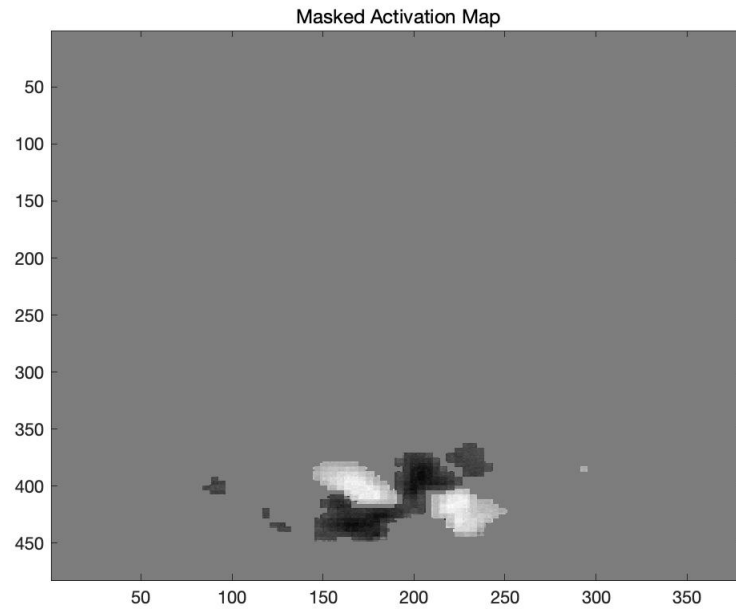


Figure 4.1: Masked Activation Map

The masked activation superimposed on the anatomical data is shown in Figure 4.2.

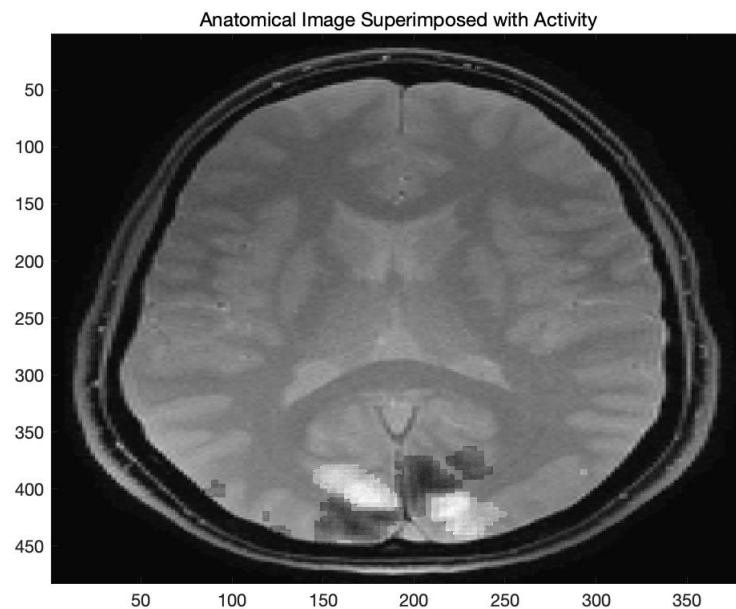


Figure 4.2: Masked Activation Superimposed on the Anatomical Data

We can see from the results that positive activity region is aligned with the paradigm yet negative activity region inversely aligned, i.e. the white and dark part in Figure 4.2 correspond to positive and negative input each respectively. Thus, we can conclude that there is a strong correlation between active region and input features.