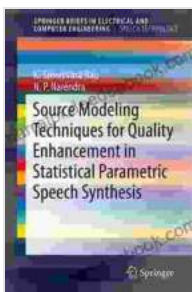


# Source Modeling Techniques for Quality Enhancement in Statistical Parametric Mapping

Statistical parametric mapping (SPM) is a neuroimaging technique that is used to analyze brain activity. SPM uses a statistical model to compare the brain activity of two groups of subjects, such as patients and controls. This comparison can be used to identify areas of the brain that are activated or deactivated in the patient group.

One of the challenges of SPM is that it can be difficult to localize the sources of brain activity. This is because the brain is a complex organ, and the activity of one brain region can affect the activity of other brain regions.

Source modeling techniques are a powerful tool for improving the localization of brain activity in SPM. By explicitly modeling the sources of brain activity, these techniques can help to reduce noise and improve the accuracy of SPM results.



## Source Modeling Techniques for Quality Enhancement in Statistical Parametric Speech Synthesis

(SpringerBriefs in Speech Technology) by Heidi Loney

★★★★☆ 4 out of 5

Language	: English
File size	: 16080 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 214 pages
Paperback	: 154 pages
Item Weight	: 7.5 ounces

Dimensions : 6 x 0.35 x 9 inches



There are two main types of source modeling techniques:

- **Forward modeling**
- **Inverse modeling**

**Forward modeling** uses a mathematical model to predict the brain activity that would be measured by an imaging technique, such as fMRI or EEG. This model is based on the known anatomy of the brain and the physics of the imaging technique.

**Inverse modeling** uses the measured brain activity to estimate the sources of brain activity. This is a more complex problem than forward modeling, but it can provide more accurate results.

There are a variety of different forward and inverse modeling techniques available. The choice of technique depends on the specific imaging technique being used and the desired level of accuracy.

Source modeling techniques have a wide range of applications in SPM. These applications include:

- **Localization of brain activity**
- **Identification of the sources of brain activity**
- **Estimation of the strength of brain activity**

- **Classification of brain activity**

Source modeling techniques can be used to improve the quality of SPM results in a variety of ways. By reducing noise and improving localization, source modeling techniques can help to identify the true sources of brain activity and improve the accuracy of SPM results.

The following is a step-by-step guide to using source modeling in SPM:

### **1. Preprocess the data**

The first step is to preprocess the imaging data. This involves removing artifacts, such as motion and noise, from the data.

### **2. Create a forward model**

The next step is to create a forward model. This model is based on the known anatomy of the brain and the physics of the imaging technique.

### **3. Invert the data**

The next step is to invert the data. This process uses the forward model to estimate the sources of brain activity.

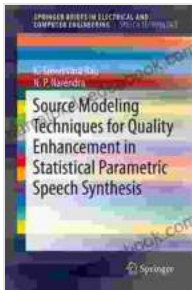
### **4. Analyze the results**

The final step is to analyze the results. This involves identifying the sources of brain activity and estimating the strength of brain activity.

Source modeling techniques are a powerful tool for improving the quality of SPM results. By explicitly modeling the sources of brain activity, these

techniques can help to reduce noise, improve localization, and identify the true sources of brain activity.

Source modeling techniques are a valuable addition to the SPM toolbox. These techniques can help to improve the accuracy and reliability of SPM results, and they can be used to investigate a wide range of brain activity.



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