# AssignmentNo. 5

## ProblemStatement:

Implement the Continuous Bag of Words (CBOW) Model. Stages can be:

1. Data preparation
2. Generate training data
3. Train model
4. Output

**Objective:**

1. To be able to apply deep learning algorithms to solve problems of moderate complexity
2. Implement the Continuous Bag of Words (CBOW) Model using deep learning algorithms.

**Outcomes:**

At the end of the assignment the students should able-

1. Implement and understand how CBOW model architecture works

**Solution Expected**

The CBOW model tries to predict the target word by trying to understand the context of the surrounding words. If we have 4 context words used for predicting one target word the input layer will be in the form of four 1XW input vectors. These input vectors will be passed to the hidden layer where it is multiplied by a WXN matrix. Finally, the 1XN output from the hidden layer enters the sum layer where an element-wise summation is performed on the vectors before a final activation is performed and the output is obtained.

**Methodology to be used**

* Deep learning
* Build the CBOW Model architecture using neural networks

**Theory:**

**CBOW Model**

The CBOW model tries to understand the context of the words and takes this as input. It then tries to predict words that are contextually accurate. Let us consider an example for understanding this. Consider the sentence: ‘It is a pleasant day’ and the word ‘pleasant’ goes as input to the neural network. We are trying to predict the word ‘day’ here. We will

use the one-hot encoding for the input words and measure the error rates with the one-hot

encoded target word. Doing this will help us predict the output based on the word with

least error.

**Conclusion**

Thus, we have successfully implemented and understood CBOW model using deep learning algorithms and how it works. We also implemented the model on a custom dataset and got good output. The purpose here was to get a high-level idea of what word embeddings are and how CBOW is useful. These can be used for text recognition, speech to text conversion etc.