

## Tutorial 4: CSNLP

### Learning the English Past Tense

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**Student's name:**

In this tutorial, the aim is to familiarise yourself with the network simulation of English past tense learning as discussed in Chapter Nine of McLeod, Plunkett & Rolls. Here, you will work through some of the exercises developed in Chapter 11 of Plunkett & Elman.

- To begin, copy the contents of \\top\connectionism\tutorial4 directory to your desktop.
- You may continue your answers on the back of this sheet, where necessary.

**Ex 11.1:** Take some time to look at the input and output representations used by the network. Why do you think Plunkett & Marchman used this sort of coding scheme for the suffix?

**Ex 11.2(3):** Open the project **phone**. Try training the network with a learning rate of 0.3, momentum of 0.8 for 50 epochs. You may need to vary the learning parameters and seed to get a reasonably low error. Once you have done so, report the parameters you used.

**Ex 11.3(1&2):** Examine/report the performance on the network on the irregular verbs. Note, in the training, the first 2 are arbitrary past tense forms, then 410 regulars, 20 no-change, and 68 vowel change verbs.

- Why does the networks have difficulty learning irregular verbs?
- Look at the **Node Activations** display for some irregulars. What is the network doing?

**Ex 11.4:** Use the **Output Translation** utility to examine performance on the training data. Try to classify the errors. How well does it do on the regulars versus the irregulars?

**Ex 11.5(1):** Follow the instructions of 11.5(1) to examine performance on unknown stems.

**Ex 11.6:** Why should an increase in token frequency of irregular verbs stems lead to an improved overall performance in the network?