- How much time does it take for information to cross the two hemispheres? Write a simple detection experiment where a visual target can appear in the left or right hemifield and the response can be given with the left or right hand. Can you detect a difference between the reaction times when the hand and the target are on the same side or not? (you must assess how many trials are needed to obtain a precision of about a few milliseconds in the estmates of reaction times)
- Create a pseudoword (non-words that could potentially be real words) generator (in French, and in more languages if possible).
- Build an automatic classifier that tries to identify the language (e.g. English vs French) of a text from letter statistics; Test it on words, sentences, full documents. You must use cross validation (the test and training sets must be different). Plot the identifciation performance as a function of the lenght of the text (in characters).
- Mix and Match are tools to support experimental research. Mix will allow experimental stimuli to be pseudo-randomised, according to constraints supplied by the user in a simple script. Match can match the conditions of factorial experiments. Write similar tools in Python.
- Do you know the *Countdown game* ("Le compte est bon" en français)? An interesting question is how do humans solve it. About this, read Daniel Defays (2015) Numbo: A study in cognition and recognition. In Douglas Hofstadter (editor), *Fluid concepts and creative analogies: computer models of the fundamental mechanisms of thought*). Implement one or several algorithms to solve this type of puzzles (after trying to invent your own algorithm(s), you can learn about the ones proposed by Jean-Marc Alliot (2015). "The (Final) Countdown." ArXiv:1502.05450 [Cs], February. `http://arxiv.org/abs/1502.05450`.)
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