

Exercise 1.2: Understanding Neuroscience Papers - Part 2

Upload your answers in PDF format to the Moodle by 29.09.2020
and provide your name, student ID and email address in the header.

The goal of this assignment is to get a better understanding about how (computational) neuroscientists think about the brain. By reading/discussing the papers you will get a feeling for the complexity of the brain, and develop ideas about how we can work towards better understanding it.

1. You will be assigned to a Zoom room in which you can discuss the two papers with your classmates. Each group will contain people that have read paper 1 and people that have read paper 2. Discuss the main ideas/findings from both papers using your summaries as a guideline.
2. Discuss and answer the following questions within your group. Take notes together, but formulate and submit your answers individually.
 - (a) Explain the following concepts from the paper by Bashivan et al.
 - cRF
 - Stretch experiment
 - One-hot population control
 - (b) Explain the following concepts from the paper by Freeman et al.
 - Orientation columns
 - Pinwheel representation
 - Retinotopic map
 - (c) In the paper by Bashivan et al., what recording method do the authors use and why did they choose this method? (max. 100 words)
 - (d) In the paper by Freeman et al., what recording method do the authors use and why did they choose this method? (max. 100 words)
 - (e) On what spatial scale is information represented in the visual system according to the two papers? Highlight similarities and discrepancies between the papers. (max. 150 words)
 - (f) What are the merits and limitations of using DNNs as a model of the visual system? (max. 150 words)
 - (g) Could incorporating more biological details improve the performance of DNNs? Give some examples of missing biological details and speculate on how DNNs could benefit. (max. 200 words)
3. Use font size 12 and a line spacing of 1.5, the full document should not be more than 2 pages. Submit your answers to these questions to the Moodle by 29.09.2020.