



שם הקורס

סדנה חינוכית במערכות סנסוריות

מרצה

מארק שיין-אידלסון, רגב אייל

סמסטר

ב

דרישות הקדם לקורס

מבוא למערכות סנסוריות - 04553090

הרכב הציון הסופי

100% הגשת עבודות

מבנה הקורס

תאריך /
מס' שיעור

נושא השיעור ותכני השיעור
(מטלות, רשימת קריאה, משימות וכיו"ב)

Introduction to Python

- Basic syntax
- Science packages: pandas, numpy, xarray, scipy, matplotlib
- Anaconda environment

Working with Jupyter Notebooks

Retina 1

Dataset of mouse retina (Marcus Meister Lab, Caltech)

- Analysis of retinal data
- On vs. Off ganglion cells
- Raster Plots of ganglion cells

Tuning curves for stimulus position

Retina 2

Dataset of mouse retina (Marcus Meister Lab, Caltech)

- Spike triggered average and receptive field extraction with random noise stimuli.

2D tuning plots for Gabor stimulus position.

Grasshopper Lab

Surgery with electrophysiology

Grasshopper DCMD Data Analysis

Analysis of the data collected in the previous lesson or previously recorded grasshopper data.

- Visuomotor tuning

Statistical methods for tuning specificity

Practical aspects in sensory systems signal processing

Sampling / quantization



<ul style="list-style-type: none"> - Fourier transform - Spectrogram - Convolution - Filtering <p>Spike sorting</p>	
<p>Allen Institute SDK</p> <ul style="list-style-type: none"> - Neuropixels probe - Working with the neuropixels database <p>Tuning curves for orientation and frequency for drifting gratings in V1 and Thalamus</p>	
<p>Neural Correlations</p> <p>Data set of V1 recordings from the Allen Institute</p> <p>Correlations in neural analysis</p> <ul style="list-style-type: none"> - Pearson's correlation - Cross-correlation - Signal correlation <p>Noise correlation</p>	
<p>LFP</p> <p>Working with hippocampal dataset from Allen institute in regard to visual stimuli.</p> <ul style="list-style-type: none"> - Brain Oscillations - LFP response to stimulus - Correlation with running speed and pupil diameter 	
<p>Machine Learning</p> <ul style="list-style-type: none"> - Introduction to classification models: decision trees, K-means and SVM. <p>models for classifying natural scenes based on neural activation in mouse V1 (Allen institute)</p>	
<p>Olfaction</p> <p>Dataset of olfactory bulb and piriform cortex (Bolding and Franks, 2018)</p> <ul style="list-style-type: none"> - Neural coding of odor in OB and PCx - Odor specificity <p>Respiration and odor detection</p>	
<p>Taste</p> <p>Dataset from the Lab of Dr. Anan Moran, TAU</p> <ul style="list-style-type: none"> - Conditioned taste aversion - Taste specificity in Gustatory cortex using ANOVA <p>Palatability analysis</p>	
<p>Active Sensing</p> <p>Dataset of bats recording. Prof. Yossi Yovel Lab, TAU</p> <ul style="list-style-type: none"> - Spectrograms <p>Bats echolocation</p>	



סילבוס מפורט

קריאת רשות

הערות

ניתן לקחת במקביל לקורס במערכות סנסוריות 04553090