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Human Brain Project

NEST Desktop

An educational GUI for neuroscience

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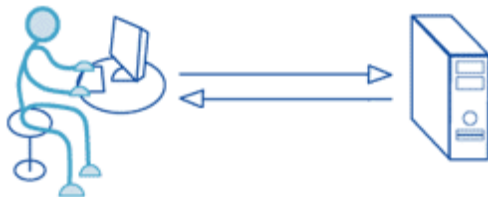


Primary Objectives

- ▶ A tool of classroom strength
- ▶ No learning programming language required
- ▶ Frontend app for the NEST simulator



Client-server concept



NEST Desktop

client
web interface
HTML5

NEST Server

local or remoted server
API, simulation script
Python (Flask, pyNEST)

Data transfer via GET/POST in JSON format

Data structure

JSON format

Data to NEST Server

- ▶ Kernel
- ▶ Models
- ▶ Collections
- ▶ Connectomes
- ▶ Simulation

Data from NEST Server

- ▶ Simulation outcome

```
"description": "It contains a minimal c
"kernel": {
  "resolution": 0.1
},
"models": {
  "stimulator-0": {
    "existing": "poisson_generator",
    "params": {
      "rate": 6500.0
    }
  },
  "neuron-1": {
    "existing": "iaf_psc_alpha",
    "params": {}
  },
  "recorder-2": {
    "existing": "spike_detector",
    "params": {}
  }
},
"collections": [{
  "idx": 0,
  "element_type": "stimulator",
  "model": "stimulator-0",
  "sketch": {
    "x": 50,
    "y": 50
  }
}, {
  "model": "stimulator-0",
  "sketch": {}
}, {
  "idx": 1,
  "element_type": "neuron",
  "model": "neuron-1",
  "n": 100,
  "sketch": {}
}, {
  "idx": 2,
  "element_type": "recorder",
  "model": "recorder-2",
  "sketch": {}
}],
"connectomes": [{
  "idx": 0,
  "pre": 0,
  "post": 1,
  "syn_spec": {
    "weight": 10.0
  }
}, {
  "idx": 1,
  "pre": 1,
  "post": 2
}],
"simulation": {
  "time": 1000.0
}
```

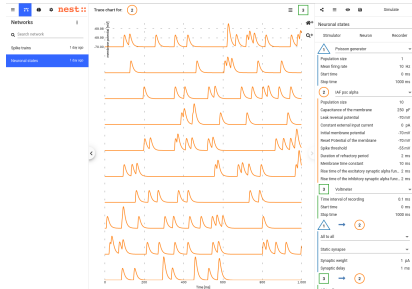
NEST Desktop

Under the hood

Angular modules

- ▶ Navigation (left)
- ▶ Controller (right)
- ▶ Graph (Sketch, chart)
- ▶ Model
- ▶ Network
- ▶ Results

Design concept



Goals

- ▶ Software development activities for NEST Desktop
 - ▶ Integration into the HBP infrastructure
 - ▶ Implementation of session management, e.g. Docker
 - ▶ Integration of *VIOLA* and the *NEST Instrumentation App*
 - ▶ Integration of *in situ pipeline*
 - ▶ Developer documentation of NEST Desktop
- ▶ Integration into the HBP storage infrastructure and collaboration tools
- ▶ Usability evaluation in a classroom setting
- ▶ Conceptual work on provenance tracking

And keep it in open-source and public for everyone.

This talk would motivate you ...

- ▶ to use NEST Desktop for teaching
- ▶ to tell others about NEST Desktop
- ▶ to build own frontend application