NeuralTractSpikes

January 26, 2017

```
In [1]: import sys
        sys.path.insert(0, '..')
        import time
        import matplotlib.pyplot as plt
        %matplotlib inline
        import numpy as np
        import scipy.stats

        from Configuration import Configuration
        from NeuralTract import NeuralTract
```

```
In [2]: conf = Configuration('confNeuralTractSpikes.rmto')
```

```
In [3]: t = np.arange(0.0, conf.simDuration_ms, conf.timeStep_ms)
```

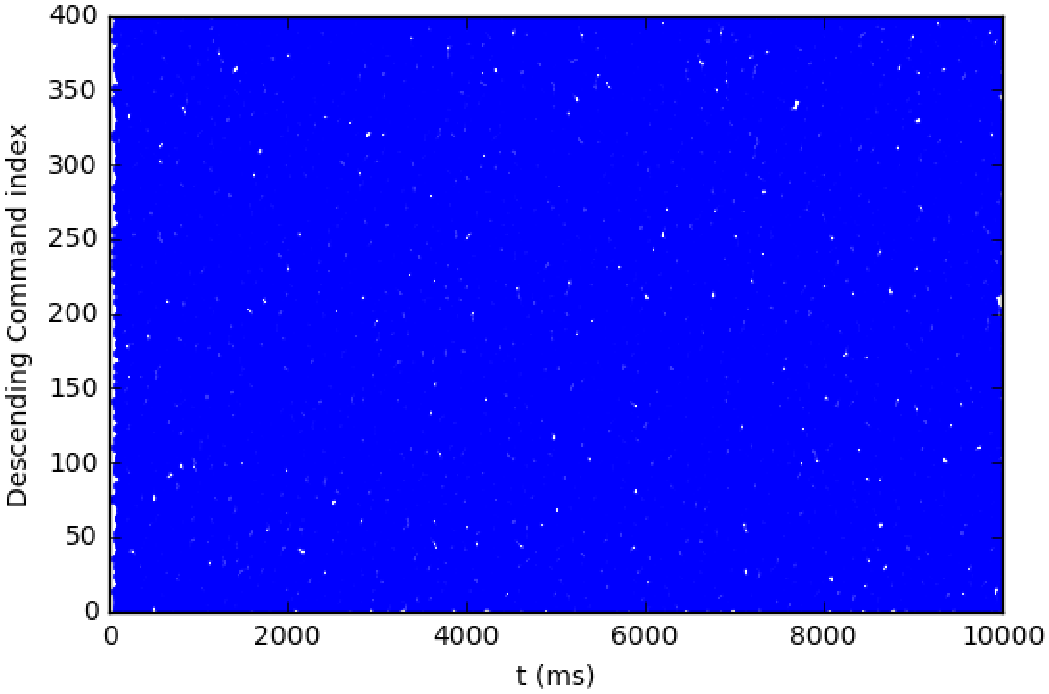
```
In [4]: pools = dict()
        pools[0] = NeuralTract(conf, 'CMExt')

        tic = time.clock()
        for i in xrange(0,len(t)-1):
            pools[0].atualizePool(t[i])
        toc = time.clock()
        print str(toc - tic) + ' seconds'
```

```
Descending Command CMExt built
101.170835 seconds
```

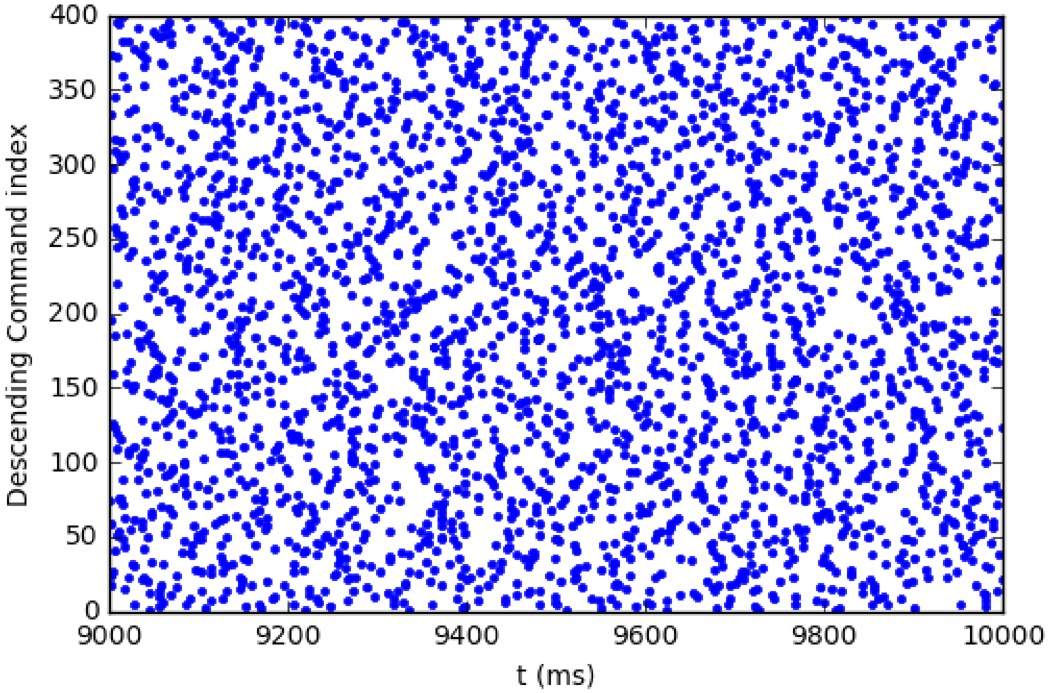
```
In [5]: pools[0].listSpikes()
```

```
In [20]: plt.figure()
         plt.plot(pools[0].poolTerminalSpikes[:, 0],
                  pools[0].poolTerminalSpikes[:, 1]+1, '.')
         plt.xlabel('t (ms)')
         plt.ylabel('Descending Command index')
```

```
Out[20]: <matplotlib.text.Text at 0x7fe57ccb8590>
```

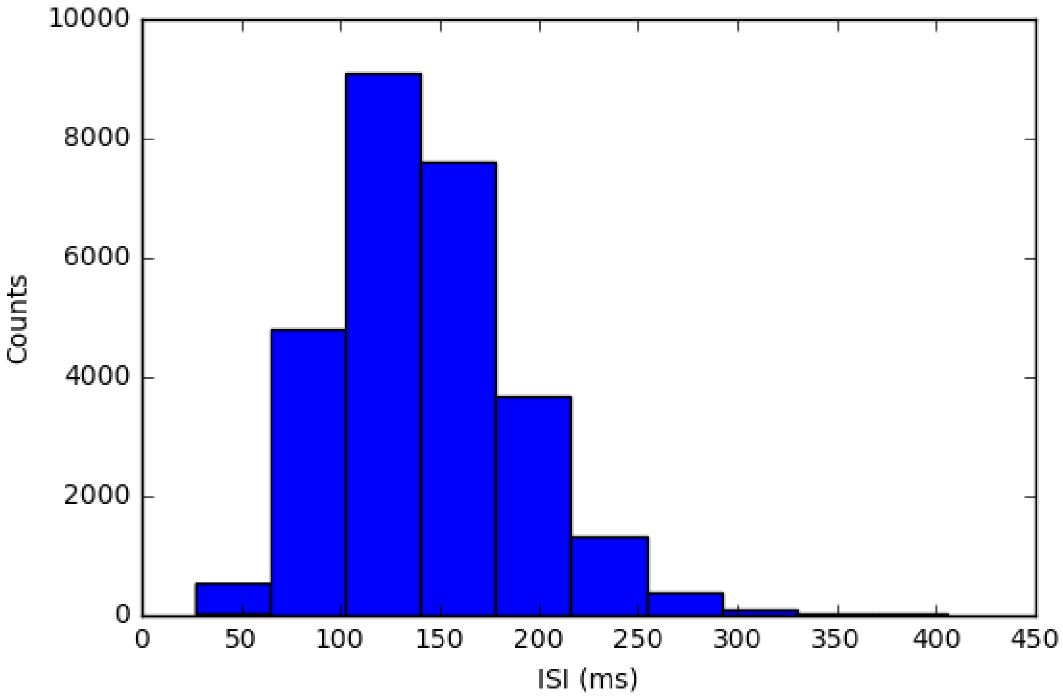


```
In [14]: plt.figure()
         plt.plot(pools[0].poolTerminalSpikes[pools[0].poolTerminalSpikes[:, 0]>900
                  pools[0].poolTerminalSpikes[pools[0].poolTerminalSpikes[:, 0]>900
         plt.xlabel('t (ms)')
         plt.ylabel('Descending Command index')

Out[14]: <matplotlib.text.Text at 0x7fe57ce8d050>
```



```
In [15]: ISI = np.array([])
         for i in xrange(0,len(pools[0].unit)):
             ISI = np.append(ISI, np.diff(np.reshape(np.array(pools[0].unit[i].term
```

```
In [21]: plt.figure()
         plt.hist(ISI)
         plt.xlabel('ISI (ms)')
         plt.ylabel('Counts')

Out[21]: <matplotlib.text.Text at 0x7fe57cd21990>
```



```
In [26]: SD = np.std(ISI)
         M = np.mean(ISI)
         CV = SD / M

         print 'ISI Mean = ' + str(M) + ' ms'
         print 'ISI Standard deviation = ' + str(SD) + ' ms'
         print 'ISI CV = ' + str(CV)
```

```
ISI Mean = 142.637822804 ms
ISI Standard deviation = 45.1699743313 ms
ISI CV = 0.31667599409
```

```
In [27]: M_FR = 1000.0 / M
         SD_FR = np.sqrt((SD**2) * 1000 / (M**3) + 1/6.0 + (SD**4) / (2*M**4) - SK/


         print 'Firing rate mean = ' + str(M_FR) + ' Hz'
         print 'Firing rate standard deviation = ' + str(SD_FR) + ' Hz'
```

```
Firing rate mean = 7.0107632067 Hz
Firing rate standard deviation = 0.935286146037 Hz
```

```
In [28]: CV_FR = SD_FR / M_FR
         print 'CV of Firing rate = ' + str(CV_FR)
```

```
CV of Firing rate = 0.13340717957
```

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In [ ]:
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