Workshop
Tools in Machine Learning

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Tools in Machine Learning

- Matlab
- Python
- R

Matlab


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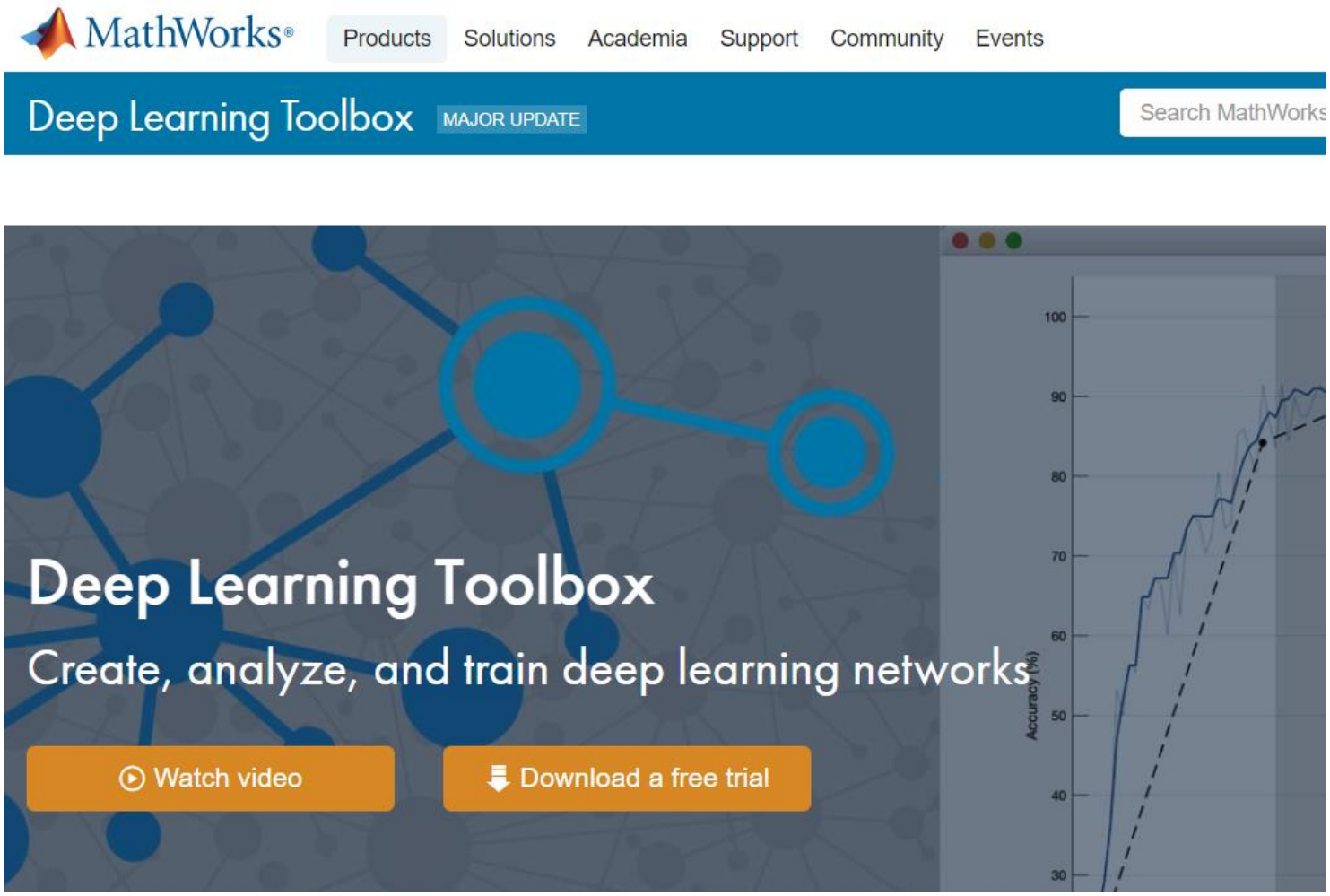
Time (sec)

Matlab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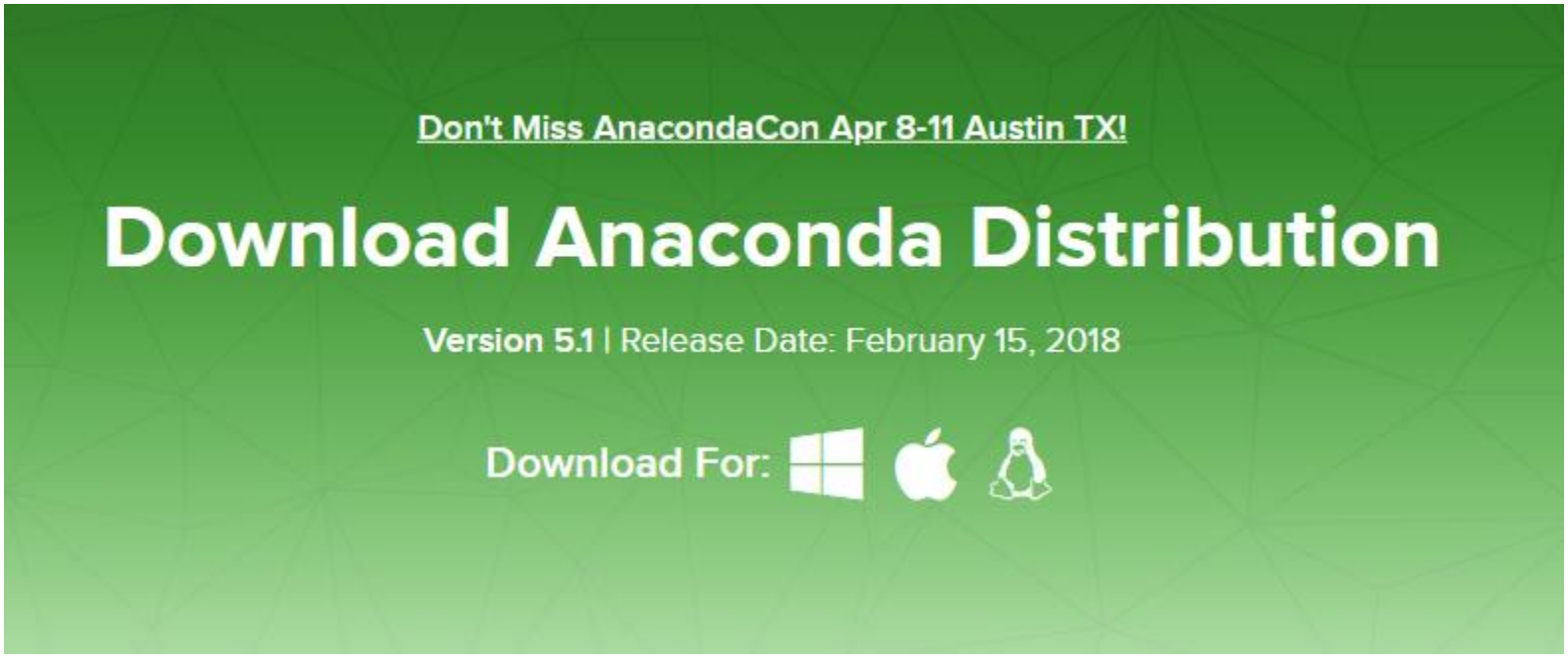
Accuracy (%)
100
90
80
70
60
50
40
30

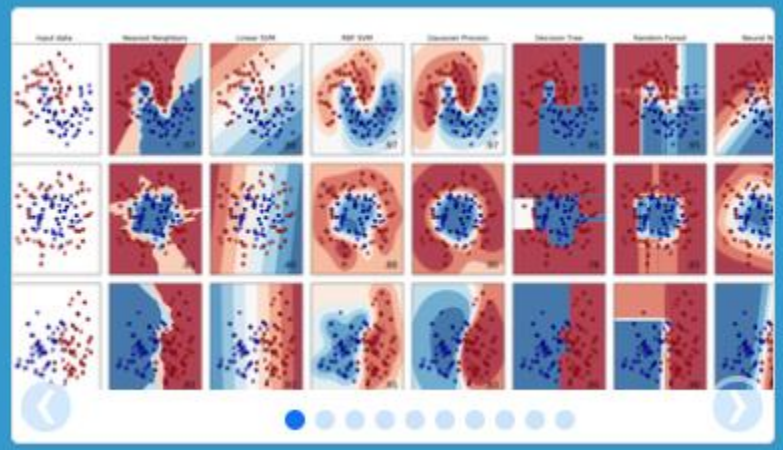
Python

ANACONDA.



Python

- Scikit-learn



scikit-learn

Machine Learning in Python

- Simple and efficient tools for data mining and data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib
- Open source, commercially usable - BSD license

Deep Learning in Python

Keras: The Python Deep Learning library

Keras

R

[Home]

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R Project

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The R Project for Statistical Computing

Getting Started

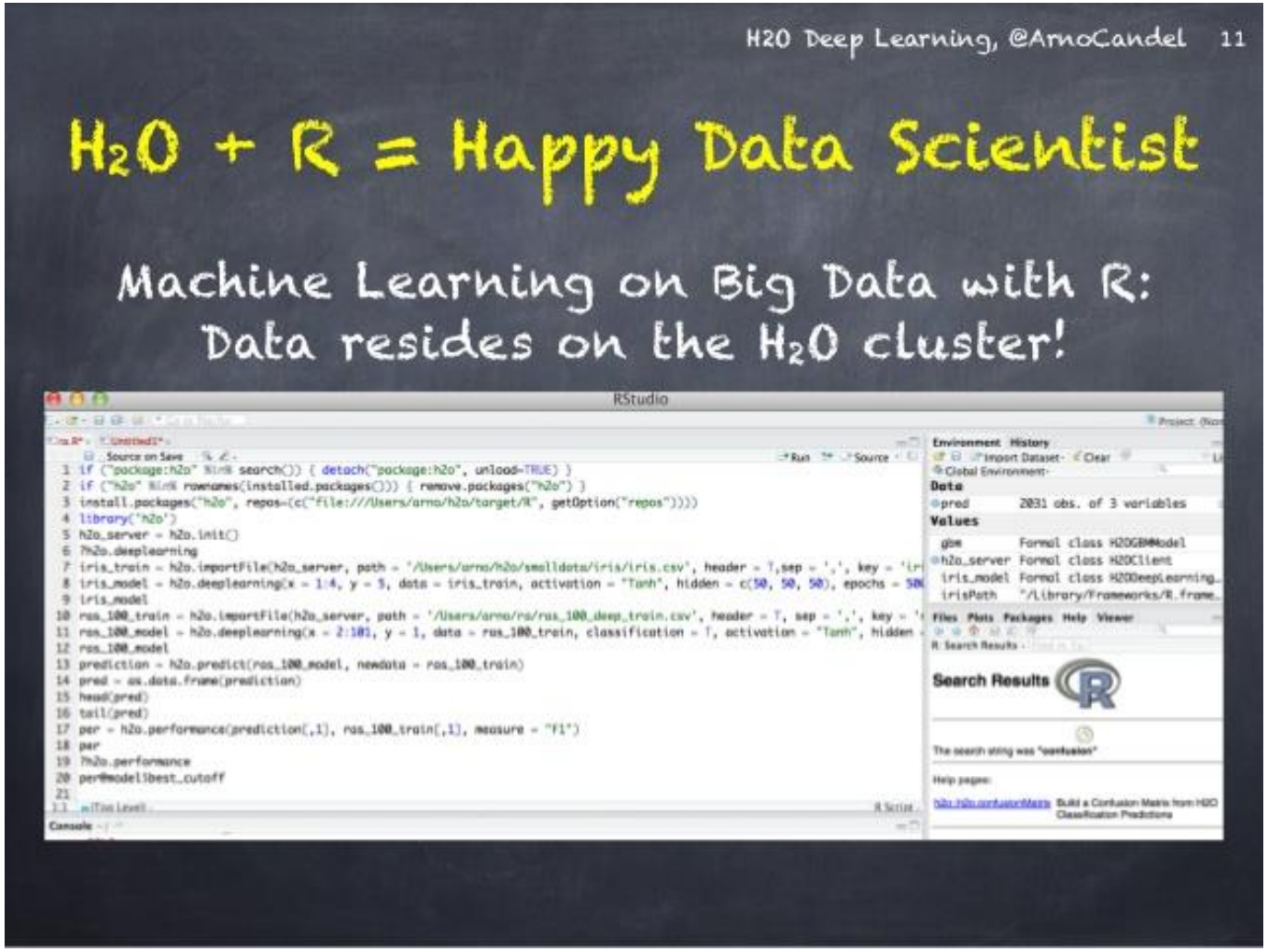
R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R**, please choose your preferred CRAN mirror.

If you have questions about R like how to download and install the software, or what the license terms are, please read our answers to frequently asked questions before you send an email.

News

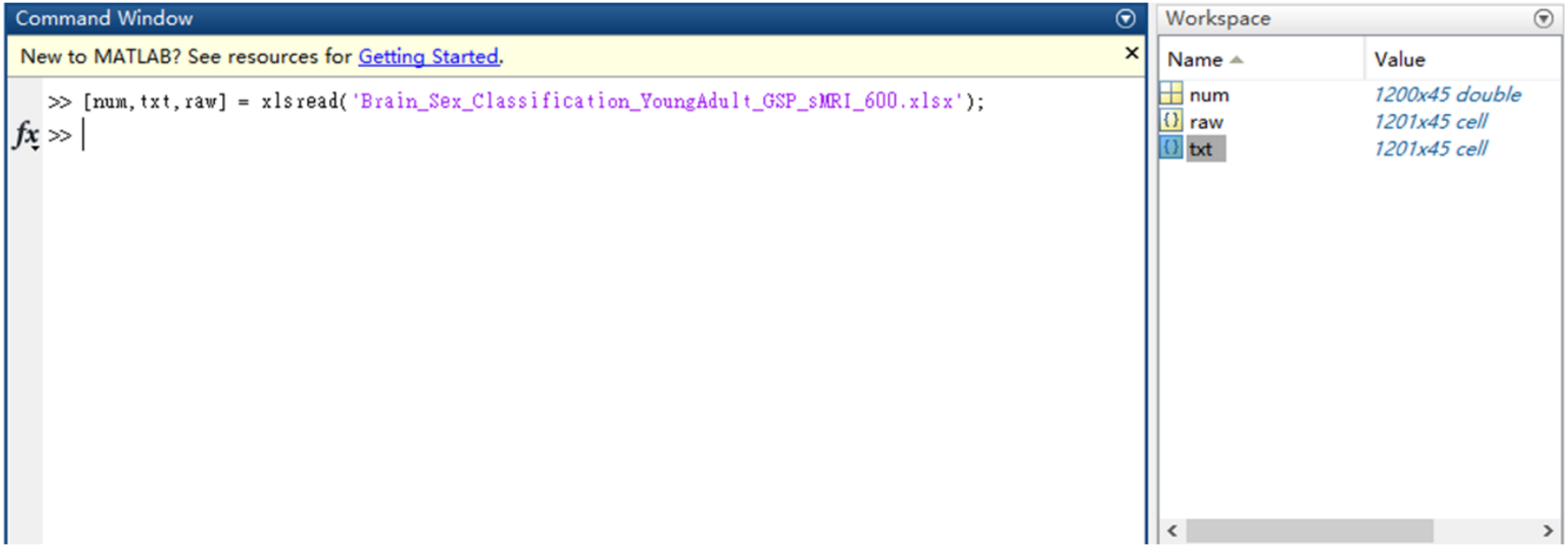
- **R version 3.5.0 (Joy in Playing) prerelease versions** will appear starting Friday 2018-03-23. Final release is scheduled for Monday 2018-04-23.
- **R version 3.4.4 (Someone to Lean On)** has been released on 2018-03-15.
- **useR! 2018** (July 10 - 13 in Brisbane) is open for registration at **https://user2018.r-project.org**
- **The R Journal Volume 9/2** is available.
- **R version 3.3.3 (Another Canoe)** has been released on Monday 2017-03-06.
- **useR! 2017** took place July 4 - 7 in Brussels **https://user2017.brussels**
- The **R Logo** is available for download in high-resolution PNG or SVG formats.

Deep Learning in R



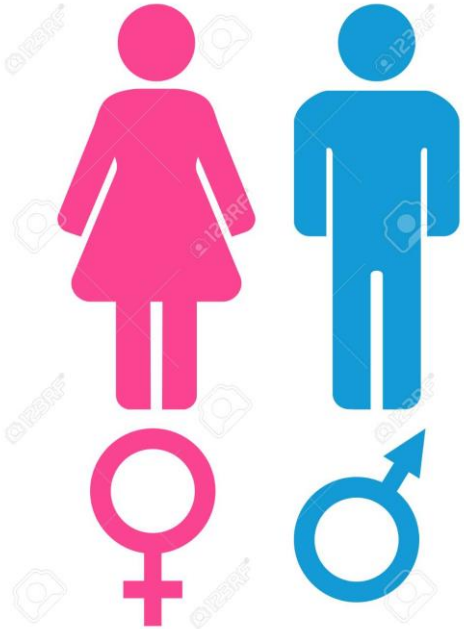
Importing Excel Data into Matlab

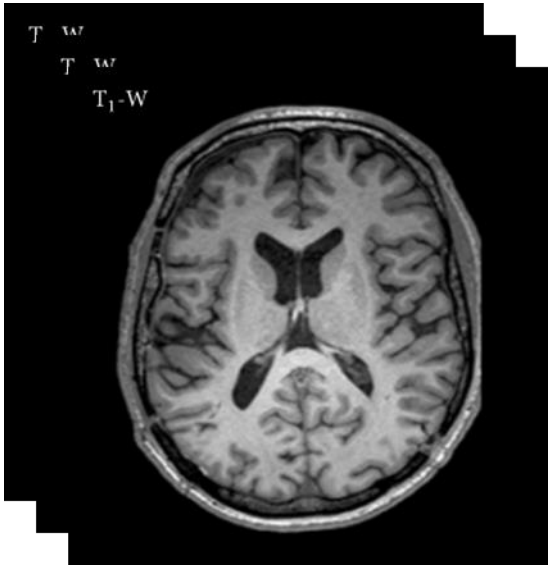
- [num,txt,raw] = xlsread('Brain_Sex_Classification_YoungAdult_GSP_sMRI_600.xlsx');



Variables Organization

- sex=num(:,3);
- brain=num(:,6:45);





Look into Brain Metrics

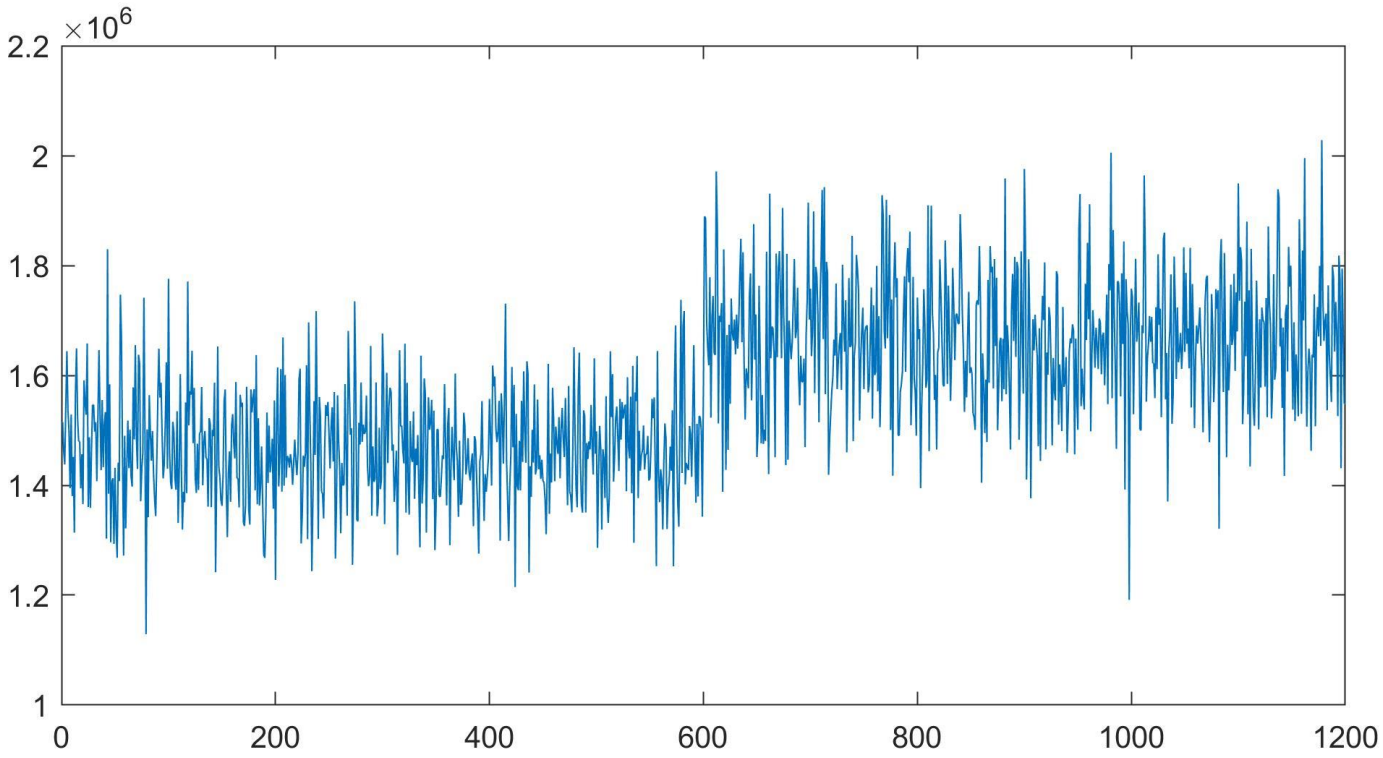
brain

1200x40 double

	1	2	3	4	5	6	7	8	9
1	1.5150e+06	1189565	1177053	1071	661	601	556	913	2.363
2	1.4632e+06	1144258	1130784	1054	574	489	425	945	2.526
3	1.4379e+06	1126298	1117216	920	464	522	474	807	2.604
4	1.5448e+06	1234031	1223971	960	593	774	715	1147	2.399
5	1.6441e+06	1259277	1250056	962	610	626	633	866	2.350
6	1.5365e+06	1248211	1237336	941	478	512	487	886	2.507
7	1.4981e+06	1165208	1151957	1104	447	424	527	829	2.577
8	1.3947e+06	1139605	1126518	918	550	509	495	925	2.464
9	1.5288e+06	1175892	1164037	918	549	513	417	842	2.628
10	1.3803e+06	1097100	1080649	868	395	375	366	705	2.486
11	1.4517e+06	1169329	1156849	876	455	486	416	941	2.479
12	1.3138e+06	1006265	993326	906	398	425	428	846	2.340
13	1.5660e+06	1234050	1219934	915	448	531	560	875	2.475
14	1.6491e+06	1269133	1258709	961	580	841	791	865	2.427
15	1.5226e+06	1189312	1161984	893	323	313	312	668	2.514
16	1.4803e+06	1161407	1145072	752	296	350	367	830	2.443
17	1.4795e+06	1163231	1150676	1015	453	435	422	805	2.496
18	1.3944e+06	1127640	1113453	1202	593	622	478	797	2.541

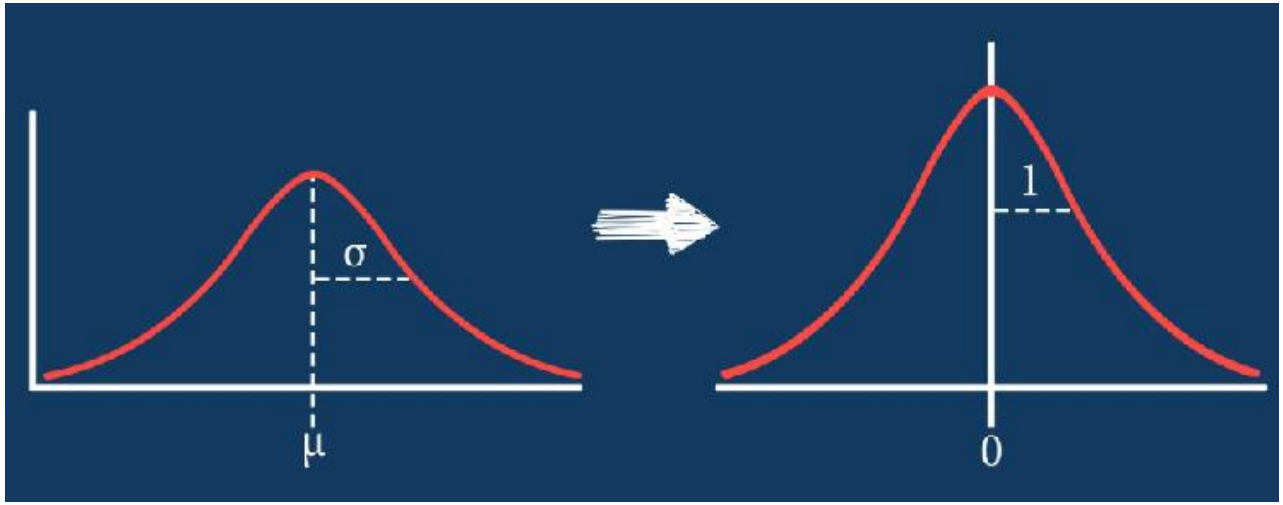
Look into Brain Metrics

- plot(brain(:,1));



Data Normalization

- m = mean(brain);
- sd = std(brain);
- for i=1:40
- brain(:,i) = (brain(:,i)-m(i))/sd(i);
- end



Normalized Data

brain

1200x40 double

	1	2	3	4	5	6	7	8	9
1	-0.3498	-0.5498	-0.5490	1.1641	2.2142	1.0047	0.7419	0.3939	-1.86
2	-0.6954	-0.9133	-0.9260	1.0413	1.1861	-0.0760	-0.5637	0.6350	0.23
3	-0.8639	-1.0573	-1.0366	0.0734	-0.1138	0.2424	-0.0754	-0.4049	1.23
4	-0.1513	-0.1931	-0.1668	0.3623	1.4106	2.6740	2.3266	2.1572	-1.39
5	0.5110	0.0094	0.0458	0.3768	1.6115	1.2459	1.5093	0.0397	-2.02
6	-0.2062	-0.0794	-0.0579	0.2251	0.0516	0.1459	0.0542	0.1904	-0.08
7	-0.4625	-0.7452	-0.7535	1.4024	-0.3147	-0.7032	0.4529	-0.2391	0.88
8	-1.1519	-0.9506	-0.9608	0.0590	0.9025	0.1170	0.1339	0.4843	-0.56
9	-0.2576	-0.6595	-0.6551	0.0590	0.8907	0.1556	-0.6435	-0.1411	1.53
10	-1.2481	-1.2916	-1.3345	-0.3021	-0.9292	-1.1760	-1.1518	-1.1735	-0.28
11	-0.7718	-0.7121	-0.7137	-0.2443	-0.2202	-0.1049	-0.6534	0.6049	-0.37
12	-1.6911	-2.0203	-2.0460	-0.0277	-0.8938	-0.6935	-0.5338	-0.1110	-2.15
13	-0.0098	-0.1930	-0.1997	0.0373	-0.3029	0.3293	0.7818	0.1075	-0.42
14	0.5444	0.0885	0.1163	0.3696	1.2570	3.3205	3.0840	0.0322	-1.03
15	-0.2991	-0.5518	-0.6718	-0.1216	-1.7801	-1.7742	-1.6900	-1.4523	0.07
16	-0.5811	-0.7757	-0.8096	-1.1399	-2.0992	-1.4172	-1.1418	-0.2316	-0.83
17	-0.5863	-0.7611	-0.7640	0.7596	-0.2438	-0.5971	-0.5936	-0.4199	-0.15
18	1.1537	1.0466	1.0672	2.1102	1.4106	1.2073	0.0355	0.4802	0.43

1200 Cases

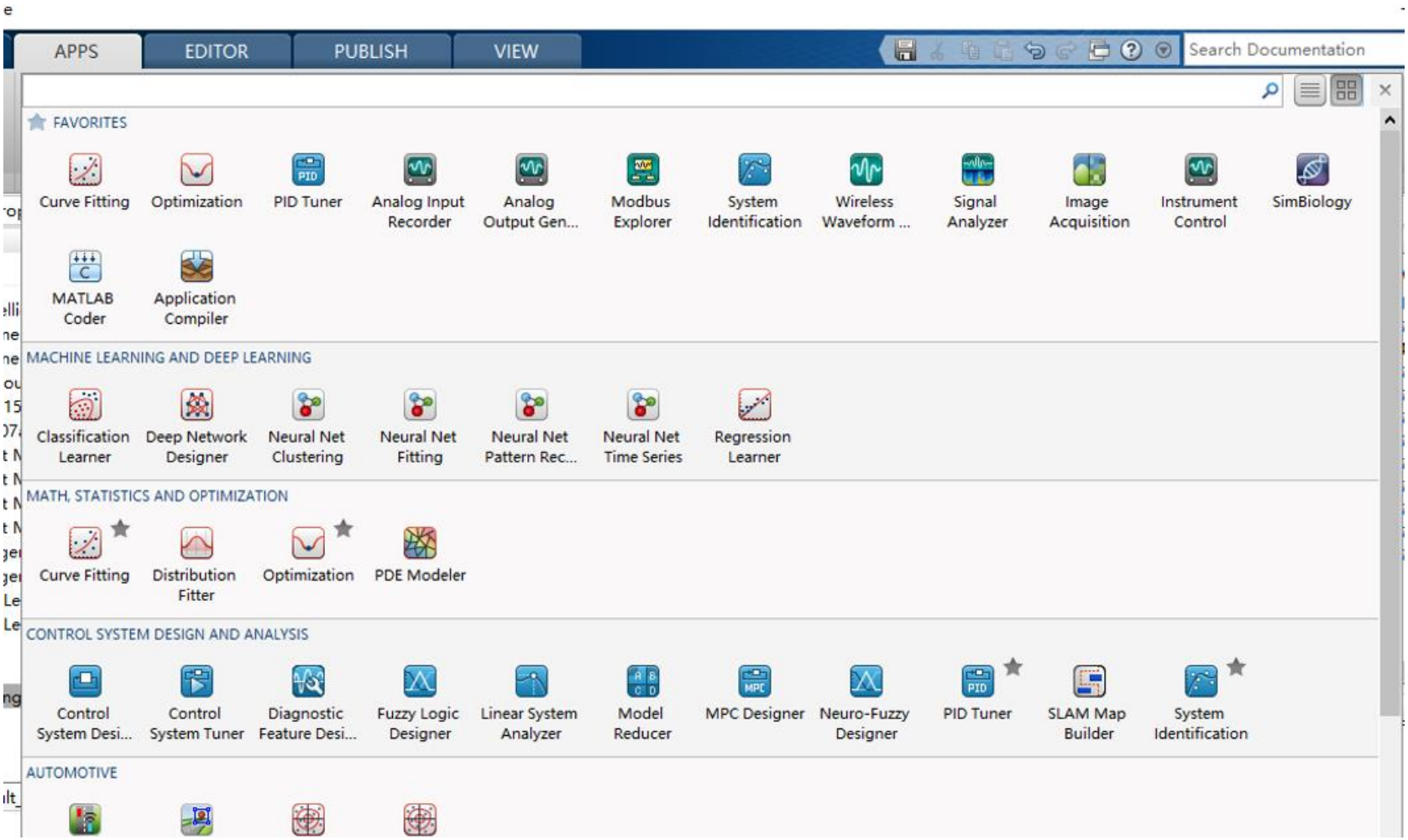
40 Variables

40 Variables

Prepare for Machine Learning Data

- mldata = [brain sex];

Matlab Machine Learning APP



Linear Discrimination