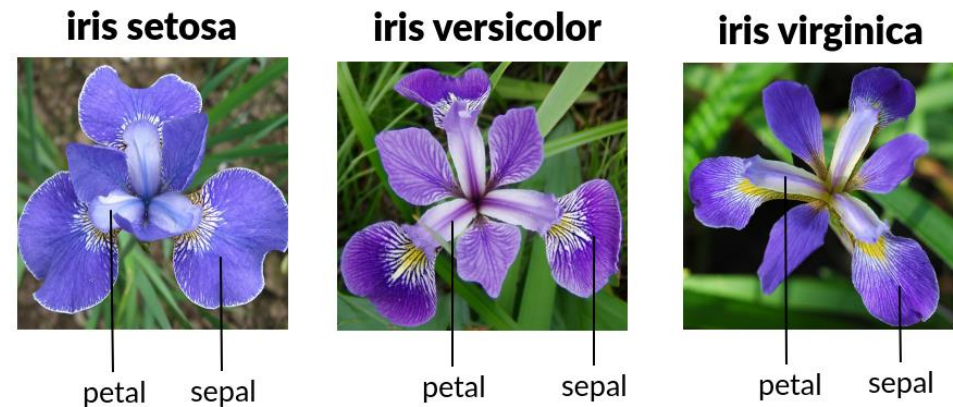
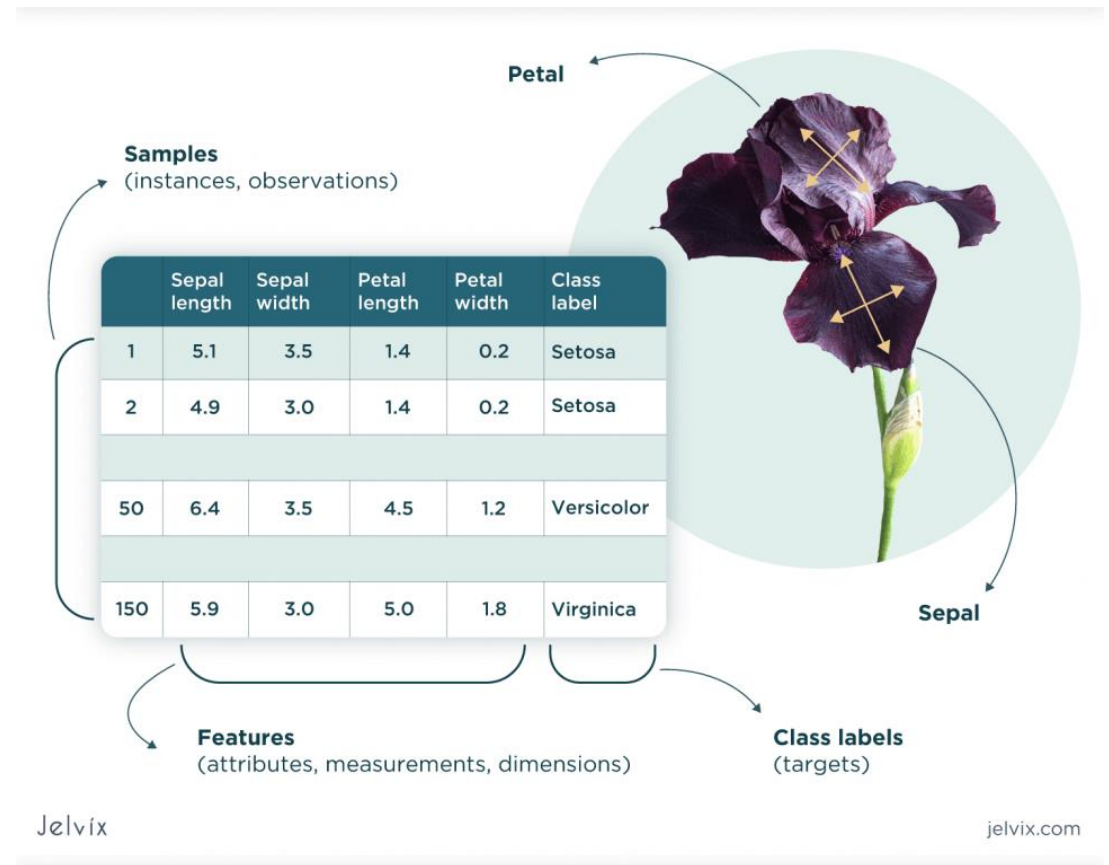


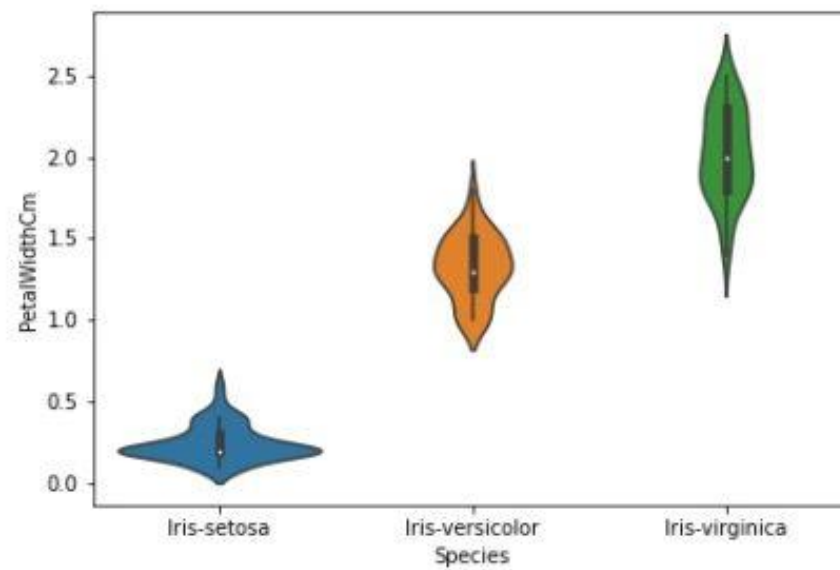
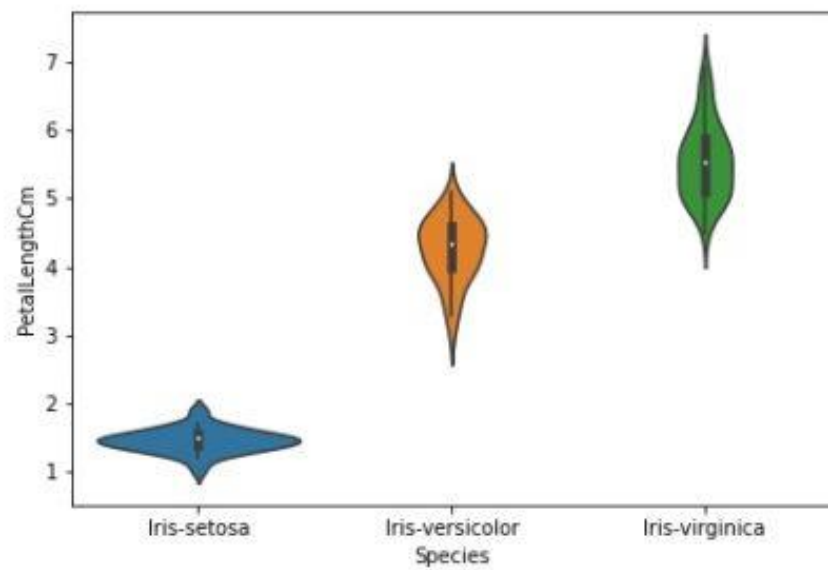
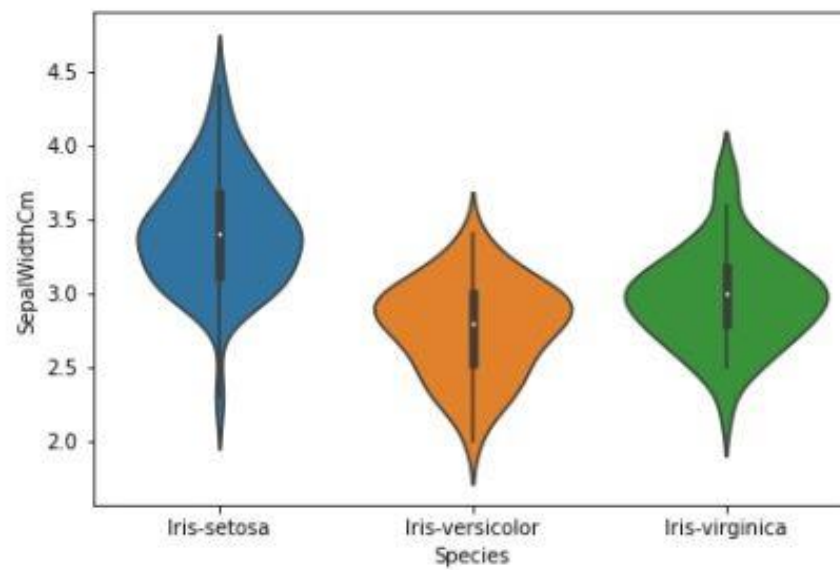
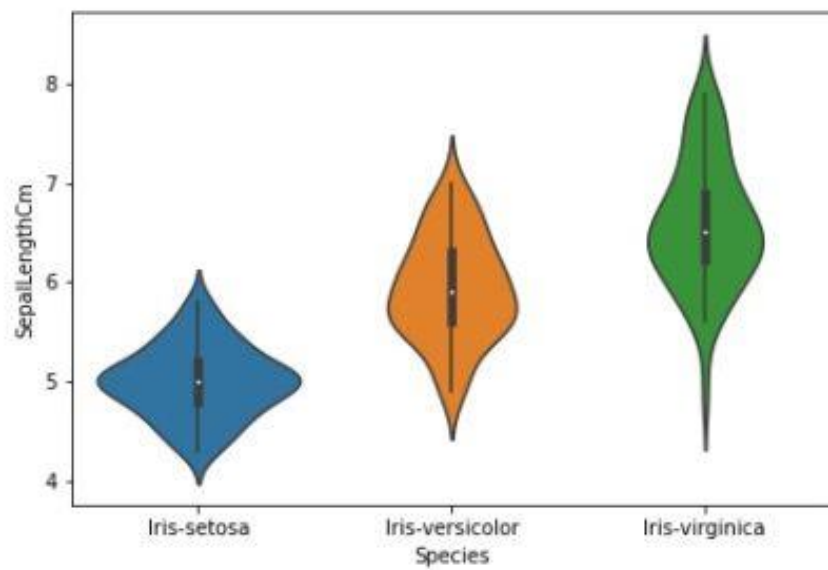
Data reduction issues in our
machine learning problem

- Usually in ML classification problems the input dataset is something that is measured directly or obtained from experiments.
- A good example would be the standard iris datasets



- Usually in ML classification problems the input dataset is something that is measured directly or obtained from experiments.
- A good example would be the standard iris datasets






In our case each parameter in every row is derived from a set of values

Event number	Garlock(West) tau0	SanAndreas(BigBend) tau0	SanAndreas(MojaveN) tau0	Garlock(West) sigma0	SanAndreas(BigBend) sigma0	SanAndreas(MojaveN) sigma0
1000437	60.04190726	61.67687402	57.74435719	99.83037768	100.2124689	99.65598909
100131	56.20946773	58.73331152	59.60381279	99.93918736	100.2449305	98.75738253
100147	56.19885042	58.79143583	59.61280818	99.95341546	100.271625	98.7609523
1002191	61.08461463	61.08526452	61.43338748	100.3765091	99.94553894	100.1209592
1003135	58.06691719	56.49362561	56.36484954	99.75534165	100.0240552	99.86692243
1003864	59.51869948	61.2397191	60.71914584	100.2257092	100.0118951	100.0397417
1004624	59.1510803	60.78117703	60.61821577	100.3441226	100.1393588	99.45835997
1005605	60.36919632	60.76554522	60.28831021	100.2638058	100.068004	99.78546739
1005979	60.59494607	56.1222807	58.02880696	100.062324	99.97640662	99.8801633
1006633	60.86890096	59.58953113	60.13128992	100.3249169	100.0024022	100.0067239
1006911	60.95236617	55.76342166	56.67140135	99.85662908	99.84218692	100.3185679
1007601	61.09325681	60.70250896	60.76023085	100.3070856	99.97015231	100.3695358
1008146	61.62556109	61.76486498	62.37239754	100.4855718	99.89438467	100.457039
1008736	56.9952573	60.14469451	61.00451192	100.319885	100.2063237	99.08703292
1009069	57.38223949	60.88941281	61.69349956	100.4202598	100.2173247	99.14748589
100909	57.4271972	61.27956317	61.0578784	100.1578803	100.3038098	98.91915818
1009925	58.94259505	60.20085038	60.17919644	100.2676355	100.165527	99.46852341
1010831	59.62415863	60.19026844	60.03174225	100.1992219	100.0381225	99.64649018
1011556	60.54247056	59.18212603	59.73028439	100.1244794	99.97096026	99.92127628
1011961	60.52032889	58.28392704	61.02807239	100.3441211	99.93158743	99.97448534

Input data to ML classification



Each row belongs to one unique output class.

In our case each parameter in every row is derived from a set of values

Event number	Garlock(West) tau0	SanAndreas(BigBend) tau0	SanAndreas(MojaveN) tau0	Garlock(West) sigma0	SanAndreas(BigBend) sigma0	SanAndreas(MojaveN) sigma0
1000437	60.04190726	61.67687402	57.74435719	99.83037768	100.2124689	99.65598909
100131	56.20946773	58.73331152	59.60381279	99.93918736	100.2449305	98.75738253
100147	56.19885042	58.79143583	59.61280818	99.95341546	100.271625	98.7609523
1002191	61.08461463	61.08526452	61.43338748	100.3765091	99.94553894	100.1209592
1003135	58.06691719	56.49362561	56.36484954	99.75534165	100.0240552	99.86692243
1003864	59.51869948	61.2397191	60.71914584	100.2257092	100.0118951	100.0397417
1004624	59.1510803	60.78117703	60.61821577	100.3441226	100.1393588	99.45835997
1005605	60.36919632	60.76554522	60.28831021	100.2638058	100.068004	99.78546739
1005979	60.59494607	56.1222807	58.02880696	100.062324	99.97640662	99.8801633
1006633	60.86890096	59.58953113	60.13128992	100.3249169	100.0024022	100.0067239
1006911	60.95236617	55.76342166	56.67140135	99.85662908	99.84218692	100.3185679

index	patches_list	flts	slip	tau0	sigma0	vel0	theta0	tau0_sigma0_ratio	strength_excess
1	1	Garlock(West)		62.00593842	101.5096715	0	7729392583	0.610837741	-1.100135542
2	2	Garlock(West)		53.169044	101.4775816	0	6085286587	0.523948671	7.717504945
3	3	Garlock(West)		56.98579973	97.43748845	0	7480175041	0.584844711	1.476693343
4	4	Garlock(West)		57.15742671	99.38541488	0	10487879242	0.5751088	2.473822211
5	5	Garlock(West)		57.43587508	98.00800295	0	9245533464	0.586032501	1.368926692
6	6	Garlock(West)		57.86038145	97.80084991	0	8870452739	0.591614301	0.820128494
7	7	Garlock(West)		53.73026048	99.41857133	0	9480754643	0.540444906	5.920882317
8	8	Garlock(West)		57.60469926	100.3383147	0	9808336445	0.574104712	2.59828958
9	9	Garlock(West)		56.63908685	99.76104159	0	9189335776	0.567747549	3.217538107
10	10	Garlock(West)		57.13787448	99.02026562	0	8531028639	0.577032127	2.27428489
11	11	Garlock(West)		59.87316458	99.98073785	0	8949543984	0.598846997	0.115278134
12	12	Garlock(West)		58.42702853	100.609329	0	9453692866	0.580731718	1.938568897
13	13	Garlock(West)		54.81808658	99.9871249	0	8968867338	0.548251454	5.174188362
14	14	Garlock(West)		57.54182643	99.89742855	0	8845364874	0.576009085	2.396630702
15	15	Garlock(West)		55.55802003	99.87898578	0	8762701190	0.556253346	4.369371434
16	16	Garlock(West)		59.84509268	99.93112586	0	8746116268	0.598863389	0.113582837
17	17	Garlock(West)		58.0643693	99.99678948	0	8881728822	0.580662335	1.933704388
18	18	Garlock(West)		67.98071536	99.85210601	0	14781918163	0.680814037	-8.069451753
19	19	Garlock(West)		62.9299741	99.93534413	0	13774980283	0.629706884	-2.968767627
20	20	Garlock(West)		61.5435171	99.81605866	0	11979609232	0.616569297	-1.653881898
21	21	Garlock(West)		57.66870331	99.7931875	0	12936400203	0.577882166	2.20720919
22	22	Garlock(West)		57.50908936	99.85689373	0	13535254998	0.575915064	2.405046879
23	23	Garlock(West)		50.98251036	99.83456057	0	15492021954	0.510669953	8.918225982
24	24	Garlock(West)		57.85590288	99.74298594	0	10999131163	0.580049838	1.989888687

Each row's parameters are derived by calculating the mean of a parent dataset values.

Parent dataset for the first row

Parent dataset belongs to the class output that the row belongs to.



Event number	Garlock(West) tau0	SanAndreas(BigBend) tau0	SanAndreas(MojaveN) tau0	Garlock(West) sigma0	SanAndreas(BigBend) sigma0	SanAndreas(MojaveN) sigma0
1000437	60.04190726	61.67687402	57.74435719	99.83037768	100.2124689	99.65598909
100131	56.20946773	58.73331152	59.60381279	99.93918736	100.2449305	98.75738253
100147	56.19835042	58.79143583	59.61280818	99.95341546	100.271625	98.7609523
1002191	61.08461462	61.08526452	61.43338748	100.3765091	99.94553894	100.1209592
1003135	58.06691719	56.49362561	56.36484954	99.75534165	100.0240552	99.86692243
1003864	59.51869948	61.2397191	60.71914584	100.2257092	100.0118951	100.0397417
1004624	59.1510803	60.78117703	60.61821577	100.3441226	100.1393588	99.45835997
1005605	60.36919632	60.76554522	60.28831021	100.2638058	100.068004	99.78546739
1005979	60.59494607	56.1222807	58.02880696	100.062324	99.97640662	99.8801633
1006633	60.86890096	59.58953113	60.13128992	100.3249169	100.0024022	100.0067239
1006911	60.95236617	55.76342166	56.67140135	99.85662908	99.84218692	100.3185679

index	patches_list	flts	slip	tau0	sigma0	vel0	theta0	tau0_sigma0_ratio	strength_excess
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2	2	Garlock(West)		53.169044	101.4775816	0	6085286587	0.523948671	7.717504945
3	3	Garlock(West)		56.98579973	97.43748845	0	7480175041	0.584844711	1.476693343
4	4	Garlock(West)		57.15742671	99.38541488	0	10487879242	0.5751088	2.473822211
5	5	Garlock(West)		57.43587508	98.00800295	0	9245533464	0.586032501	1.368926692
6	6	Garlock(West)		57.86038145	97.80084991	0	8870452730	0.591614301	0.820128494
7	7	Garlock(West)		53.73026048	99.41857133	0	8188751611	0.540111906	5.920882317
8	8	Garlock(West)		57.60469926	100.3383147	0	8188751611	0.5712	2.59828958
9	9	Garlock(West)		56.63908685	99.76104159	0	8188751611	0.549	3.217538107
10	10	Garlock(West)		57.13787448	99.02026562	0	8188751611	0.5127	2.27428489
11	11	Garlock(West)		59.87316458	99.98073785	0	8188751611	0.5997	0.115278134
12	12	Garlock(West)		58.42702853	100.609329	0	8188751611	0.718	1.938568897
13	13	Garlock(West)		54.81808658	99.9871249	0	8188751611	0.454	5.174188362
14	14	Garlock(West)		57.54182643	99.89742855	0	8188751611	0.085	2.396630702
15	15	Garlock(West)		55.55802003	99.87898578	0	8188751611	0.346	4.369371434
16	16	Garlock(West)		59.84509268	99.93112586	0	8746116268	0.598863389	0.113582837
17	17	Garlock(West)		58.0643693	99.99678948	0	8881728822	0.580662335	1.933704388
18	18	Garlock(West)		67.98071536	99.85210601	0	14781918163	0.680814037	-8.069451753
19	19	Garlock(West)		62.9299741	99.93534413	0	13774980283	0.629706884	-2.968767627
20	20	Garlock(West)		61.5435171	99.81605866	0	11979609232	0.616569297	-1.653881898
21	21	Garlock(West)		57.66870331	99.7931875	0	12936400203	0.577882166	2.20720919
22	22	Garlock(West)		57.50908936	99.85689373	0	13535254998	0.575915064	2.405046879
23	23	Garlock(West)		50.98251036	99.83456057	0	15492021954	0.510669953	8.918225982
24	24	Garlock(West)		57.85590288	99.74298594	0	10999131163	0.580049838	1.989888687

Each row's parameters are derived by calculating the mean of a parent dataset values.

mean

Garlock(West)_tau0
60.04190726