

The data set (and description) can be downloaded here:

<http://archive.ics.uci.edu/ml/machine-learning-databases/statlog/heart/heart.dat>

### Description:

This database contains 13 attributes (which have been extracted from a larger set of 75)

### Attribute Information:

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- 1. age
  - 2. sex
  - 3. chest pain type (4 values)
  - 4. resting blood pressure
  - 5. serum cholestoral in mg/dl
  - 6. fasting blood sugar > 120 mg/dl
  - 7. resting electrocardiographic results (values 0,1,2)
  - 8. maximum heart rate achieved
  - 9. exercise induced angina
  - 10. oldpeak = ST depression induced by exercise relative to rest
  - 11. the slope of the peak exercise ST segment
  - 12. number of major vessels (0-3) colored by flourosopy
  - 13. thal: 3 = normal; 6 = fixed defect; 7 = reversable defect

### Attributes types

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Real: 1,4,5,8,10,12  
Ordered: 11,  
Binary: 2,6,9  
Nominal: 7,3,13

### Variable to be predicted

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Absence (1) or presence (2) of heart disease

### Cost Matrix

	abse	pres
absence	0	1
presence	5	0

where the rows represent the true values and the columns the predicted.

No missing values.

270 observations

Citation Request:

Please refer to the repository <http://archive.ics.uci.edu/ml> (see citation policy).  
See also Frank, A. & Asuncion, A. (2010). UCI Machine Learning Repository  
[<http://archive.ics.uci.edu/ml>].  
Irvine, CA: University of California, School of Information and Computer Science.

**Descriptive statistics:**

Dataset= heart : n= 270 , d= 13

Class1: n= 120

Covariance matrix:

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]
[1,]	65.8739	-0.4636	-0.2923	33.9718	61.6627	0.2600	0.8405	-27.7558	-0.0845	0.9876	0.6136	3.1122	-2.5728
[2,]	-0.4636	0.1401	-0.0392	-2.3880	-5.6359	-0.0182	-0.0042	-0.7801	0.0084	-0.0632	-0.0308	-0.0336	0.1064
[3,]	-0.2923	-0.0392	0.6081	-1.5520	-0.1894	-0.0125	0.0534	-4.0800	0.1370	0.0964	0.0216	0.1000	0.1877
[4,]	33.9718	-2.3880	-1.5520	364.6352	210.2796	1.1302	1.4376	10.1807	0.6038	4.0205	2.2749	0.3197	3.5364
[5,]	61.6627	-5.6359	-0.1894	210.2796	2301.0409	1.9669	4.4739	50.2431	2.2706	-4.0354	-0.9389	4.9546	-4.6527
[6,]	0.2600	-0.0182	-0.0125	1.1302	1.9669	0.1226	0.0267	0.5244	0.0139	-0.0078	0.0178	0.0458	0.0154
[7,]	0.8405	-0.0042	0.0534	1.4376	4.4739	0.0267	0.9489	1.0153	-0.0155	0.0196	0.0080	0.1424	-0.1555
[8,]	-27.7558	-0.7801	-4.0800	10.1807	50.2431	0.5244	1.0153	535.0302	-3.4929	-6.9199	-4.7741	-2.0038	0.8754
[9,]	-0.0845	0.0084	0.1370	0.6038	2.2706	0.0139	-0.0155	-3.4929	0.2496	0.1163	0.0597	-0.0244	0.1345
[10,]	0.9876	-0.0632	0.0964	4.0205	-4.0354	-0.0078	0.0196	-6.9199	0.1163	1.6437	0.4399	0.1713	0.3553
[11,]	0.6136	-0.0308	0.0216	2.2749	-0.9389	0.0178	0.0080	-4.7741	0.0597	0.4399	0.3190	0.0025	0.1289
[12,]	3.1122	-0.0336	0.1000	0.3197	4.9546	0.0458	0.1424	-2.0038	-0.0244	0.1713	0.0025	1.0697	0.0168
[13,]	-2.5728	0.1064	0.1877	3.5364	-4.6527	0.0154	-0.1555	0.8754	0.1345	0.3553	0.1289	0.0168	3.1317

Correlation matrix:

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]
[1,]	1.0000	-0.1526	-0.0462	0.2192	0.1584	0.0915	0.1063	-0.1478	-0.0208	0.0949	0.1338	0.3707	-0.1791
[2,]	-0.1526	1.0000	-0.1344	-0.3342	-0.3139	-0.1389	-0.0115	-0.0901	0.0449	-0.1316	-0.1458	-0.0868	0.1607
[3,]	-0.0462	-0.1344	1.0000	-0.1042	-0.0051	-0.0456	0.0702	-0.2262	0.3516	0.0964	0.0490	0.1240	0.1360
[4,]	0.2192	-0.3342	-0.1042	1.0000	0.2296	0.1690	0.0773	0.0230	0.0633	0.1642	0.2109	0.0162	0.1047
[5,]	0.1584	-0.3139	-0.0051	0.2296	1.0000	0.1171	0.0957	0.0453	0.0947	-0.0656	-0.0347	0.0999	-0.0548
[6,]	0.0915	-0.1389	-0.0456	0.1690	0.1171	1.0000	0.0782	0.0647	0.0793	-0.0174	0.0899	0.1265	0.0249
[7,]	0.1063	-0.0115	0.0702	0.0773	0.0957	0.0782	1.0000	0.0451	-0.0319	0.0157	0.0145	0.1414	-0.0902
[8,]	-0.1478	-0.0901	-0.2262	0.0230	0.0453	0.0647	0.0451	1.0000	-0.3023	-0.2333	-0.3654	-0.0838	0.0214
[9,]	-0.0208	0.0449	0.3516	0.0633	0.0947	0.0793	-0.0319	-0.3023	1.0000	0.1816	0.2114	-0.0472	0.1521
[10,]	0.0949	-0.1316	0.0964	0.1642	-0.0656	-0.0174	0.0157	-0.2333	0.1816	1.0000	0.6075	0.1292	0.1566
[11,]	0.1338	-0.1458	0.0490	0.2109	-0.0347	0.0899	0.0145	-0.3654	0.2114	0.6075	1.0000	0.0043	0.1289
[12,]	0.3707	-0.0868	0.1240	0.0162	0.0999	0.1265	0.1414	-0.0838	-0.0472	0.1292	0.0043	1.0000	0.0092
[13,]	-0.1791	0.1607	0.1360	0.1047	-0.0548	0.0249	-0.0902	0.0214	0.1521	0.1566	0.1289	0.0092	1.0000

Median: 57.2071 0.8922 3.5733 131.9347 254.9462 0.2104 1.2672 140.6252 0.59 1.5064 1.7807 1.1327 6.0081

Mean: 56.5917 0.8333 3.6167 134.4417 256.4667 0.1417 1.225 138.8583 0.55 1.5842 1.8167 1.15 5.8333

MCD-estimated:

MDC-0.975-Mean: 55.6419 0.9405 4.0001 129.6567 248.5972 -1e-04 1.2537 135.3581 0.6717 1.6313 1.7909 1.1344 5.9703

MDC-0.750-Mean: 55.2572 0.9002 4.0001 130.4713 258.1858 -1e-04 1.3428 136.1427 0.6571 1.5429 1.7427 1.1429 6.0716

MDC-0.500-Mean: 55.4384 0.8632 4.0001 130.9725 257.1782 -1e-04 1.3013 136.6574 0.6712 1.5644 1.767 1.1096 5.8906

Class2: n= 150

Covariance matrix:

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]
[1,]	90.4369	-0.8433	0.3630	43.3834	116.4992	0.5352	0.7976	-97.2103	0.1392	1.1980	0.4000	1.5410	1.8833
[2,]	-0.8433	0.2488	-0.0407	0.2622	-5.8437	0.0287	-0.0093	1.5727	0.0153	0.0243	-0.0013	-0.0120	0.3000
[3,]	0.3630	-0.0407	0.8600	-2.0711	3.8038	-0.0460	-0.0455	-2.4228	0.0345	-0.0912	-0.0215	-0.0219	-0.0051
[4,]	43.3834	0.2622	-2.0711	270.8546	89.8676	0.9132	1.6792	11.2125	-0.2143	2.6185	-0.0336	0.1996	0.3338
[5,]	116.4992	-5.8437	3.8038	89.8676	2918.0616	-0.6705	10.0368	26.1365	-0.5497	0.9126	-1.8644	2.4552	-2.2830
[6,]	0.5352	0.0287	-0.0460	0.9132	-0.6705	0.1307	0.0149	-0.1857	-0.0102	-0.0075	0.0054	0.0430	0.0598
[7,]	0.7976	-0.0093	-0.0455	1.6792	10.0368	0.0149	0.9803	-0.7450	0.0283	0.0750	0.1034	-0.0603	-0.1844
[8,]	-97.2103	1.5727	-2.4228	11.2125	26.1365	-0.1857	-0.7450	371.8479	-1.2528	-2.8130	-2.4966	-1.3512	-3.4318
[9,]	0.1392	0.0153	0.0345	-0.2143	-0.5497	-0.0102	0.0283	-1.2528	0.1307	0.0039	0.0121	-0.0107	0.0598
[10,]	1.1980	0.0243	-0.0912	2.6185	0.9126	-0.0075	0.0750	-2.8130	0.0039	0.6414	0.2439	-0.0106	0.1371
[11,]	0.4000	-0.0013	-0.0215	-0.0336	-1.8644	0.0054	0.1034	-2.4966	0.0121	0.2439	0.3490	-0.0483	0.1262
[12,]	1.5410	-0.0120	-0.0219	0.1996	2.4552	0.0430	-0.0603	-1.3512	-0.0107	-0.0106	-0.0483	0.4206	0.0414
[13,]	1.8833	0.3000	-0.0051	0.3338	-2.2830	0.0598	-0.1844	-3.4318	0.0598	0.1371	0.1262	0.0414	2.4240

Correlation matrix:

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]
[1,]	1.0000	-0.1778	0.0412	0.2772	0.2268	0.1557	0.0847	-0.5301	0.0405	0.1573	0.0712	0.2499	0.1272
[2,]	-0.1778	1.0000	-0.0879	0.0319	-0.2169	0.1590	-0.0188	0.1635	0.0846	0.0608	-0.0046	-0.0372	0.3864
[3,]	0.0412	-0.0879	1.0000	-0.1357	0.0759	-0.1373	-0.0496	-0.1355	0.1029	-0.1228	-0.0392	-0.0364	-0.0035
[4,]	0.2772	0.0319	-0.1357	1.0000	0.1011	0.1535	0.1031	0.0353	-0.0360	0.1987	-0.0035	0.0187	0.0130
[5,]	0.2268	-0.2169	0.0759	0.1011	1.0000	-0.0343	0.1877	0.0251	-0.0281	0.0211	-0.0584	0.0701	-0.0271
[6,]	0.1557	0.1590	-0.1373	0.1535	-0.0343	1.0000	0.0416	-0.0266	-0.0784	-0.0260	0.0251	0.1834	0.1062
[7,]	0.0847	-0.0188	-0.0496	0.1031	0.1877	0.0416	1.0000	-0.0390	0.0791	0.0946	0.1767	-0.0939	-0.1196
[8,]	-0.5301	0.1635	-0.1355	0.0353	0.0251	-0.0266	-0.0390	1.0000	-0.1797	-0.1822	-0.2192	-0.1080	-0.1143
[9,]	0.0405	0.0846	0.1029	-0.0360	-0.0281	-0.0784	0.0791	-0.1797	1.0000	0.0134	0.0566	-0.0456	0.1062
[10,]	0.1573	0.0608	-0.1228	0.1987	0.0211	-0.0260	0.0946	-0.1822	0.0134	1.0000	0.5155	-0.0203	0.1099
[11,]	0.0712	-0.0046	-0.0392	-0.0035	-0.0584	0.0251	0.1767	-0.2192	0.0566	0.5155	1.0000	-0.1261	0.1372
[12,]	0.2499	-0.0372	-0.0364	0.0187	0.0701	0.1834	-0.0939	-0.1080	-0.0456	-0.0203	-0.1261	1.0000	0.0410
[13,]	0.1272	0.3864	-0.0035	0.0130	-0.0271	0.1062	-0.1196	-0.1143	0.1062	0.1099	0.1372	0.0410	1.0000

Median: 51.9046 0.5836 2.854 129.017 238.94 0.1537 0.913 160.2496 0.1521 0.6348 1.4162 0.2947 3.7179

Mean: 52.7067 0.5533 2.82 128.8667 244.2133 0.1533 0.86 158.3333 0.1533 0.6227 1.4 0.2867 3.7867

MCD-estimated:

MDC-0.975-Mean: 50.195 0.4268 2.9147 126.695 245.0122 1e-04 0.8414 161.6586 1e-04 0.4951 1.3169 0.1463 3

MDC-0.750-Mean: 49.7316 0.4634 2.9391 126.0854 241.2926 1e-04 0.9389 162.3415 0.1342 0.5146 1.3535 -1e-04 3

MDC-0.500-Mean: 49.9877 0.4391 2.9391 127.4999 242.9023 1e-04 0.8901 162.0488 0.122 0.4878 1.3535 0 3

Measures:

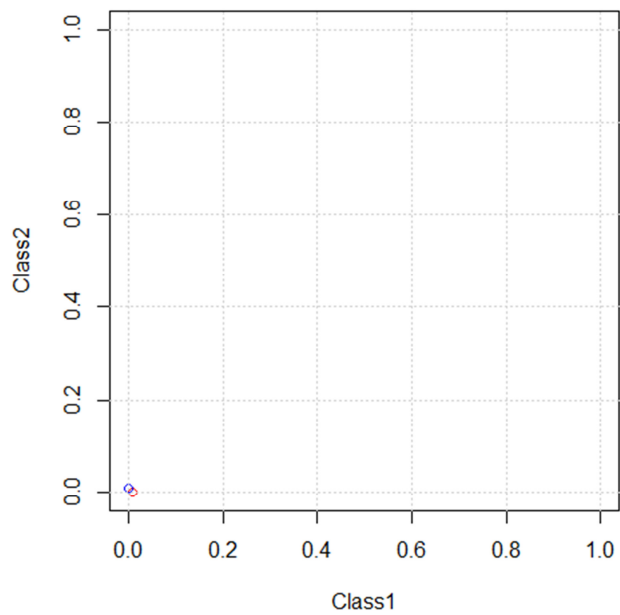
Mah.Dist: 2.1954

Mah.Dist-MCD-0.975: 3.8226

Mah.Dist-MCD-0.750: 3.6445

Mah.Dist-MCD-0.500: 3.8894

DD-Plot (zonoid): heart



DD-Plot (random Tukey): heart

