RECONHECIMENTO DE PADRÕES

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ANALYSIS OF SOIL BEHAVIOUR AND PREDICTION OF CROP YIELD USING DATA MINING APPROACH

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OBJETIVO

- This work presents a system, which uses data mining techniques in order to predict the category of the analyzed soil datasets. The category, thus predicted will indicate the yielding of crops.

TÉCNICAS UTILIZADAS

- K-Nearest Neighbor.
- Naive Bayes.

BASE DE DADOS E FERRAMENTAS

- Rapid Miner 5.3.
- Datasets considered in this work have sufficient amount of readings of nutrients and micronutrients taken from Jabalpur area.
- The dataset: 100 instances with 12 attributes.
- The tuples of dataset thus define the availability of nutrients and micronutrients in soil.

RESULTADO DA PREDIÇÃO (KNN)

Row No.	confidence(L)	confidence(...	confidence(...	prediction(...	Name of Fa...	pH	EC	...	% O.C.	Aval N (kg h...	Ava. P (kg h...	Ava. K (kg h...	Zn mg kg...	Cu m...	Fe mg ...	Mn ...	S
1	1	0	0	L	Ram Charar	7.500	0.263		0.840	403.768	46.330	793.520	1.030	3.820	26.950	19.190	10.350
2	1	0	0	L	Gajju Patel	7.500	0.286		0.810	389.407	23.360	778.400	1.350	2.750	14.720	16.770	8.280
3	1	0	0	L	Madan Lal	7.200	0.268		0.750	360.685	9.900	554.064	0.600	3.110	15.320	13.270	16.560
4	0	1	0	M	Shiv Prasad	7.500	0.138		0.330	159.631	6.730	214.928	0.280	1.760	12.700	10.850	13.110
5	0	0	1	H	Sunil Patel	7.300	0.170		0.495	238.617	16.230	135.072	0.600	1.400	10.640	10.950	15.180
6	0	1	0	M	Sohan Dahi	7.600	0.268		0.420	202.714	2.370	341.600	0.670	3.180	22.130	18.460	8.280
7	0	1	0	M	Mahendra P	7.600	0.152		0.480	231.436	9.500	407.344	0.320	1.410	17.910	8.980	20.010
8	0	0	1	H	Rampyare P	7.400	0.199		0.855	410.949	5.540	165.536	0.600	5	24.490	26.390	6.210
9	0	1	0	M	Sanjay Chou	7.100	0.226		0.660	317.602	14.650	334.096	0.710	2.570	16.620	19.180	17.250
10	1	0	0	L	Rajkumar	7	0.090		0.450	217.075	7.120	562.240	0.570	2.590	18.380	12.440	5.520
11	0	1	0	M	Santosh Pat	6.900	0.166		0.260	172.002	24.450	974.920	1.040	5.120	22.920	10.180	12.420

RESULTADO DA PREDIÇÃO (NB)

Row No.	confidence(L)	confidence(...	confidence(...	prediction(...	Name of Fa...	pH	EC	...	% O.C.	Aval N (kg h...	Ava. P (kg h...	Ava. K (kg h...	Zn	mg kg...	Cu	m...	Fe	mg ...	Mn	...	S
1	0.961	0.039	0.000	L	Ram Charar	7.500	0.263		0.840	403.768	46.330	793.520	1.030		3.820		26.950		19.190		10.350
2	0.884	0.116	0.000	L	Gajju Patel	7.500	0.286		0.810	389.407	23.360	778.400	1.350		2.750		14.720		16.770		8.280
3	0.814	0.134	0.052	L	Madan Lal	7.200	0.268		0.750	360.685	9.900	554.064	0.600		3.110		15.320		13.270		16.560
4	0.027	0.121	0.852	H	Shiv Prasad	7.500	0.138		0.330	159.631	6.730	214.928	0.280		1.760		12.700		10.850		13.110
5	0.072	0.278	0.650	H	Sunil Patel	7.300	0.170		0.495	238.617	16.230	135.072	0.600		1.400		10.640		10.950		15.180
6	0.559	0.413	0.028	L	Sohan Dahiy	7.600	0.268		0.420	202.714	2.370	341.600	0.670		3.180		22.130		18.460		8.280
7	0.168	0.292	0.540	H	Mahendra P:	7.600	0.152		0.480	231.436	9.500	407.344	0.320		1.410		17.910		8.980		20.010
8	0.657	0.342	0.001	L	Rampyare P	7.400	0.199		0.855	410.949	5.540	165.536	0.600		5		24.490		26.390		6.210
9	0.437	0.491	0.072	M	Sanjay Chou	7.100	0.226		0.660	317.602	14.650	334.096	0.710		2.570		16.620		19.180		17.250
10	0.074	0.600	0.326	M	Rajkumar	7	0.090		0.450	217.075	7.120	562.240	0.570		2.590		18.380		12.440		5.520

ESTATÍSTICAS

Role	Name	Type	Statistics	Range
confidence_L	confidence(L)	real	avg = 0.300 +/- 0.461	[0.000 ; 1.000]
confidence_M	confidence(M)	real	avg = 0.450 +/- 0.500	[0.000 ; 1.000]
confidence_H	confidence(H)	real	avg = 0.250 +/- 0.435	[0.000 ; 1.000]
prediction	prediction(Category)	polynominal	mode = M (45), least = H (25)	L (30), M (45), H (25)

Figure 10: Statistic result of KNN algorithm

Role	Name	Type	Statistics	Range
confidence_L	confidence(L)	real	avg = 0.231 +/- 0.254	[0.000; 1.000]
confidence_M	confidence(M)	real	avg = 0.413 +/- 0.277	[0.000; 1.000]
confidence_H	confidence(H)	real	avg = 0.356 +/- 0.315	[0.000; 0.852]
prediction	prediction(Category)	polynominal	mode = H (45), least = L (15)	L (15), M (40), H (45)

Figure 11: Statistic result of Naive Bayes Algorithm

CONCLUSÃO

- In this work, classification of soil into low, medium and high categories are done by adopting data mining techniques in order to predict the crop yield using available dataset.

- This study can help the soil analysts and farmers to decide sowing in which land may result in better crop production.

ESTIMATION OF MARBLING SCORE IN LIVE CATTLE BASED ON ICA AND A NEURAL NETWORK

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INTRODUÇÃO

- The marbling score is a major factor in determining the quality of beef. Since the score is determined based on the appearance of the carcass, livestock breeders cannot determine the quality of the beef until slaughter.

INTRODUÇÃO

- In addition, there is a problem with respect to lack of objectivity because beef carcasses are graded by judges through visual inspection.
- Therefore, the score can vary with the experience and the bias of the judge.

OBJETIVO

- Improve the estimation accuracy of the BMS number based on ICA and the neural network.

- BMS: beef marbling standard number.

TÉCNICAS

- ICA: Independent Component Analysis.
- Neural Network.

METODOLOGIA

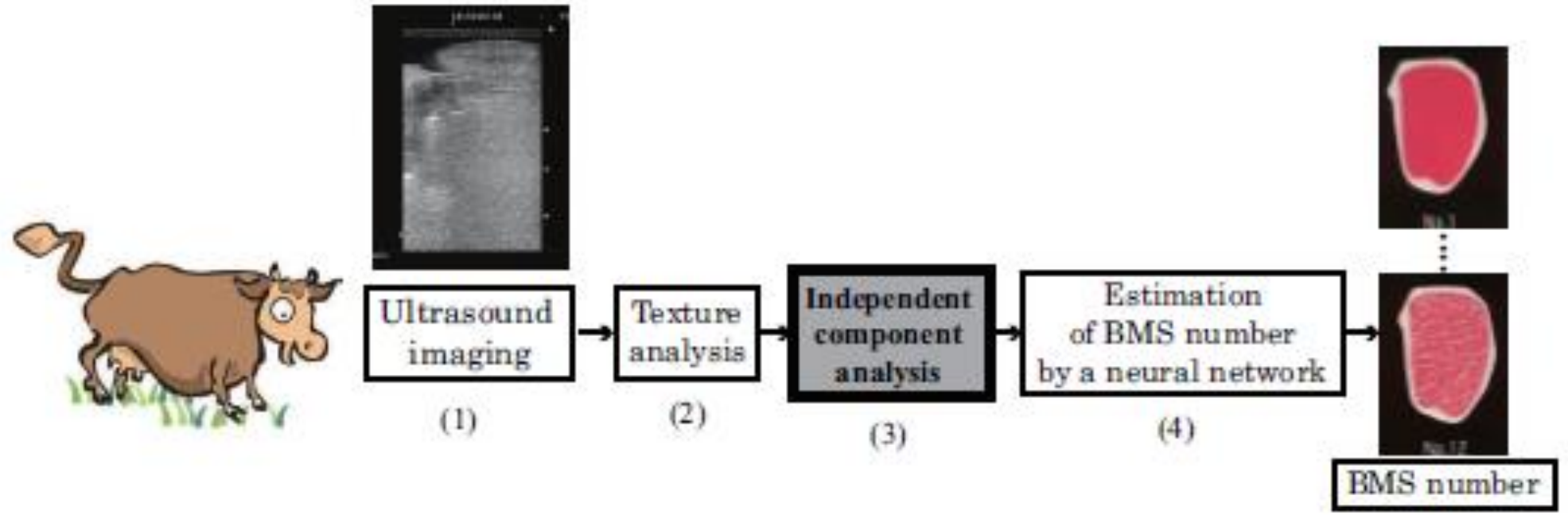

Fig. 3. Proposed method for the estimation of marbling score in live cattle.

RESULTADOS

- The correlation coefficient was R = 0.62 and the mean estimation error was 1.70 (PCA).

- The correlation coefficient was R = 0.70 and the mean estimation error was 1.55 (ICA).

RESULTADOS

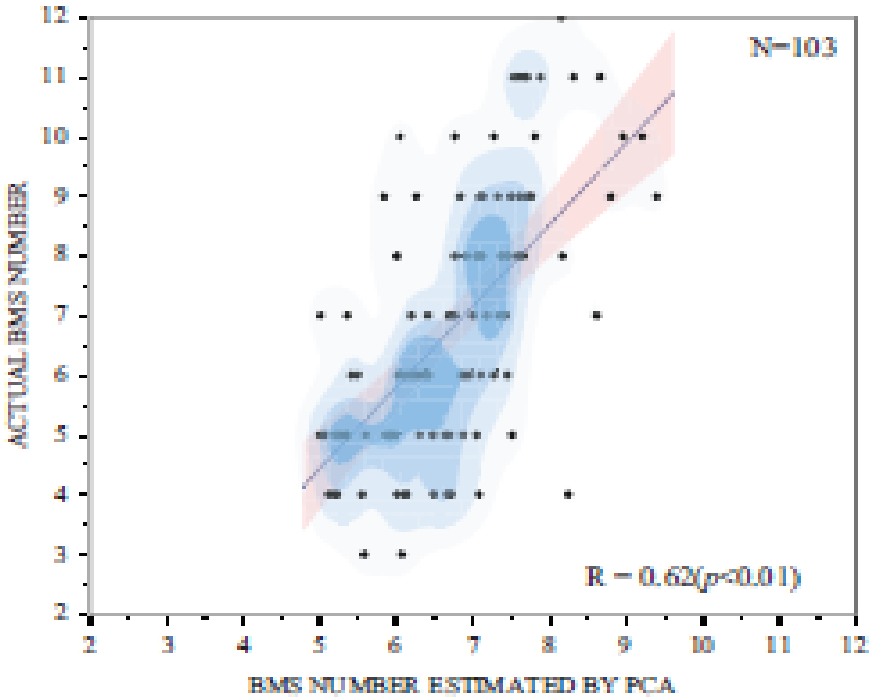

Fig. 6. Relationship between the BMS number estimated by PCA and the actual BMS number.

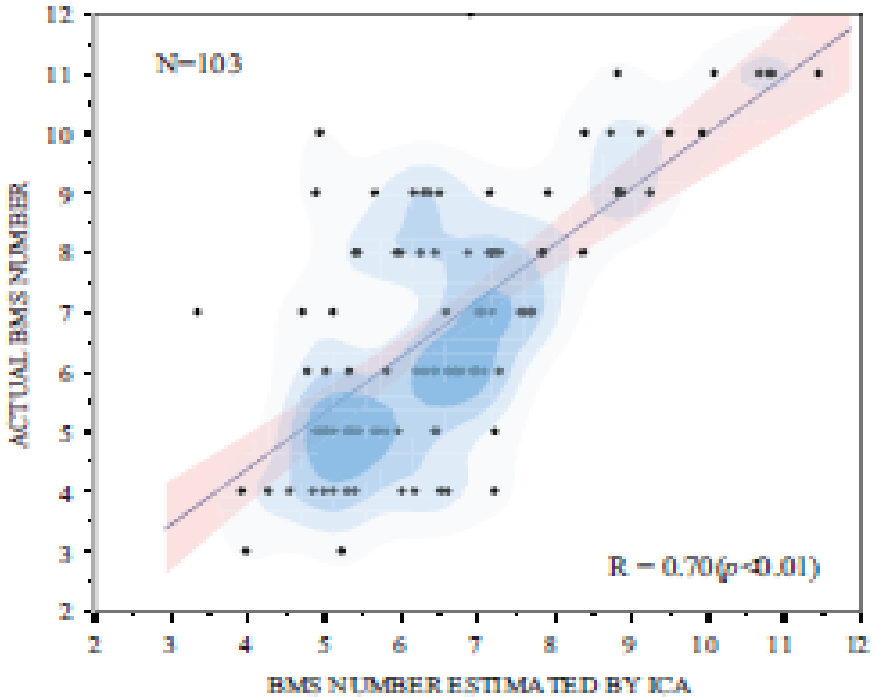

Fig. 7. Relationship between the BMS number estimated by ICA and actual BMS number.

RESULTADOS

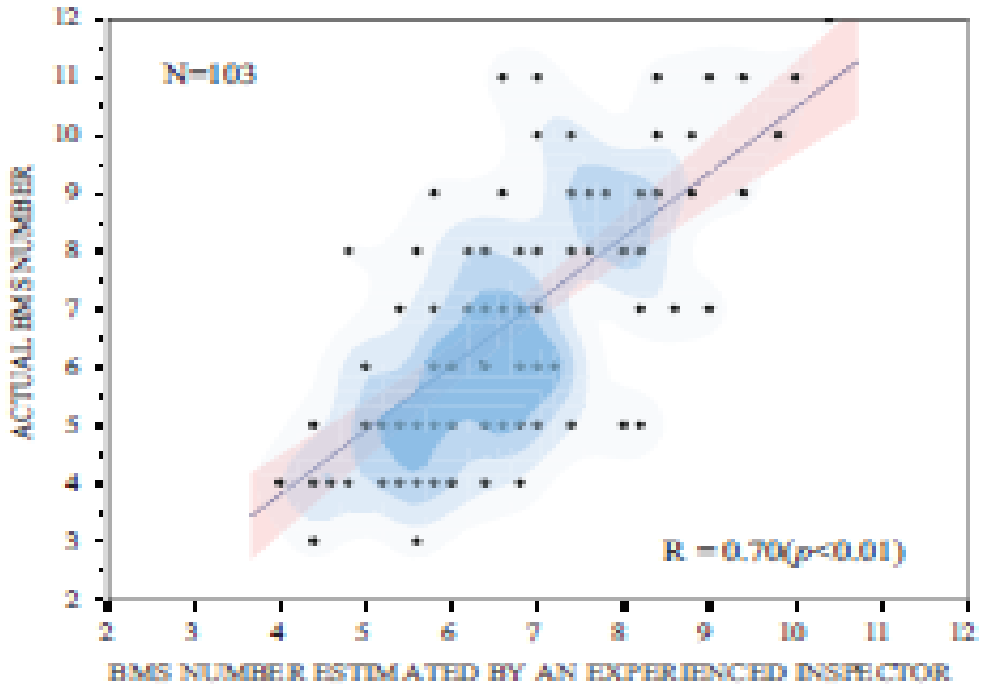

Fig. 9. Relationship between the estimated BMS number by an experienced inspevtor and actual BMS number.

RESULTADOS

- The correlation coefficient was R = 0.70.

- We can considered that the estimation accuracy of the ICA-based method is almost the same as that of the experienced inspector.

CONCLUSÕES

- The results showed that the accuracy of the ICA-based method was similar to that of the experienced inspector, with similar estimated BMS numbers.

TÉCNICAS UTILIZADAS NOS ARTIGOS

- KNN;
- Naïve-Bayes;
- ICA;
- PCA;
- Neural Networks.

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