BAB V
PENUTUP

A. Kesimpulan

1. Metode K-Means dapat digunakan untuk mengelompokkan pergerakan harga saham dengan harga komoditas dengan menggunakan variabel berupa data numerik. Metode K-Means adalah salah satu metode yang digunakan untuk mengelompokkan kuantitatif data. Oleh karena itu, untuk mengelompokkan pergerakan harga saham ini digunakan persentase selisih harga saham dengan harga komoditas yang merupakan data berupa data kuantitatif.
2. Metode K-Means dapat digabungkan dengan metode *Principal Component Analysis* dengan tujuan untuk menghilangkan variabel – variabel yang tidak berkorelasi dengan baik. Metode ini dapat efektif untuk menghilangkan variabel – variabel yang tidak saling berkorelasi dengan baik pada suatu klaster. Hasil penerapan metode ini adalah klaster yang memiliki variabel – variabel yang saling berkorelasi dengan baik.
3. Metode Backpropagation diterapkan untuk tiap klaster yang dihasilkan pada metode K-Means Klasterisasi. Sebagai masukan adalah variabel – variabel yang ada dalam tiap metode klaster. Data dari tiap klaster dipisahkan menjadi 2 bagian, yaitu data pelatihan dan data pengujian. Data pelatihan dipilih secara acak 2/3 dari total data untuk tiap klaster. Sedangkan data pengujian dipilih secara acak 1/3 dari total data untuk tiap klaster. Penerapan metode Backpropagation ini juga digunakan untuk klaster dengan dimensi yang sudah tereduksi. Sebagai hasilnya, kinerja dari tiap jaringan memiliki kinerja yang meningkat dibandingkan dengan klaster yang tidak direduksi.

B. Saran

1. Perlu adanya pengembangan suatu sistem berbasis pengetahuan untuk mendapatkan prediksi perubahan harga saham penutupan berdasarkan persentase perubahan harga komoditas, seperti emas, perak, minyak, tembaga, dan gas.
2. Penulis menyarankan untuk dapat menggunakan beberapa harga komoditas lainnya untuk dapat mengetahui pergerakan harga saham terhadap harga komoditas
3. Metode K-Means dan *Principal Component Analysis* juga dapat diuji cobakan terhadap perubahan harga saham dengan harga reksadana dan harga obligasi untuk melakukan pengujian terhadap harga saham terhadap harga reksadana dan harga obligasi

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APPENDIX 1

RATA – RATA PERUBAHAN HARGA SAHAM PER SEKTOR TIAP TAHUN

Tahun	Sector	Rata - rata selisih harga Penutupan	Rata - rata selisih harga Pembukaan
2001	1	0,00413	0,00552
2001	2	-0,00355	-0,00252
2001	3	-0,00133	-0,00076
2001	4	-0,0022	-0,00164
2001	5	0,0006	0,00055
2001	7	-0,00041	-0,00024
2001	8	0,00195	-0,00033
2001	9	0,00456	0,00148
2002	1	0,00055	0,00015
2002	2	0,00041	0,00043
2002	3	0,00031	0,0001
2002	4	0,00157	0,00134
2002	5	0,00243	0,00298
2002	7	0,00174	0,0014
2002	8	0,01779	0,01125
2002	9	0,00192	0,00149
2003	1	0,00455	0,0044
2003	2	0,00548	0,00545
2003	3	0,00234	0,00173
2003	4	0,00194	0,00184
2003	5	0,00303	0,00254
2003	6	0,00336	-0,00764
2003	7	0,00989	0,00939
2003	8	0,01316	0,01289
2003	9	0,00674	0,00463
2004	1	0,00193	0,00264
2004	2	0,00207	0,00218
2004	3	0,00039	0,00069
2004	4	0,00213	0,00237
2004	5	0,00277	0,00275
2004	6	0,00137	0,00133
2004	7	0,00241	0,00226

Tahun	Sector	Rata - rata selisih harga Penutupan	Rata - rata selisih harga Pembukaan
2004	8	0,0072	0,00563
2004	9	0,00395	0,00379
2005	1	0,00264	0,00275
2005	2	0,00121	0,00121
2005	3	0,0012	0,0012
2005	4	0,00034	0,00016
2005	5	0,00087	0,00073
2005	6	0,00324	0,00342
2005	7	0,00065	0,00052
2005	8	-0,00015	-0,00069
2005	9	0,00249	0,00241
2006	1	0,00389	0,00378
2006	2	0,00203	0,00227
2006	3	0,00138	0,00121
2006	4	0,00279	0,00283
2006	5	0,00179	0,00184
2006	6	0,00166	0,00164
2006	7	0,00167	0,00174
2006	8	0,00223	0,00192
2006	9	0,00146	0,00077
2007	1	0,00223	0,00279
2007	2	0,00202	0,00187
2007	3	0,00071	0,00094
2007	4	0,00072	0,00097
2007	5	0,00217	0,00219
2007	6	3E-5	0,00041
2007	7	0,00542	0,00643
2007	8	0,00497	0,00616
2007	9	0,00146	0,00163
2008	1	-0,00347	-0,00337
2008	2	-0,00157	-0,00154
2008	3	-0,00219	-0,0024
2008	4	-0,00299	-0,00258
2008	5	-0,00309	-0,00328
2008	6	-0,00313	-0,00243
2008	7	-0,00418	-0,00363
2008	8	-0,00549	-0,00483
2008	9	-0,00192	-0,00233
2009	1	0,00264	0,00448

Tahun	Sector	Rata - rata selisih harga Penutupan	Rata - rata selisih harga Pembukaan
2009	2	0,00431	0,00514
2009	3	0,00473	0,00532
2009	4	0,00236	0,00284
2009	5	0,00475	0,00553
2009	6	0,00393	0,00465
2009	7	0,00343	0,0051
2009	8	0,00407	0,00396
2009	9	0,00394	0,00461
2010	1	0,00195	0,00262
2010	2	0,0024	0,00247
2010	3	0,00221	0,00223
2010	4	0,0014	0,00164
2010	5	0,00111	0,00117
2010	6	0,00159	0,00158
2010	7	0,00103	0,00107
2010	8	0,00131	0,00127
2010	9	0,00336	0,00342
2011	1	-0,00025	-0,00025
2011	2	0,00067	0,00067
2011	3	0,00071	0,00071
2011	4	0,0003	0,0003
2011	5	0,00132	0,00132
2011	6	-0,00035	-0,00035
2011	7	-0,00095	-0,00095
2011	8	0,00154	0,00154
2011	9	0,00132	0,00132
2012	1	0,00232	0,00232
2012	2	0,00195	0,00195
2012	3	-0,00073	-0,00073
2012	4	0,00111	0,00111
2012	5	0,00245	0,00245
2012	6	0,00151	0,00151
2012	7	0,00544	0,00544
2012	8	0,00128	0,00128
2012	9	0,00595	0,00595
2013	1	-0,0037	-0,0037
2013	2	0,00104	0,00104
2013	3	0,00044	0,00044
2013	4	0,00326	0,00326

Tahun	Sector	Rata - rata selisih harga Penutupan	Rata - rata selisih harga pembukaan
2013	5	-0,00081	-0,00081
2013	6	0,0004	0,0004
2013	7	0,00033	0,00033
2013	8	0,00802	0,00802
2013	9	-0,00167	-0,00167
2001	1	0,00413	0,00552
2001	2	-0,00355	-0,00252
2001	3	-0,00133	-0,00076

APPENDIX 2

RATA – RATA PERUBAHAN HARGA KOMODITAS

TIAP TAHUN

Tahun	Perak	Gas	Tembaga	Emas	Minyak
2001	-	-	-	0,0006	-
2002	-	-	-	0,0008	-
2003	-	-	-	0,0009	0,0001
2004	-	-	-	0,0002	0,0013
2005	-	-	-	0,0008	0,0015
2006	-	-	-	0,0005	-0,0002
2007	-	-	-	0,0011	0,0018
2008	-	-	-	0,0003	-0,0042
2009	-0,0003	0,002	0,0004	0,0013	0,0026
2010	0,0023	-0,0013	0,0009	0,0008	0,0006
2011	-0,0005	-0,0012	-0,0008	0,00003	0,0007
2012	0,0101	-0,0112	0,0047	0,0061	0,002
2013	0,0023	0,0034	-0,0001	0,0001	0,0014