;zKk$N8l5A$K4pE/%K%e!<%91GA|$N J,N`!&:w0zIU$1<jK!

Classification and indexing method for news video based on semantic attributes of captions

0f<j 0lO: Ichiro IDE ;3K\ 98;J Koji YAMAMOTO EDCf 1QI' Hidehiko TANAKA

El5~Bg3XBg3X1! 9)3X7O8&5f2J
Graduate School of Engineering, The University of Tokyo

1 O8aK

MM!9JG^BNrDL8FDs6!5l$k%^%k%A%a%G%#%"!"FC$K1GA|>pJsNNLOKDBgG"$j!">-Mh$N:FMxMQ$d8!:w$r9MN8$9$k$H!"FbMF$rH?1G7?:w0zIU1r9TJC$FC_@Q$7F*$/I,MW$,$"$k!#7+$7!"KDBg$JNL$N1GA|$KBP7F!"FbMF$rH?1G$7$?:w0zIU$1$r9T$J$&$?aK$OAj1~$NO+NOrMW7!"=>MhNh$&$K?M<j$G9T$$$B3$1$kNO8=<BE*GO$J$$!#K\8&5fGO3Nh&$J<{MW$rGX7JH7$F!"1GA|$X$N<+F0E*$J:w0zIU$1<jK!$rDs0F9k!#$^$?!":FMxMQ$d8!:w$N<{MWNBg-5H$$$&E@$+$i!"%K%e!<%91GA|$rBP>]$H9k!#

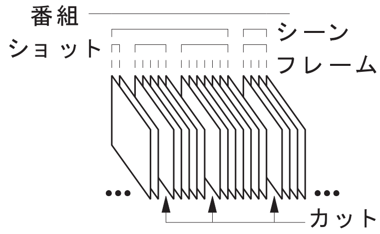
1GA|XN<+F0E*:w0zIU1K4X9k8&5f$O!"5lMh$N2hA|$K4X$9$k>\:Y$JGX7JCN<1KMjk<jK!$N[$+!"6aG/!"1GA|$KMM!9$J7A$GIU?o$9$k<+A38@8l>pJs$rMxMQ9k;n$_$,9TJolF$$$k!#$=$NCfGb CMU K*1k Informedia %W%m%8%'%/%H [4] $O4{$K>&MQ2=?e=`$KC#$7$D$D$"$k$,!"$3$l$r;O$a$H$9$kB?$/$NN`;w8&5fK*$$$F!":w0z8l$OOCBjC10L!"$"$k$$$O=P8=;~E@(H/@<!&I=<(5l$?;~E@)$K!"=P8=IQEYdDA7$5$JIN4p=`$K4p$E$$$FIUM?5lk3H,B?$/!"1GA|FbMF$rCi<B$KH?1G$7$F!"$+$D;~4VE*N3EY$N:Y$+$$:w0zIU1O$"$^$j9T$Jol$F$$$J$$$N$,8=>u$G$"$k!#

I.<TiO!"%7%g%C%H$r$$$/D+$NE57?(2q8+!&=89g$J$I)$KJ,N`9k3HKh$j!"1GA|FbMF$r$*$*$^$+$K?dDj$7$?8e!"3FE57?Kh$KI,MW$J:w0z8l$r;zKkJI$+$iCj=P9k<jK!$rDs0F$7!"4JC1$J<B83$K$*$$$FI>2A7? [2]!#3lKh$j!"%7%g%C%H$H$$$&;~4VE*N3EY$N:Y$+$$6h4VXN!"1GA|FbMF$KCi<B$J:w0zIU1,2DG=HJ$k!#F1MM$N<jK!$OCfB<$i [3] $bDs0F$7$F$$$k$,!"$3liNh$&$KE57?E*%7%g%C%HXNJ,N`$G$O!"J,N`4p=`$rE72<$jE*$KM?$($k$?$a!"8B$i$l$?J,N`KHI^i6krF@$J$$!#

$=$3$GK\8&5f$G$O!";zKk$N8l5A$N<+A38@8lE*J,N`$K4p$E$$$F%7%g%C%H$rJ,N`$7!"3FJ,N`$KB0$91GA|$+$i!"<+F0E*$K!"J,N`4p=`(J,N`$rBeI=$9$k2hA|E*FCD'NL)$rE}7WE*$KN3=P$9$k<jK!$rDs0F9k!#$^$?!"RH$?$S3Nh&$JJ,N`4p=`$,F@illP!";zKk$,B8:_$7$J$$%7%g%C%H$K4X$7Fb!"FCD'NL%Y%/%H%k$NN`;wEY$+$i!"$I$NJ,N`$KINDxEY$N3N$+i5$G4^$^lk$+$r5aak3HKh$j!"$h$jHFMQE*$J:w0zIU$1<jK!$HJjF@$k!#

1.1 MQ8l$NDj5A

0lHL$K1GA|$O!"?^ 1$K<($9h&$J3,AX9=B$$H7FDj5AG-$k!#K\8&5f$G<g$K07$&%7%g%C%HHO!"2hA|E*$K@Z$lL\$N$J$$O"B3$7$?@E;_2hA|(%U%l!<%`)$N=89g$N3HG"$j!"$[...]



?^ 1: 1GA|$N9=@.$HMQ8l$NDj5A

F1GA|FbMF$,7QB3$9$k:G>.AGJR$H$_$J$;$k!#$^$?!"%7%[...]%HF1;N$N6-3&$r%+%C%H$H8F$V!#

2 ;zKk$N8l5A$K4pE/:w0zIU$1

0J2<$K<($9h&$J 2 CJ3,$N<j=gKh$j!":w0zIU$1$N<+F[...]2=$r9T$&!#

1. 3F8l5AJ,N`$rBeI=$9$k2hA|E*FCD'NL$N<}=8
(1) ;zKk$N8l5AJ,N`$r2r@O9kHHbK!"(2) %7%g%C%H$NFCD'NL%Y%/%H%k$r7W;;$7!"(1) $GF@$il?8l5AJ,N[...]$rBeI=$9$kFCD'NL$XE}7WE*$KH?1G$5$;$k!#
2. 3F%7%g%C%H$NJ,N`
;zKk$=$NbN$NB>$K!"%7%g%C%H$NFCD'NL%Y%/%H%k$H3[...]8l5AJ,N`$rBeI=$9$kFCD'NL$H$NN`;wEY$r5a$a!"N`;wE[...]$N9b$$8l5AJ,N`$r:w0z$H7FIUM?9k!#

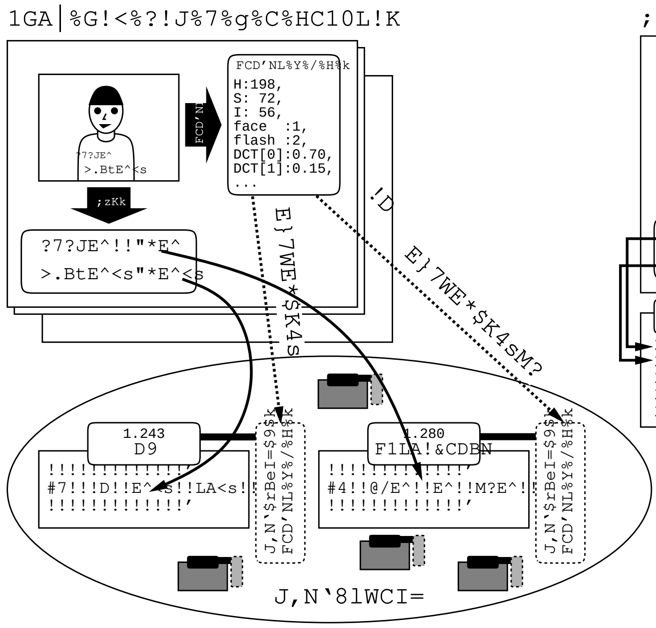
0J2<$N 2 @a$G3F!9KD$$$F>\$7$/5-$9!#

2.1 8l5AJ,N`Kh$N2hA|E*FCD'NL%Y%/%H%k$N<}=8

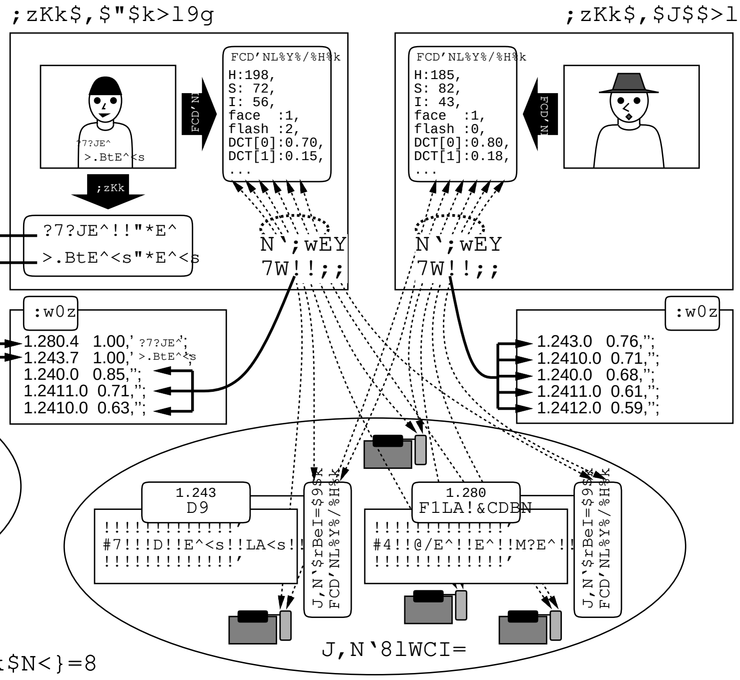
0lHL$K8@8l3X$NJ,LnK*$$$F!"8l$r35G0(0UL#)$Kh[...]9k;n$_$,9TolF-$?!#K\8&5f$G$O!"$=NCfG$b[...]$rMQ$$$kJ,N`8lWCI= [5] $rMQ$$$F!";zKk$N8l5A$rJ,N`9k[...]Ji$K8lWCI=$O!"36,780 8l$, 798 9`L\$KJ,N`$5lF$$$k<-=q[...]G"$j!"%+%?%+%J8l$JIN<}O??t$O>/$J$$$bNN!"%K%e[...]KbK$K4^$^lk8l$r=hM}$9kK$O35$M==J,$J8lWC$rb[...]$k!#J,N`8lWCI=$N3FJ,N`9`L\$rBeI=9k2hA|E*FCD[...]NL$rE}7WE*$K<}=8$9$kMM;R$r<($9!#

3NNc$,<($9h&$K!"0J2<$N<j=g$K=>$$!"==J,JNLN[...]%7%g%C%H$r2r@O$9k3HKhj!";zKk$N8l5AJ,N`[...]2hA|FCD'NL%Y%/%H%k$H$NAH$r5a$a!"3FJ,N`9`L\$rBeI=[...]2hA|FCD'NL$rE}7WE*$K<}=8$9$k!#

1. ;zKk$r2r@O
F|K\8l$N;zKk$N>l9g!"KvHx$KB8:_$9$kL>;l$KCmL\$9$[...]$HKh$j!";zKkA4BN$NB0@-$,2r@O$G$-$k [2]!#$=$3$G[...];zKk$r7ABVAG2r@O$7!"KvHx$,L>;lG"$k>l9g!"$=l[...]J,N`8lWCI=Cf$N$I$NJ,N`9`L\$K4^$^$lk+$rD4$Y$k!#



?^ 2: 3FJ,N`9`L\$rBeI=9kFCD'NL%Y%/%H%k$N<}=8



?^ 3: %7%g%C%HXN:w0zIU$1

2. FCD'NL%Y%/%H%k$rCj=P
J,N`$r9T$&NK==J,$J<!85?t$rbDFCD'NL%Y%/%H%k$N
3FJQ?tNCMr5aak!#>\:Y$O [1] $r;2>H!#
3. %7%g%C%H$,B0$9$kJ,N`9`L\$rBeI=9kFCD'NL$XH?1G
3FJ,N`9`L\$rBeI=9kFCD'NL$X!"?7$?$K 2. $G5a$a$?FC
D'NL%Y%/%H%k$rE}7WE*$KH?1G5;$k!#

2.2 %7%g%C%HXN:w0zIU$1

?^ 3$K!"%7%g%C%H$X$N:w0zIU$1K!$r;zKk$NM-L5$K>l9gJ,$1
7F<($7!"0J2<$K3F!9KD$$$F5-$9!#$J$*!"<B:]$NF|K\8l
%K%e!<%9HVAH$r2r@O$7$?7k2L!"A4BN$N 6 3dDxEY$N%7%g%C%H
$K;zKk$,B8:_7?!#

2.2.1 ;zKk$,B8:_$7$J$$>l9g

%7%g%C%H$rBeI=$9$kFCD'NL%Y%/%H%k$H!"J,N`8lWCI=Cf$N
3FJ,N`9`L\$rBeI=9kFCD'NLHNN`;wEY$r7W;;$7!"01Dj$N
ogCM0J>e$NJ,N`9`L\HV9f$HN`;wEY$rNs5s$7!":w0zH9$k!#

3Nh&K9k3HKhj!";zKk$,B8:_$7$J$$%7%g%C%H$K
$D$$$F$b!"FbMF$r?dB,$7!"JX59E*$J:w0zIU1,2DG=HJ$k!#
5i$KN`;wEY$rMQ$$$k3HKh$j!"8!:w;~$NLd$$9go;$K
BP7F!"Ds<(7k2L$N3N?.EY$rDjNLE*$K<($9$3$HbG$-$k!#

2.2.2 ;zKk$,B8:_$9$k>l9g

4pK\E*KO;zKk$,B8:_$7$J$$>l9g$HF1$8$@$,!";zKk$=$N
bN$bJ,N`$HV9f$H$H$b$KJ;5-$7$F$*$/!#$^$?!"J,N`8lWCI=
Cf$KB8:_$7$J$$;zKk$N>l9g$b!"$=$N$^$^5-=R7F$*$/!#

3Nh&K9k3HKhj!"8GM-L>;lJI$NJ,N`8lWCI=
$+$i$OF@$ilJ$$$=EMW$J>pJs$bO3i5$:$K!":w0zIU$1$9$k
3H$,2DG=$HJk!#

3 $*$ojK

K\<jK!$O0MA3<B83CJ3,$K$"$j!"E,@Z$JJ,N`$r9T$&$?aK
I,MW$JFCD'NL$N<oN`$*$h$S!"8l5AJ,N`$rBeI=$9$kFCD'NL$N
I=8=K!$N8!F$$r7P$F!"K\3JE*$JM-8z@-$NI>2A$O:#8e$N2]Bj
G"$k!#

7+$7!"3F%7%g%C%HJ,N`4p=`$NCj=P (8l5AJ,N`Kh$NFCD'N
$NCj=P) $+$i!":w0zIU1K$$$?k^$G!"40A4$K<+F0E*$J=h
2DG=G"$kE@$*hS!";zKk$,B8:_$7$J$$%7%g%C%HKD
FbFbMF$r?dB,$7$?J,N`$,2DG=G"$kE@$OHs>o$KM-8z$G
kH9M$($ilk!#

$^$?!"8=;~E@GOF|K\8l%K%e!<%9HVAH$rBP>]$K7F$$$
$,!"2$JF$NHVAH$N>l9gKO;zKk$N;HMQ$,FbMFE*KbNLE*
bCx7$/8BDj$5lF$$$k$?$a!":#8e$O2;@< ($r=q$-2<$7$
bN, *i.e.* %/%m!<%:%I%-%c%W%7%g%sJI) $r;O$aH9$kB>$N<
A38@8l>pJs$N!"K\OHAH$K$*$1$kM-8z$JMxMQK!$b8!F$$7$?$

;29MJ88%

[1] ;3K\ 98;J, 0f<j 0lO:, EDCf 1QI': !V8@8l>pJs$r4p=`$K
7?3X=,Kh$k1GA|J,N`<jK!!W; 1998 G/EE;R>pJsDL?.3X
2qAm9gBg2q (Mar. 1997 K\Bg2q0lHL9V1iKFH/I=M=Dj).

[2] 0f<j#0lO:, ;3K\ 98;J, EDCf 1QI': !V%7%g%C%H$NJ,N`$K4p
EK/1GA|%G!<%?XN<+F0E*:w0zIU$1!W; >pJs=hM}3X2qE
56 A49qBg2q (Mar. 1997).

[3] Nakamura, Y., Kanade, T.: "Semantic Analysis for Video Contents Extraction –Spotting by Association in News Video–"; Proc. The Fifth ACM International Multimedia Conf., pp.393-402 (Nov. 1997).

[4] 6b=P IpM:, :4F# ??0l: !VInformedia: CMU %G%#%8%?
%k%S%G%*%i%$%V%i%j%W%m%8%'%/%H!W; >pJs=hM}, Vol.37,
No.9, pp.841-847 (Sep. 1996).

[5] 9qN) 9q8l8&5f=j: !V9qN) 9q8l8&5f=j8@8l=hM}%G!<%?=8
J,N`8lWCI= [%U%m%C%T!<%G%#%9%/HG]!W; =(1Q=PHG (Dec.
1993).