FCJL%;%C%7%g%s!V%^%k%A%(!<%8%'%s%H%7%9%F%`K*1k3NN(%b%G%k!W

3NN(%M%C%H%o!<%/$K4p$E$/2;6AG'<1

— 2;3ZG'<1$+$i0lHL2;G'<1XNE83+ —

GpLn K.IW　　　B<@%　MN

NTT 4pAC8&5f=j

1 O8aK

2;$NG'<1$N8&5fGO!$=>Mh!$C10l<oN`$N2;$KCeL\$7!$ $=$l$@$1$rG'<1$9$k;n$_$,$[$H$s$I$G$"$C$?!%Nc$($P2; @<G'<1%7%9%F%`$O!$?M4V$N2;@<$@1rG'<1$NBP>]$H$9 $k!%$bAm$s!$2;@<G'<1%7%9%F%`$NF~NO$H7F!$?'!9$J ;(2;$,:.:_$7$F$$$k3H$r9MN8$9k3Hb9Tol$F$$ k,!$$=$N>l9g$b!$G'<1$NBP>]HJkN$O2;@<$@1G $"$k!%

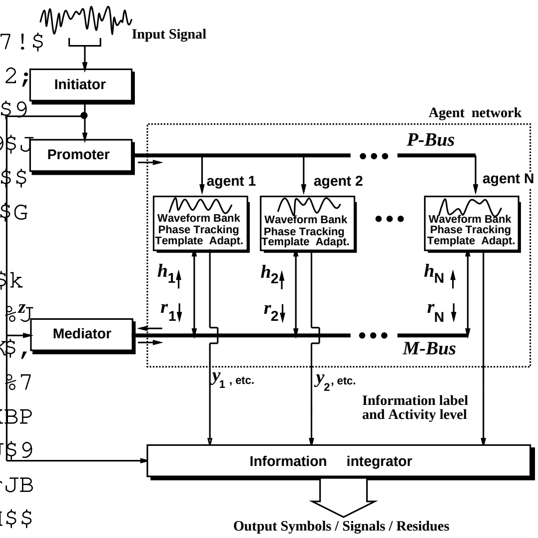
3lKBP72f!9$O!$J#?t<oN`$NG'<1BP>]$,:.:_9k >l9g$N2;$NG'<1$K<h$jAHsG$$$k!%3NLdBj$O!$%7%0%J %k!JG'<1BP>]$N2;!K$H%N%$%:!JG'<1BP>]$GOJ$$2;!K$, 0l5AE*$K7h$^$C$F$$$kNGOJ$/!$F1;~$KJ#?t$N2;$,%7 %0%J%k$HJjF@kN$,FCD'$G$"$k!%3Nh&$JLdBj$KBP 7F!$$"$k2;$r%7%0%J%k$HB*$(B>$N2;$r%N%$%:$H$_$J$9 h&$J=hM}$b%8%e!<%k$rJ#?t=`Hw$7F*$-!$$=li$rJB Ns$KF0:n5;k3HKhC$F8D!9$N2;$NG'<1$r?^kH$$ $&%"%W%m!<%A$O!$$-oa$F<+A3$G$"$k!%3l$O!$$=l> lN=hM}%b%8%e!<%k$O3F!9$,C4Ev9k2;$@$1$r8!=P$9$k $H$$$&Hf3SE*C1=c$J5!G=$rbA!$$^$?=hM}%b%8%e!<%k$O A4$/FHN)$KGOJ/!$Aj8_$K1F6A$r5Z$\$7J,$iF0:n$9 kH$$$&!$$$$ofk%^%k%A%(!<%8%'%s%H%b%G%k$NH/A[$K B>Ji$J$$!%

2f!9O3Nh$&$JH/A[$KN)$C$F!$$3l^$G<g$K2;3Z $N%"%s%5%s%V%k1iAU$NG'<1$rNcBj$H7F8&5f$r?J$a$F $-$?!%K\9FGO$^$:!$%^%k%A%(!<%8%'%s%H%b%G%k$KhC $F2;3ZG'<1%7%9%F%`$r9=C[$9$k$K$"$?$C$F$NFs$D$N5:=Q E*2]Bj!$$9$J$o$A (1) %(!<%8%'%s%H4V$ND4Dd$H (2) 3N N(E*>pJs$NE}9g$H$r<h$j>e$2$F5DO@$9$k!%0lJ}!$F1;~$K J#?t$NG'<1BP>]$,:.:_$9$k>l9g$N2;$NG'<1$NLdBj$O!$2; 3ZG'<1%7%9%F%`$@1GOJ$/!$2;KhCF<~0O$N>u67$r M}2r9k%7%9%F%`$d!$%^%k%A%a%G%#%"%G!<%?Y!<%9$N<+ F0%$%s%G%/%7%s%0%7%9%F%`JIK*$$$F$b=EMW$G$"$k!% $=$3$GK\9F$G$O!$2;3ZMQ$N%7%9%F%`$r0lHL2;$NG'<1%7%9 %F%`$K3HD%9k>l9g$NLdBjE@$K$D$$$F$b5DO@$9$k!%

2 %^%k%A%(!<%8%'%s%H%b%G%kKh$k2;6AG'<1

?^ 1 $K!$2f!9$,Ds0F$7$?2;6AG'<1%7%9%F%`$N=hM}%b %G%k!J%"!<%-%F%/%A%c!K$r<($9 [1]!%$3$N%7%9%F%`$O!$J# ?t<oN`$N2;$,:.:_$7$?2;6A?.9f$rF~NO$H$9$k!%$3$3$G $O!$F~NO?.9f$H$7$F2;3Z1iAU$rA[Dj$7$F$$$k!%=PNO$H$7 $F$O!$3ZIh$KN`;w$7$?7A<0$N5-9fI=8=!$3F2;8;$4HN2; 6A?.9f!$$*hS2r<a$N;D:9$N2;6A?.9f$r@8@.$9$k!%

?^ 1 $N%"!<%-%F%/%A%c$O!$=hM}$N$-$C$+$1$rM?$($k %$%K%7%(!<%?!JInitiator!K$%(!<%8%'%s%H$N=hM}$r@hF3$9



?^ 1: Ipanema %"!<%-%F%/%A%c

$k%W%m%b!<%?!JPromoter!K$2;8;J,N%!&F1Dj=hM}$N<gBN HJ$k%(!<%8%'%s%H%M%C%H%o!<%/!JAgent network!K$$* hS%(!<%8%'%s%H$ND4Dd$r9T$&%a%G%#%(!<%?!JMediator!K of agents!K$+$i@.CF$$$k!%$=$3$G!$?^ 1 $N%"!<%-%F%/ %A%c$r!VIpanema!W$H8F$V!%$^$?!$>e5-$NMWAG$NB>$K!$8e =hM}%b%8%e!<%k$H7F>pJs$$%s%F%0%l!<%?!JInformation integrator!K$,Hw$oCF$$$k!%

%$%K%7%(!<%?$O!$F~NO?.9f$r<u$1<h$j!$2;$NN)>e$j $r8!=P$9$k!%N)>e$j$,8!=P$5lk4H$K!$F~NO?.9fGH7A $r@Z$j=P7F=PNO9k!%@Z$j=P$5l?GH7A$r%U%l!<%`$H $h$V!%$$%K%7%(!<%?$K$h$C$F@8@.$5$l$?%U%l!<%`$O!$%W %m%b!<%?$KEO5l$k!%%W%m%b!<%?$O!$%U%l!<%`$NGH7A$K BP$7$F<~GH?t2r@O$r9T$$!$$=$N>pJs$r%(!<%8%'%s%H%M%C %H%o!<%/KEO9!%

%(!<%8%'%s%H%M%C%H%o!<%/Cf$N%(!<%8%'%s%H$O!$8D!9 $N2;8;<oN`!JNc$($P%U%k!<%H!$%T%"%NJI!K$KBP1~$7$F $$$k!%3F%(!<%8%'%s%H$O%F%s%W%l!<%H%P%s%/$r;}CF$* $j!$%F%s%W%l!<%H%P%s%/CfKO!Nc($PH>2;$:$D4pK\<~ GH?t$N0[JkC12;$NGH7A$,C_@Q5l$F$$$k!%4pK\E*$K $O!$3F%F%s%W%l!<%HGH7AHN<+8JAj4X$r7W;;$9k3HK hC$F!$$=$N%(!<%8%'%s%H$,C4Ev9k2;$,F~NO$K4^$^$l $F$$$k$+$I$&$+$rH=CG$9kN$,%(!<%8%'%s%H$NLr3d$G $"$k!%

%a%G%#%(!<%?$O!$3F%(!<%8%'%s%H$N=PNO$rD4@0$9$k Lr3drIi&!%K\O@J8K*$$$F$O!$3F%(!<%8%'%s%H$NDs0F 9k%F%s%W%l!<%HKBP9$k%U%#%k%?78?trJV9$3HK hC$F=PNO$ND4@0$,9T$olk!%

>pJs$$%s%F%0%l!<%?$O!$3F%(!<%8%'%s%H$+$i!$=PNO GH7A$*hS2;8;L>JI$N%i%Y%k$r<u$1<h$C$F%7%9%F%`$N =PNO$r@8@.$9$k%b%8%e!<%k$G$"$k!%

Computational Auditory Scene Analysis Based on Probabilistic Network
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3 %(!<%8%'%s%H4V$ND4Dd

=>Mh!$%^%k%A%(!<%8%'%s%H$b%G%k$K4p$E$/2;6A=hM}%7%9%F%'$G$O!$%(!<%8%'%s%H4V$ND4Dd$OL@3N$KDj<02=$5lJ$$$3H,B?$+$C$?!%$7$+$7!$LdBj$r8+DL$7NI$/9M;!9k>eGO!$D4Dd$KBP7FDjNLE*$J5,HO$rM?$($k3H$,K>$^$7$$!%$=$3$G Ipanema GO!$%(!<%8%'%s%H4V$ND4Dd$rFs>hJ?6Q8m:9$N:G>.2=H7$FDjNL2=7F$$$k!%

F~NOGH7A$r3F2;8;GH7A$KJ,N%9kLdBjK*$$$F!$3F2;8;GH7A$N%F%s%W%l!<%H$r $r_n(k)$ $r!$h_n(m)$ Jk%$%s%Q%k%91~Ez$rbD@~7A%U%#%k%?$GJQ7A$5$;$F!$$=NOBGF~NO?.9f $z(k)$ $r6a;w$9k3Hr9M$($k!%$3$3$G n $O3F2;8;$KBP1~9kE:;z!$k $O%5%s%W%k;~9o$rI=$9!%$9ku!$LdBj$O!$

$$J = E\left[\left\{z(k) - \sum_{n=0}^{N-1}\sum_{m=0}^{M-1} h_n(m)\, r_n(k-m)\right\}^2\right] \qquad (1)$$

$N:G>.2=$H7FDj<02=9k3H$,$G$-$k!%$3$3$G M $O%$%s%Q%k%91~Ez$ND9$5!$N $O%F%s%W%l!<%H$N?t!$E $O;~4VJ?6Q$rI=$9!%$3$N<0$+$i $h_n(m)$ $K4X$9$k $N \times M$ 85O"N)0l<!J}Dx<0$,F3$+lk!%K\%b%G%kGO!$$3$NJ}Dx<0$N5a2r$r%a%G%#%(!<%?$K$*$$$F9T$$!$5a$ail$? $h_n(m)$ $r3F%(!<%8%'%s%H$KJV$9$3HKhC$F!$%(!<%8%'%s%H$ND4Dd$r<B8=7F$$$k!%

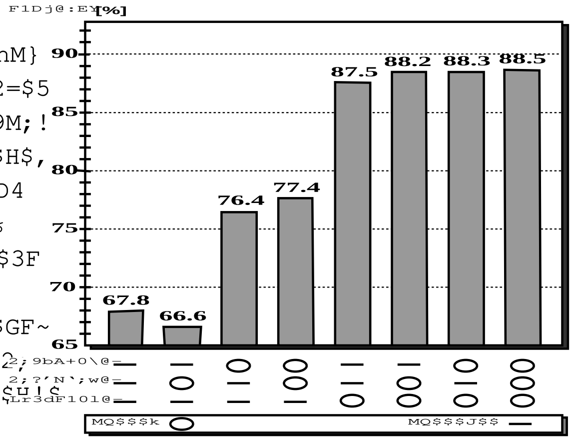
4 3NN(%M%C%H%o!<%/Kh$k>pJsE}9g

A0@a$NJ}K!$G%F%s%W%l!<%H$rJQ7A$9k3HKhj!$<B@$3&K"$k2;$NJQF0KBP7FOBP=h9k3H$,$G$-$k!%7+$7!$$3$NJ}K!$G$O6hJ,$5l?C;$$;~4VFb$N2;6A?.9f$N>pJs$@$1$rMxMQ$7$F$$$kNG!$$=l@1G$O!$<BMQKBQ($k2;8;F1Dj$N@:EY$rF@$k3HOFq7$$!%$=$3$G Ipanema GO!$>pJs%$%s%F%0%l!<%?K*$$$F!V2;NDJ,$j!W$JC12;O"7R!K$K4p$E$$$F3NN(%M%C%H%o!<%/$r:n@.$7!$@:EY$r8~>e5;$F$$$k!%

C12;O"7R$NCj=P$G$O!$$"kFsD$NC12;$NA+0\$,!$<B:]$N@{N'$rJ,@O$7$?Cf$G!VIl$@$1$"$j$,$A$JA+0\$+!WKhCF!V2;$NN.$ld9$5!W$NI>2A<\EY$rDj5A$9$k!%$9Jo$A!$FsDNC12; n_{k-1}, n_k !J$?$@$7 $k-1, k$ $OH/2;3+;O;~9o$N=g=x$rI=$9E:;z!K$,M?$(il$?$H$-!$$3NFsD$NC12;$N4V$K!$<0 (2) KhCFDj5A5l$k $Z(n_{k-1}, n_k)$ $r9M$($k!%

$$Z(n_{k-1}, n_k) = W \sum_i \left\{ -\, w_i \log P_i(n_{k-1}, n_k)\right\} \qquad (2)$$

$?$@$7!$ i $O Z K*$$$F9MN8$9$kMW0x$r?t$($kE:;z$G$"$j!$ P $O!$FsDNC12;$N4V$,F1$8@{N'>e$KB8:_9kH2>Dj7?H-!$C12;$NA+0\A4BNNCfG$=$NA+0\$,H/@8$9$k3NN($r i HVL\$NMW0xKD$$$FI>2A7?CMG"$k!% $w_i\ (> 0)$ $O3FMW0x$KBP9k=E$_$rI=$9!%$Z $O!$$=NFsD$NC12;$NA+0\$N8=olK/5rI=$9!%$=3G!$6-3&$K Z $,:G>.$HJkJ}8~$K=g<!C12;$rDJ$$$@bN$r!$C12;O"7R!Jmusic stream !K$HDj5A$9$k!%$J$* W $O;~4VAk$G$"$k!%8=:_!$C12;O"7R7A@.$NMW0xH7$F!$(1) 2;9bA+0\@-!$(2) 2;?'N`;w@-!$$*hS (3) Lr3dF10l@-$N 3 Dr9MN8$7$F$$$k!%3Nh&K7$F:n@.$7$?C12;O"7R$r%Y



?^ 2: %F%9%H6JKBP9$k2;8;F1Dj<B83$N7k2L

%$%8%"%s%M%C%H%o!<%/ [2] H_J7!$3F2;8;$KBP9k3N?,EY$rC`<!99?7$9k3HKhC$F!$2;8;F1Dj@:EY$N8~>e$r?^CF$$$k!%

C12;O"7R$NF3F~$Khk2;8;F1Dj@:EY$N8~>e$r?^ 2 $K<($9!%3l$O!$4 6J$N 3 %Q!<%H$N%"%s%5%s%V%k<B1iAUKBP9$k2;8;F1Dj@:EY$NJ?6QCM$r<($7$?$bNG$"$k!%3lKhlP!$3 DNMW0xA4FrMQ$$$?>l9gKO!$>pJs%$%s%F%0%l!<%?$rMQ$$$J$$>l9gKHfY$F!$8mjrH>J,0J2<$K8:>/$5$;$k3H$,$G$-$k3H$,J,$+$k!%

5 0lHL2;G'<1XN3HD%

?^ 1 $N%7%9%F%`$N$&$A!$%(!<%8%'%s%H%M%C%H%o!<%/$K$*$1$kE,1~:.9g7?%F%s%W%l!<%HK!Kh$k2;$N8!=P!&F1Dj=hM}$O!$FC$K2;3Z$KFC2=7?bNGO$J$$$,!$>pJs%$%s%F%0%l!<%?K*1k3NN(%M%C%H%o!<%/$N=hM}$O2;3Z FCM-NbNG$"$k!%7+$7!$0lHL:.9g2;$NG'<1$K$*$$$F$b!$LdBj$NK\<AE*[#Kf@-$N$?$a$K!$?tB?$/$N4K$$@)Ls$rE}9g$7$F:G=*E*$JG'<17k2L$rF@$k%"%W%m!<%A$,IT2D7g$G$"$j!$3NN(%M%C%H%o!<%/$NMxMQ$O7g$+$;$J$$$G$"$m$&!%3NN(E*>pJs$O!$$=$NA0Ds>r7o$,K~$?$5lJ1l$P0UL#$rJ5$J$$!%?^ 1 $N%7%9%F%`$r0lHL2;G'<1$K3HD%$9$k$?$a$K$O!$%(!<%8%'%s%H%M%C%H%o!<%/$N=PNO!J;v>]!K$+$i!$I$N<oN`$N3NN(E*>pJs$,E,MQ$5lkY-$+!J>u67!K$rH=CG9k2aDx$H!$>u67$,M?$(il$?$H$-$K:GbbCHbi$7$$;v>]$r5a$a$k2aDx$NAPJ}K*$$$F8!F$$,I,MWG"$k!%$3li$N2aDx$O!$$IAi$b3NN(%M%C%H%o!<%/$G<B8=G-$k!%$=3G!$3HD%%7%9%F%`$H7F!$J#?t$N3NN(%M%C%H%o!<%/$,%a%?$J3NN(%M%C%H%o!<%/$G7k9g$5l?7ABV$rDs0F$9$k!%

<U<- F|:"1g=u$rD:$/#N#T#T4pAC8&5f=j$NElAR MN0l=jD9$H!F18&5f=j>pJs2J3X8&5fIt$N @P0f7r0lO: ItD9$K46<U9k!%$^$?!$5DO@$7$FD:$$$?F18&5f=j$N1|G5 Gn <g448&5f0w!$@nC< 9k<g448&5f0w!$CfC+ CR9- 8&5f<gG$$K46<U9k!%

;29MJ88%

[1] Kashino K. and Murase H.: A Music Stream Segregation System Based on Adaptive Multi-Agents. *Proc. of the 15th IJCAI*, 2, 1126–1131, 1997.

[2] Pearl J.: "*Probabilistic Reasoning in Intelligent Systems*", revised second printing, Morgan Kaufmann (1988).