For calculation Recommended list we use MF-ALS

User	Movie	Rating	Genere
1	M1	4	Action, Sci fi
1	M2	3	Comedy, Sci fi
1	M3	5	Drama, Sad
1	M4	2	Action, Comedy
1	M5	4	Drama, Action

$P(f/u)$ = The probability distribution of user u's interest in aspect or feature F

$$= \frac{\text{Total number of times "Aspect"}}{\text{Total number of movie rated by user}}$$

$P(a = \text{"action"} \mid u1) = 3/5$

$P(a = \text{"Comedy"} \mid U_1) = 2/5$ etc..

$P(i \mid u, f)$ = the probability of choosing I from a set of Recommendation Rs given explicit aspect F of user u

indicator $(i, F) = 1$ if $F \in Fi$, otherwise it 0

$$P(i \mid u, F) = \frac{ind(i, f)\, s(u, i)}{\sum_{J \in Rs} ind(j, F)\, s(u, i)}$$

$$P(M1 \mid U1, \text{"Action"}) = \frac{1 \times 4}{1\times4 + 0\times3 + 0\times5 + 2\times1 + 4\times1}$$

$$= \frac{4}{4+2+2} = \frac{4}{8} = \frac{1}{2}$$

$$\text{Nov}_{xQuAD}(i, RL) = \sum_{a \in A} [p(a|u)\, p(i|u,a)] \prod_{j \in RL} (1 - p(j|u,a))$$

Example

$A \in$ (Action, Sad, Romance)

Nov (xQuAD) (MA, RL) =

diversification = 0

for a in Aspect

eqn1 $\begin{cases} p(a|u) = 3/5 & i = \text{'Action'} \\ p(i|u1, \text{'Action'}) = 0.5 \end{cases}$

eq1 = P(a|u) x P(i|u1, 'Action')

eq2 = 1

for j in RL [P(j|u,a)]

eq21 ⇒ eq1 x (1 − P(MA|u1a))

eq22 ⇒ eq1 x (1 − P(MB|u,a))

diversification → eq21 x eq22 . . .

Again we are going do it for aspect 'sad' and 'Roma'.

final Q(xQuAD) = div1 + div2 + div3

Relevance Based

A = Set of Aspects

P(a, u) = probability of user u being interested in aspect a

P("action" | u1) = 3/5

$$P(rel \mid i, u, a) = \frac{ind(i, a)\, S(u, i)}{\text{Max Rating}}$$

P(Rel | M1, u1, "action") = 4/5

loop A = { action, Sad, Romance }

for a in A

a = "action"

p("action | u1) = 3/5

p(Rel | M1, u1, "action") = 4/5

eq 1 = P(a | u) x P(rel | i, u, "action)

eq 1 = 3/5 x 4/5

eq 2 = 1

for j in RL — J = M1, M2 M3

[1 − p(rel | M1, U1, "Action) = 4/5] x eq 1

[1 − p(rel | M2, U1, "Action") = ... x eq 1

.

.

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diu = eq 21 x eq 22 . . . . . for "action"

Now loop will go for "Sad", "Romance"