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PROPOSED METHOD

* Integration Method

Word + Word $\rightarrow 0.5 : 0.5$

Word + Syllable $\rightarrow 0.8 : 0.2$

$$D(Ij) = \alpha \times D_1(Ij) + (1 - \alpha) \times D_2(Ij)$$

$$\because (0 \leq \alpha \leq 1)$$

* Re-ranking Method Using High-Ranked Candidates

$$D'(\Omega_j k) = \alpha \times D(\Omega_j k) + (1 - \alpha) \times \frac{1}{T} \sum_{i=1}^T D(\Omega_j k)$$

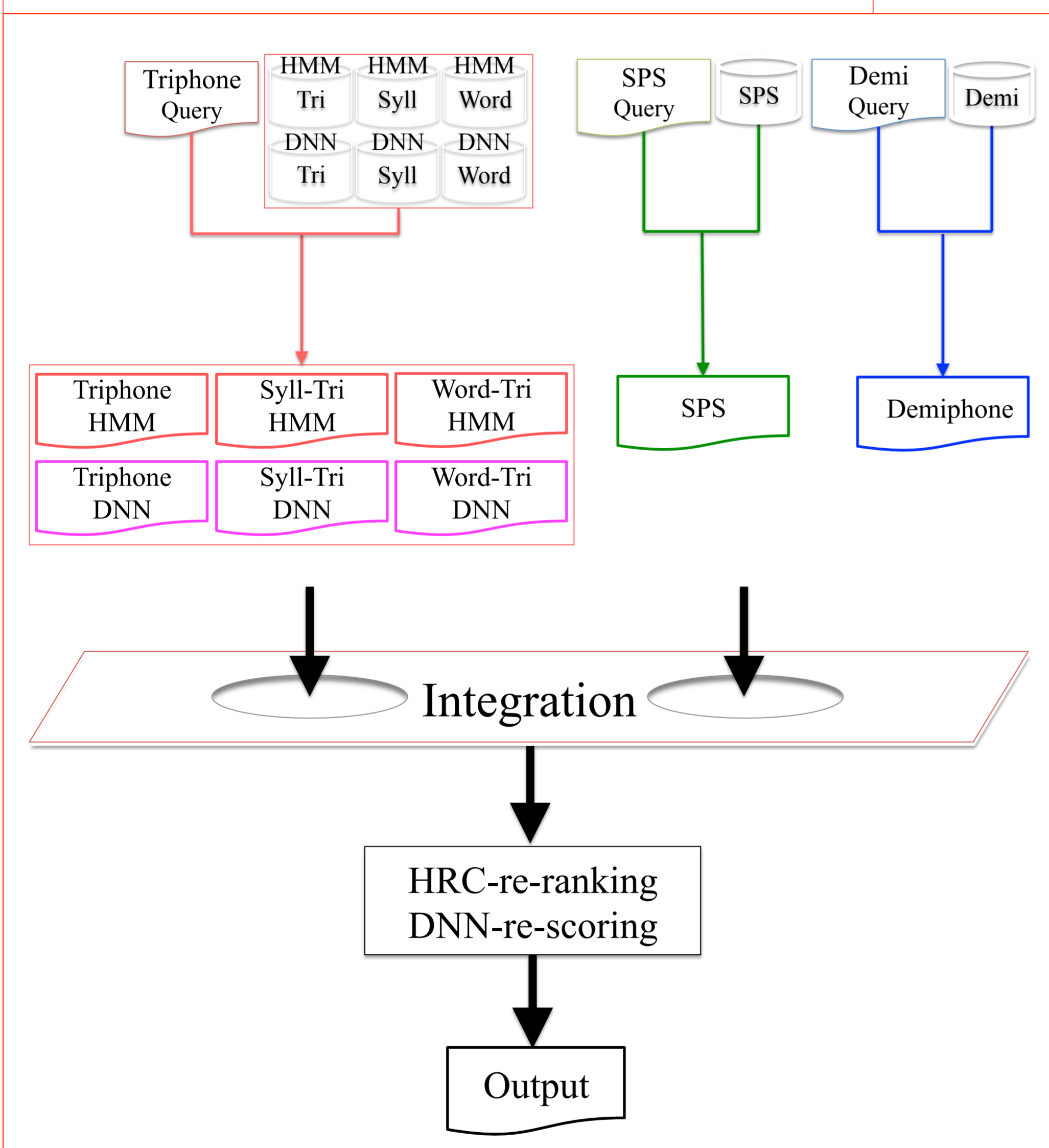
Condition
 $T = 2, \alpha = 0.4$

* Re-scoring Method Using DNN

Performing state sequence matching

Condition
 $K = 500$

SYSTEM OUTLINE



SUBMITTED RESULTS

No	SD	Re-ranking	MAP	BL = 0.54		
TEXT-QUERY for OWN Model	1	Word-Tri HMM Word-Tri DNN	HRC	0.74		
	2	Word-Tri DNN	HRC	0.73		
	-	Word-Tri HMM Word-Tri DNN		0.73		
	-	Word-Tri DNN		0.71		
	3	Word-Tri HMM	HRC	0.70		
	6	Word-Tri HMM D e m i p h o n e	HRC	0.67		
	7	Syll-Tri HMM	DNN	0.65		
	13	Syll-Tri HMM		0.54		
	14	D e m i p h o n e		0.54		
	4	Syll-Tri DNN	HRC	0.43		
	15	S P S		0.40		
	TEXT-QUERY for ORGANIZER Model	5	Match word (tri)	DNN	0.68	
		9	Match syll (demi) Match word (demi)	HRC	0.61	
		12	Match syll (tri)	DNN	0.61	
		11	Match word (demi)	HRC	0.60	
8		Match syll (SPS) Match word (demi)	HRC	0.52		
Spoken Query		1	Word-Tri DNN Word-Tri DNN Word-Tri DNN Word-Tri DNN	DNN-Word DNN-Syll Google 1st Google+	HRC	0.59
		2	Word-Tri DNN Word-Tri DNN Word-Tri DNN	DNN-Word DNN-Syll Google 1st	HRC	0.55
		3	Word-Tri HMM Word-Tri DNN	Google +		0.52
		Word-Tri DNN	Google 1st		0.45	
	4	Match Word (tri)	Google+	HRC	0.43	
		Word-Tri HMM	Google 1st		0.40	
	DNN-Word \rightarrow Word Recognition by DNN					
	DNN-Syll \rightarrow Syllable Recognition by DNN					
Google 1st \rightarrow The first candidate of the recognition result of "google speech"						
Google+ \rightarrow Selected recognition result of "google speech"						

CONCLUSIONS

- ❖ We achieved the highest MAP for both text and spoken queries.
 - ❖ Integration of multiple results using various subwords
 - ❖ DNN-re-scoring and HRC-re-ranking
 - ❖ DNN recognition
 - ❖ CDP matching at state level
- Worked Well**