EBERHARD KARLS
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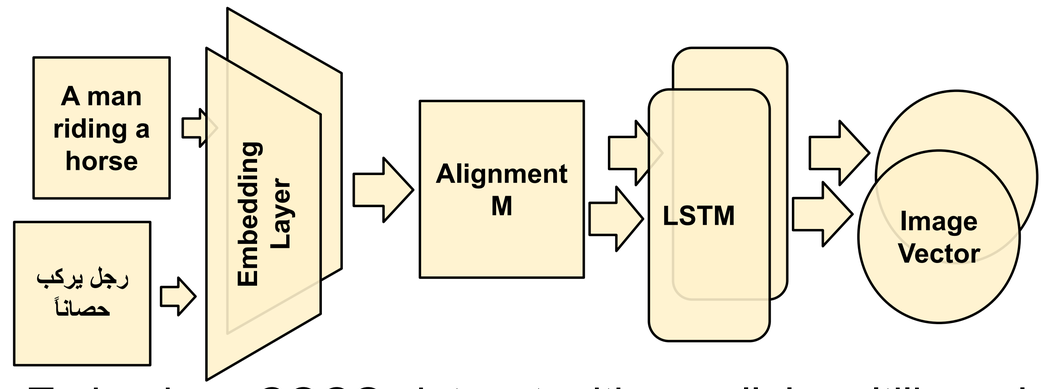
Visual Grounding of Inter-lingual Embeddings

Wafaa Mohammed, Hassan Shahmohammadi, Hendrik Lensch, Harald Baayen

INTRODUCTION

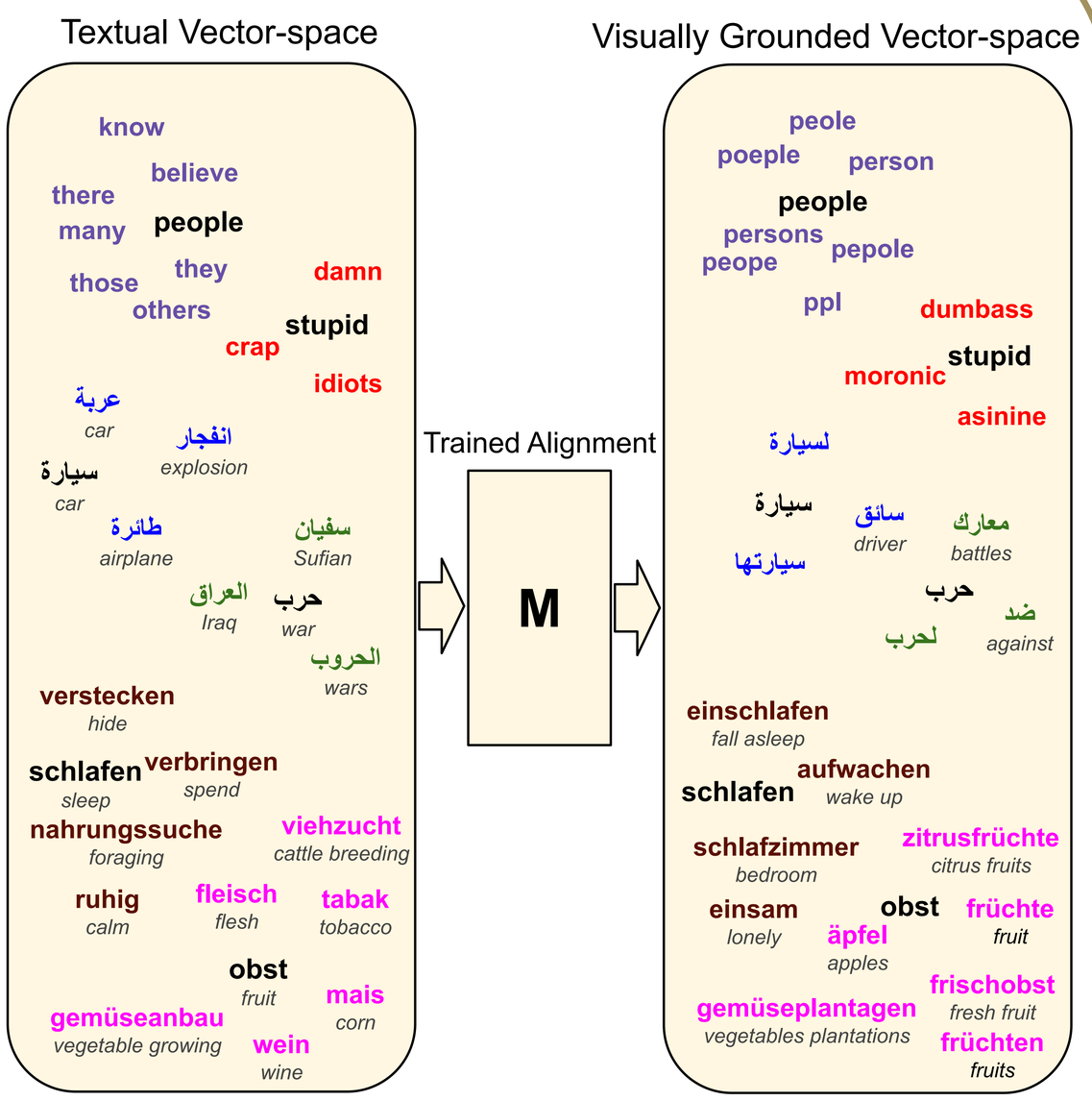
Language grounding aims at linking the symbolic representation of language (e.g., words) into the rich perceptual knowledge of the physical world.

ARCHITECTURE



- Trained on COCO dataset with parallel multilingual captions.
- The alignment M is trained on a limited number of words (those that occur in the captions), then applied to all the textual vectors to generate "zero-shot" grounded embeddings.

QUALITATIVE RESULTS



Out of the top 10 nearest neighbors for each query word, only the differing neighbors between the textual embeddings and the grounded embeddings are reported.

QUANTITATIVE RESULTS

English/ German	WSim	MEN	RW	MTurk	SimVerb	SimLex
	+3.9/ **5.4**	**+4.6/ 4.6**	+6.4/ **6.8**	+1.8/ **2.6**	**+9.7**/ 8.3	**+11.4**/ 10.2
Arabic/ English	WSim		Almarsoomi		MC30	
	+11.2/ 9.1		**+6.9/ 6.9**		**+9.3**/ 7.0	
German/ English	WSim		SimLex			
	+9.6/ **10.4**		+6.0/ **6.3**			

Improvement in pearson correlation (%) of the grounded embeddings compared to their textual counterparts on unsupervised semantic similarity benchmarks. The table shows the result of grounding a single language (left) vs. the addition of a second language (right).

CONCLUSION

- Grounding improves embeddings in all three languages.
- Similar languages benefit from each other, but differing languages seem to conflict on some aspects.
- A more advanced architecture is needed to link the three languages.
- Analysing inter-lingual grounding in fine granularity is to be investigated.

REFERENCES & CONTACT

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DFG Deutsche Forschungsgemeinschaft

Max Planck Institute for Intelligent Systems

IWM Leibniz-Institut für Wissensmedien