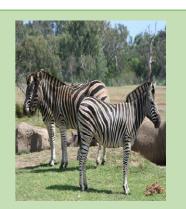
## **Examples of System Outputs**

Below are example outputs of our syntax-based SMT models (Dependency and Constituency) and comparison models. We used the <u>Microsoft COCO Captions dataset</u> [1] as training and testing data. The ranks denote relative ranks (1 is best) and were obtained from human annotators using Amazon's MT.

MS COCO 2015 Test Images







	Rank	Output	Rank	Output	Rank	Output
Template	5	a couch has a couch	4	a dog has a frisbee	5	a zebra is eating a zebra
Tuples	4	the room has a couch	3	a dog holding a frisbee	3	two zebras eating grass
Dependency	1	a dog sitting on a couch	3	a dog holding a frisbee	2	zebras standing in a field
Constituency	2	dog laying on a couch	2	a dog catching a frisbee	1	zebras are standing in a field
Human	3	a dog is looking at something	2	a dog catching a frisbee in its mouth	4	a herd of zebra standing in a safari

MS COCO 2015 Test Images







Rank Output Rank Output Rank Output

Template	2	a person is above a bed	2	an airplane is near a car	3	a tv is near a cat
Tuples	5	a man sitting in bed	5	a airplane sitting on a street	4	a tv sitting on top
Dependency	3	a man sitting on a bed	3	a airplane parked next to a car	2	a cat sitting next to a tv
Constituency	4	a girl is sitting on a bed	4	a airplane parked next to a car	5	a cat that is looking at a television
Human	1	a man bounces on the bed	1	a large plane with a red tail	1	a cat is showing its back to a tv screen
MS COCO 2015 Test Images						
	Rank	Output	Rank	Output	Rank	Output
Template	2	a refrigerator is below a microwave	1	a tv is near a laptop	2	a tie is near a pizza
Tuples	4	a refrigerator sits in a kitchen	5	a tv sitting on top	3	a man holding a pizza
Dependency	3	a refrigerator sits in a kitchen	3	a tv sitting on a desk	4	a man eating pizza
Constituency	5	a kitchen counter	2	a laptop on a desk	4	a man eating pizza
Human	1	a brown refrigerator sits up against	4	a compilation of pictures creating a	1	a calzone or oval pizza with cheese,

[1] Xinlei Chen, Hao Fang, Tsung-Yi Lin, Ramakrishna Vedantam, Saurabh Gupta, Piotr Dollar, C. Lawrence Zitnick. 2015. Microsoft COCO Captions: Data Collection and Evaluation Server. <a href="mailto:arxiv">arxiv</a>