

Natural Language Description on Images

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(1) The task to be addressed:

- a. The team is interested in addressing the task of generating captions on images.

The group has a four phases plan. In the first phase, we would want to achieve simple object detection. In the second phase, the program should be able to generate simple text about the image. In the third phase, the program should be able to generate simple sentences regarding the picture which might be based on templates without contextual information. In the final phase the program would can generate a sentence without templates. Since all group members are undergrad without the knowledge and experience for research, currently the group is expecting to achieve the first two phases in this class and if time permits the group would try to achieve the next two stages.

(2) The data set could be used:

- a. The following are the datasets that have been commonly used in the researches relevant to the topic.

- i. [Flicker 8k](#), [Flicker 30k](#), [MS COCO](#)

(3) From where you will get CPU cycles:

- a. Start from personal computers.
- b. Scale up on Amazon EC2 GPU enabled instances.

(4) Any existing software you plan to use:

- a. Google tensor flow, or Caffe as have been used in various papers.
- b. Implementation that has been done by Vinyals et al. (2016).

- i. <https://github.com/tensorflow/models/tree/master/im2txt/im2txt>

(5) The experimental methodology planned for evaluation:

- a. BLEU: a metric that evaluates how accurate our generated caption is compared to the reference descriptions. (Papineni et al., 2002).
- b. More recently, a novel metric called CIDER has been introduced and used by the organizers of the MS COCO Captioning challenge. In a nutshell, it measures consistency between n-gram occurrences in generated and reference sentences, where this consistency is weighted by n-gram saliency and rarity.

(6) Relevant researches:

- a. <https://arxiv.org/pdf/1609.06647.pdf>
- b. <http://cs.stanford.edu/people/karpathy/cvpr2015.pdf>
- c. <https://arxiv.org/pdf/1504.00325.pdf>