- Title
  - Cultural event classification using deep convolutional neural network

- Team details
  - Team name
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  - Rest of the team members
    - None
  - Team website URL
    - None
  - Affiliation
    - None

- Contribution details
  - Title of the contribution
    - Cultural event classification using deep convolutional neural network
  - Final score
    - Unknown at the time of writing
  - General method description
    - Deep convolutional neural network (CNN) is used for image cultural event

classification

- We used Caffe library for experimentation.
- I assumed this task as multiclass image classification problem
- 1. Finetuning
  - We started training(finetuning) using GoogLeNet which is pretrained on ImageNet database.
  - In addition to the training set provided by Codalab, we utilized below listed publically available dataset. These dataset images are used as 'None class' labeled image while training.
    - ImageNet database
    - MIRFLICKR-1M dataset
  - We partitioned dataset into 10-fold, so 9 fold is used as training set and remaining 1 fold is used as validation set. Theoretically, we can train 10 models by switching validation set fold. But due to the shortage of computing resource and time, we trained only 4 models.
- 2. Combining output scores from trained models
  - Output scores (predicted age) from 4 trained models are summed to produce output classification score

- References
  - Caffe : http://caffe.berkeleyvision.org/
  - ImageNet : http://www.image-net.org/
  - MIRFLICKR-1M dataset : http://press.liacs.nl/mirflickr/
- Describe data preprocessing techniques applied (if any)
  - For training data augmentation in deep learning model training, each image is randomly resized to 224 ~ 291 pixel (per each side), random mirroring (left-right flipping of image) is applied, then 224 pixel (per each side) image window is randomly cropped.

- Data Preprocessing

- Describe features used or data representation model (if any)
  - I experimented with deep convolutional neural network using original image as input.
    - No hand crafted features are used
  - Dimensionality reduction technique applied (if any)
    - None
  - Segmentation strategy used (if any)
    - None
  - Other techniques/strategy used not included in previous items FOR DATA PREPROCESSING (if any)
    - None

- Classification details
  - Classifier or method used to train and validate your results (if any)
    - Deep convolutional neural network
  - Large scale strategy (if any)
    - Deep convolutional neural network has been already used for other large dataset having more than 1 million images
  - Compositional model used (scene context representation), i.e. pictorial structure (if any)
    - None
  - Other technique/strategy used not included in previous items FOR CLASSIFICATION (if any)
    - None

- Global Method Description
  - Total method complexity
    - It took me roughly 1 day (using GPU) to train 1 deep CNN model

- Which pre-trained or external methods have been used (for any stage, if any)
  - We started from GoogLeNet which is pretrained on ImageNet database
- Qualitative advantages of the proposed solution
  - We didn't used any hand-crafted imaging features for training. Only deep convolutional neural network is used for training. So our experimental method has large flexibility and applicability.
  - We tried to utilize general image dataset (ImageNet and MIRFLIKR) as 'None class' image to discriminate unique cultural event specific objects from daily observed objects in general scene
  - Results of the comparison to other approaches (if any)
    - Evaluation results are not available at the time of writing
  - Novelty degree of the solution and if is has been previously published
    - I published experiments using finetuning from GoogLeNet in the following recent papers.
      - Choi, Sungbin. "Plant identification with deep convolutional neural network: Snumedinfo at lifeclef plant identification task 2015." *Working notes of CLEF 2015 conference*. 2015.
      - Choi, Sungbin. "Fish identification in underwater video with deep convolutional neural network: SNUMedinfo at LifeCLEF fish task 2015."

- Other details
  - Language and implementation details (including platform, memory, parallelization requirements)
    - C++, Caffe library with using NVIDIA Titan GPU
  - Human effort required for implementation, training and validation?
    - We implemented experimental code on top of Caffe library.
    - Training and validation step is processed automatically without manual intervention
  - Training/testing expended time?
    - Roughly 1 day is spent for training each CNN model.

- For testing, it took roughly 5 minutes to get scores from one CNN model

- General comments and impressions of the challenge?
  - I enjoyed participating this challenge. Thank you.