INTRODUCTION

- Despite the success of deep convolution neural networks (CNNs) trained on large-scale datasets, the number of parameters is still a bottleneck since they require more memory, consume more power in real-time implementation. To optimize the network, redundant parameters can be eliminated.
- We define redundancy of CNNs in terms of feature maps and hypothesis that the redundant feature maps respond similarly to various classes. Hence, participate insignificantly in providing discrimination.
- We employed statistical methods to identify and ignore the feature maps in an ensemble framework as proposed in our previous work [1] on SoundNet [2] for audio scene classification.
- The experiment evaluation on DCASE-16 Evaluation and ESC-50 dataset shows the effectiveness of the proposed approach.

MOTIVATION

- Feature map Ranking
  - ANOVA method
  - Entropy method
  - Cosine-similarity method

Algorithm 1: A greedy algorithm to select top-k feature maps

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input: c, Ranked indices of feature maps, p: Distribution of all feature maps of p examples.
output: Indices of top-k feature maps (C).
for m = 1 to size(c) do
  if m > size(C) then
    Select top-k feature maps meeting stopping criterion.
    for l = 1 to size(C) do
      Calculate the change in KL div. btw each consecutive k indices.
      for u = 0 to c - 1 do
        if |ξ(u)| < |ξ(u - 1)| then
          ξ(l) = ξ(u) - ξ(u + 1)
        end if
      end for
      Verify the stopping criterion.
      if |ξ(l)| ≤ |ξ(l - 1)| then
        Break
      end if
    end for
    return ξ, the selected indices.
end for
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REFERENCES