Automatic Image Tagging System
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**Motivation**
Image tag annotations are an important component of searchable image databases.

**Proposed System**
- **Framework**

<table>
<thead>
<tr>
<th>Input</th>
<th>system</th>
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- **Detail of System**
  - **Step 1 Generate Descriptor**
    - Represent image by descriptor
  - **Step 2 Retrieve kNN images**
    - Find most similar k images from training dataset
  - **Step 3 Retrieve Tags**
    - Retrieve tags from selected images

| Bag of words | 500 dimension |

- **Descriptor – Bag of words**
  - Input images
  - Histogram of features
  - Codebook

- **Image Retrieval Algorithms**
  - Query image is compared to training images by calculating Euclidean distance between descriptor vectors, and retrieve images with minimum distance as nearest neighbors

  - **Linear Search**
  - **K-Means Tree**
  - **K-D Tree**

- **Tags Retrieval**
  - Calculating histogram of tags from retrieved images and return tags with highest frequency

**Results**

- **Retrieval Time and Accuracy**

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>LS</th>
<th>KD</th>
<th>KM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training (sec)</td>
<td>0</td>
<td>0.92</td>
<td>8.02</td>
</tr>
<tr>
<td>Testing (ms)</td>
<td>5</td>
<td>0.097</td>
<td>0.18</td>
</tr>
<tr>
<td>Accuracy (%)</td>
<td>18.76</td>
<td>17.16</td>
<td>17.62</td>
</tr>
</tbody>
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- **Selected Result**

  - Input tags: nature, animal, zoo, Tiger
  - Output tags: tiger, nature, zoo, animal, bravo, cat, green, animals

- **Failure Case**
  - Fail to retrieve relevant images

**Conclusion**

- This is a system that can generate relevant keywords or tags for a new image
- Through fast k-nearest algorithm, we retrieve k most similar images from the database and then extract relevant tags from them