

Ideation Phase

Brainstorm & Idea Prioritization Template

Date	01 November 2023
Team ID	598189
Project Name	Project - Image Caption Generation
Maximum Marks	4 Marks


Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Reference: <https://www.mural.co/templates/empathy-map-canvas>

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

🕒 10 minutes to prepare
🕒 1 hour to collaborate
👤 2-8 people recommended

➔

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

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1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

How might we [your problem statement]?

Key rules of brainstorming

To run a smooth and productive session

- Stay in topic.
- Defer judgment.
- Go for volume.
- Encourage wild ideas.
- Listen to others.
- If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

TIP

You can select a sticky note and hit the pencil icon to start drawing!

Godala Sai Sreekar

Image Preprocessing: Resize images uniformly, normalize pixel values, and tokenize captions into words for model readiness.

CNN & LSTM: Learn CNN for image feature extraction and LSTM for processing image descriptions.

Split dataset, tune hyperparameters for efficient model training.

Sam

Enhance Diversity: Explore techniques like random rotations, flips, and brightness adjustments for data augmentation during preprocessing.

Grasp CNN-LSTM Fusion: Understand the vital fusion of Convolutional Neural Networks (CNN) and Long Short Term Memory (LSTM) for image captioning.

Track Loss and Metrics: Monitor training progress by observing loss and validation metrics. Consider early stopping to prevent overfitting.

Devak Reddy

Handle Missing Data: Ensure proper handling of missing or erroneous data in image and caption datasets for enhanced model accuracy.

CNN-LSTM Connections: Verify correct setup for passing image features from CNN to LSTM for caption generation.

Experiment with Adam, SGD; use learning rate schedules for optimal model training.

Abhiram

Caption Division: Split captions into training and testing sets during preprocessing. Consider cross-validation for effective model evaluation.

Add Attention Mechanisms: Consider integrating attention for refined focus in caption generation.

Feature Extraction: Explore models like VGG16, ResNet for efficient feature extraction, saving time and improving performance.

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

-Build Image Caption Generator: Develop an Image Caption Generator using CNNs and RNNs.

-Dataset: Utilize Flickr 8K with 8,000 images, each paired with five captions.

- Structure: Comprises CNN for feature extraction and LSTM-based RNN for caption generation.
- Feature Extraction: Utilize pretrained Inception V3 CNN model for efficient feature extraction.

- Dictionary Creation: Pair image filenames with caption arrays.
- Feature Dictionary: Associate image filenames with extracted features.
- Dataset Split: Divide into train and test sets, ensuring no duplicate images.
- Vocabulary Setup: Establish vocabulary, transform train captions into vectors using indices.

- Save States: Preserve encoder and decoder states using TensorFlow checkpoints.
- Initiate Training: Begin training and conduct model testing with a random image.

Assess the model's performance using BLEU scores.

Enhancing BLEU Score for $n > 2$

- Performance Improvement: Larger, diverse datasets enhance model performance.
- Feasibility Challenge: Limited feasibility due to increased data collection and annotation efforts.

- Initial Importance: Less crucial initially to adapt the model to specific domains (e.g., medical imaging, satellite imagery).
- Feasibility Challenge: Less feasible due to specialized knowledge requirements.

- Custom LSTM and Attention:
- Crucial Improvement: Essential for enhanced caption quality.
- Feasibility Challenge: Less feasible for beginners due to complexity involved.

Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕒 20 minutes

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the **H** key on the keyboard.

