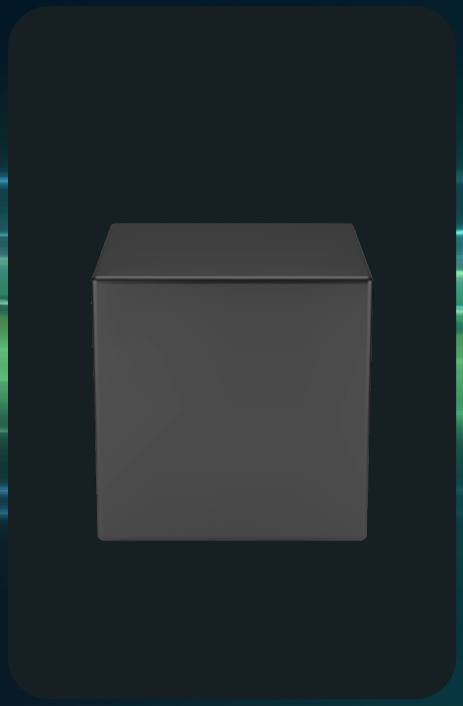
Video Highlights Detection

Александр Гордеев
Computer Vision Engineer
SberDevices

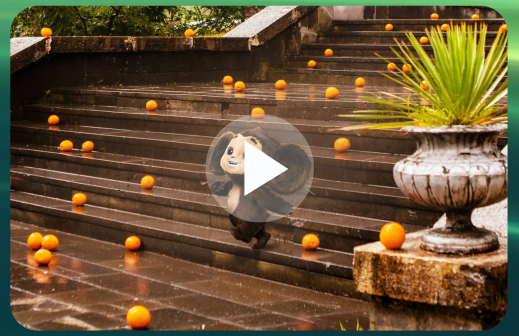
Описание задачи

1 Полнометражный фильм

2 Black box



3 Интересные моменты



Video shorts
здесь и сейчас

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Модальности фильма

Аудио модальность

Видео модальность

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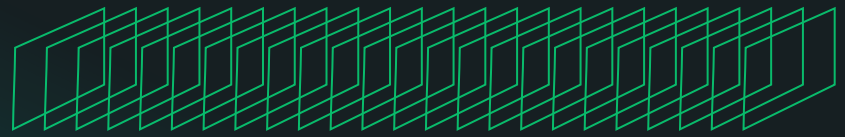
Структура видео-потока

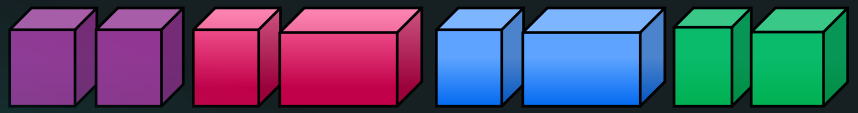
Frame

Одиночное неподвижное изображение, которое при последовательном воспроизведении с другими кадрами видеоролика создает движение на поверхности воспроизведения



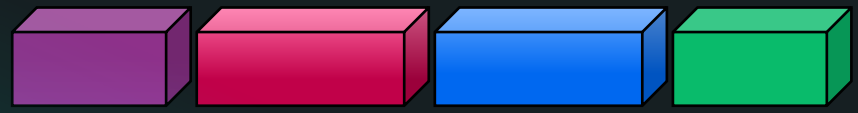
Shot

Серия кадров, снятых одной и той же камерой в течение непрерывного периода времени



Scene

Серия shot-ов, представляющая собой семантически связную часть сюжета



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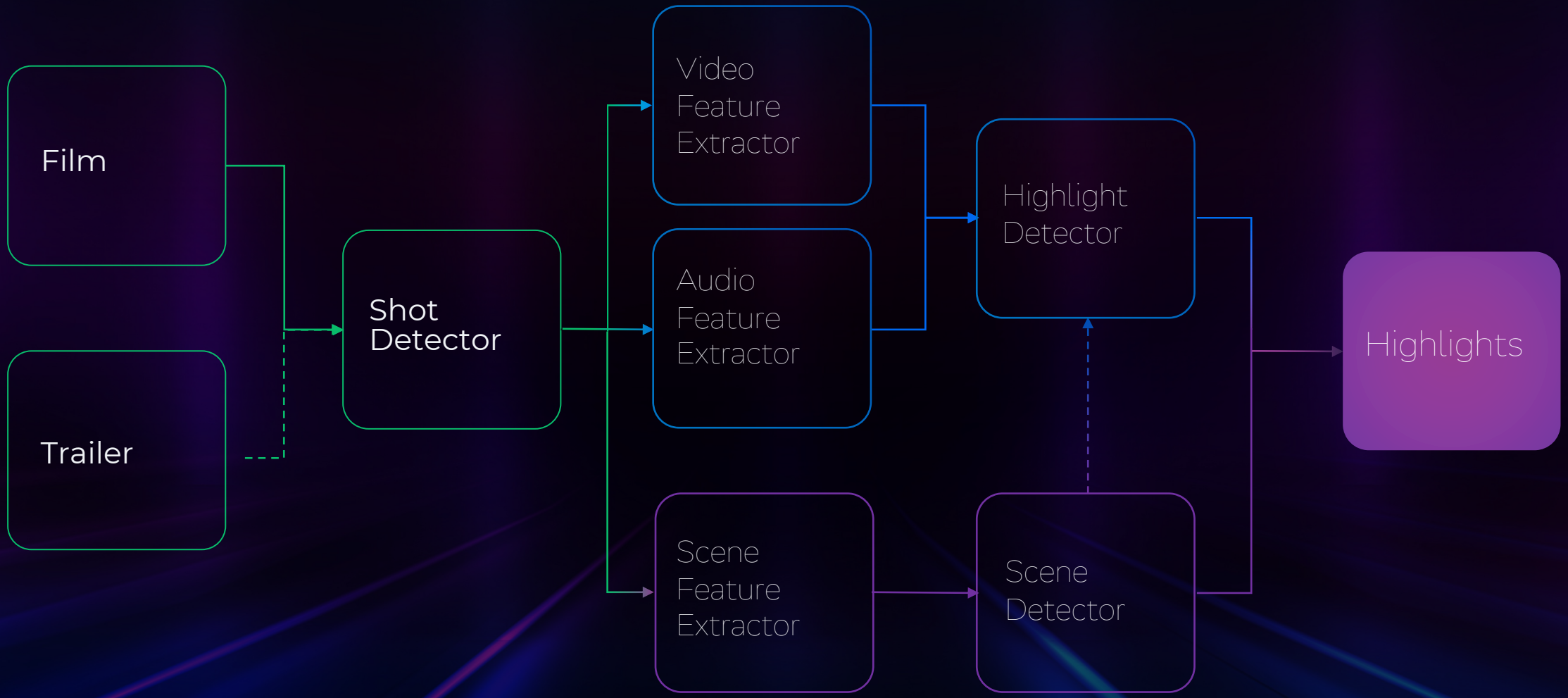
Архитектура решения



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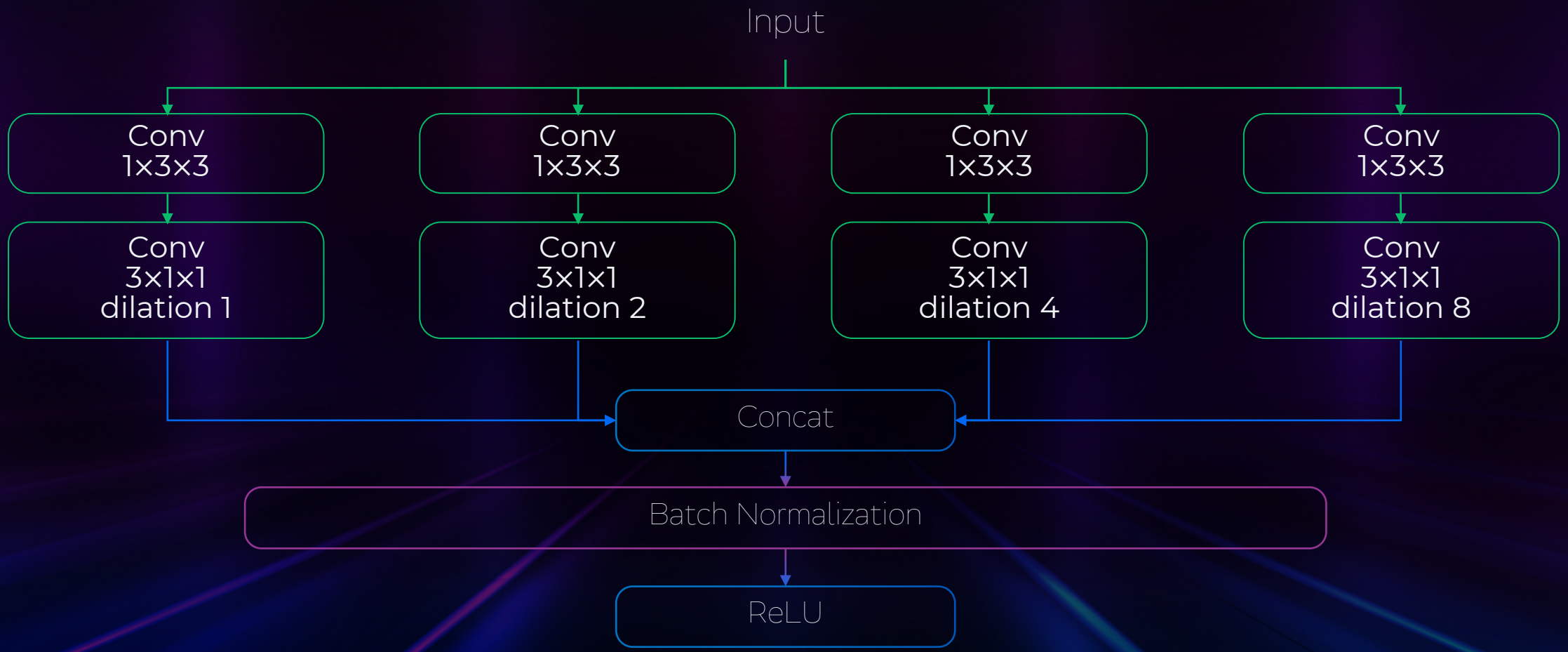
Shot Detector

Dilated 3D Conv Block



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Shot Detector

Бенчмарк:
целевая метрика –
F1-Score

Dataset	ClipShots	BBC	RAI
DSMs	0.761	0.893	0.928
ST ConvNets	0.759	0.926	0.939
TransNet	0.735	0.929	0.943
TransNetV2	0.776	0.962	0.939
AutoShot	0.787	0.971	0.955
Ours	0.808	0.980	-

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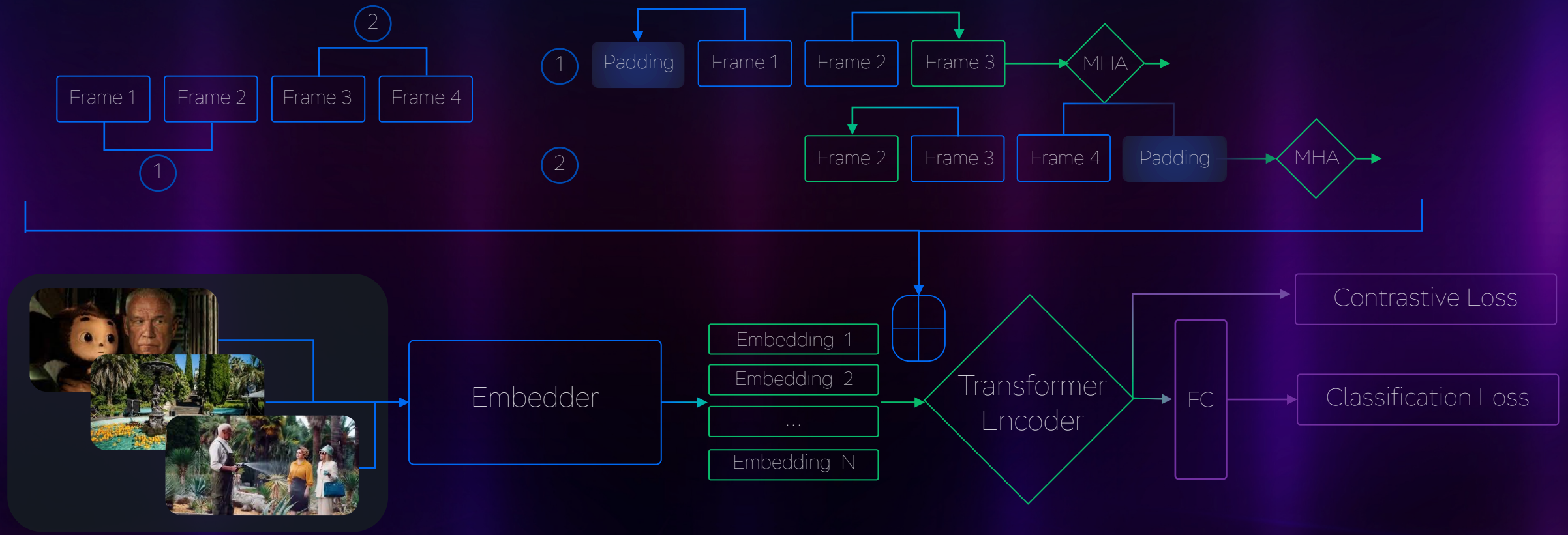
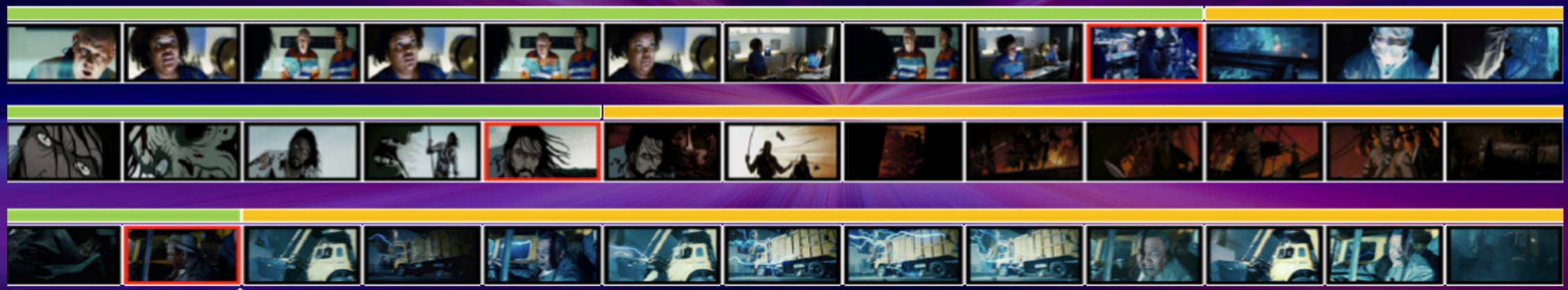
Shot Detector



Scene Detector



Pseudo-boundary

Pseudo Scene A

Pseudo Scene B

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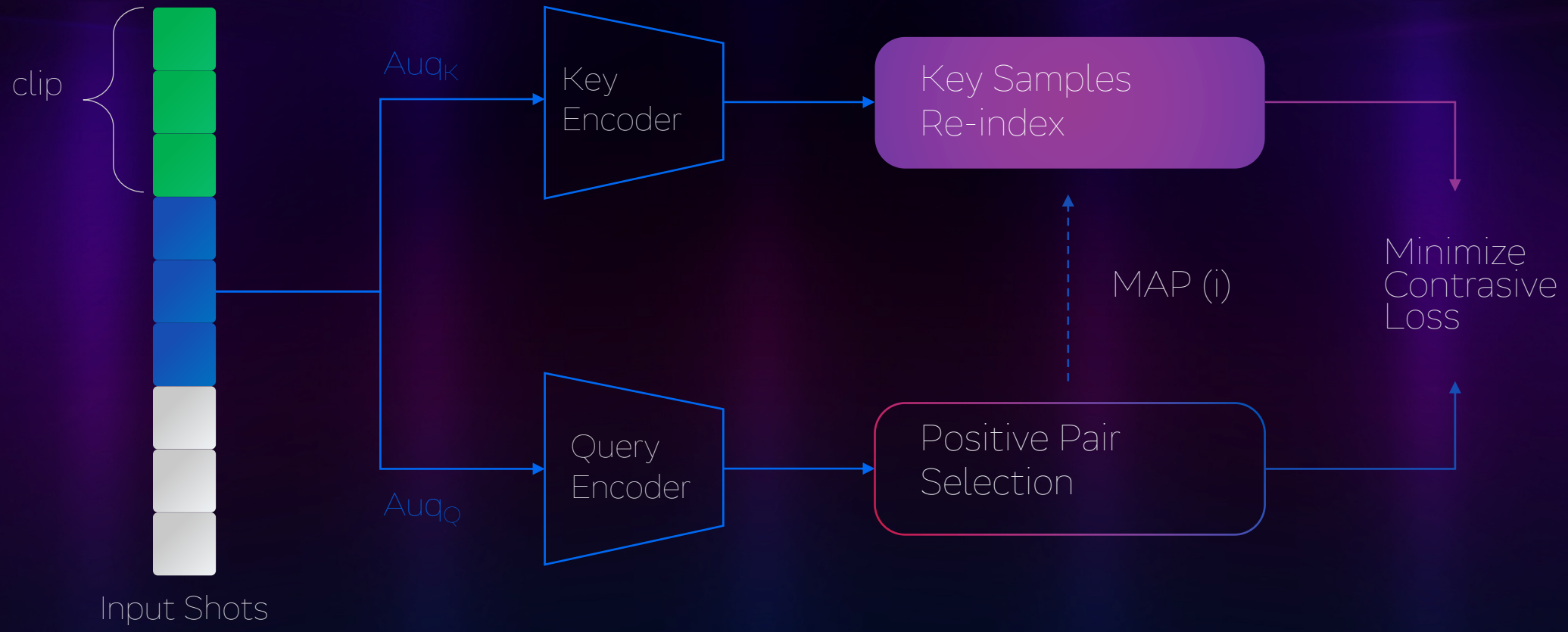
Scene Detector

Representation Learning Stage



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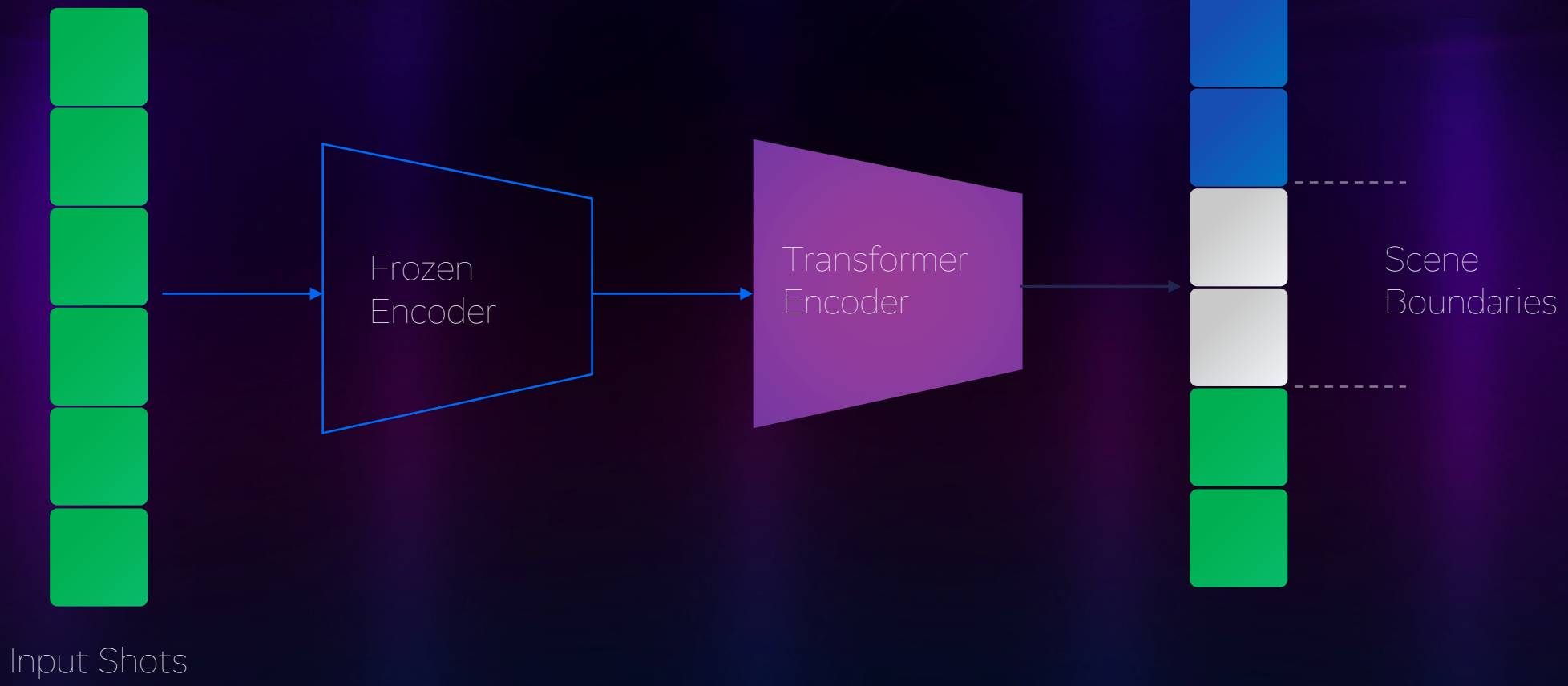
Scene Detector

Video Scene Segmentation Stage



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Highlight Detector

Video

$\{v_i\}_{i=1}^{N_v}$

Video Encoder

Uni-modal Encoder

Audio

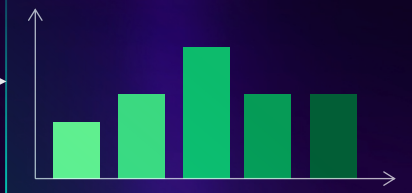
$\{a_i\}_{i=1}^{N_v}$

Audio Encoder

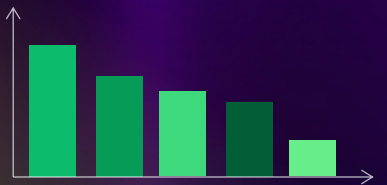
Uni-modal Encoder

Cross-modal Encoder

Contrastive Attention



Classification Loss



Ranking Loss

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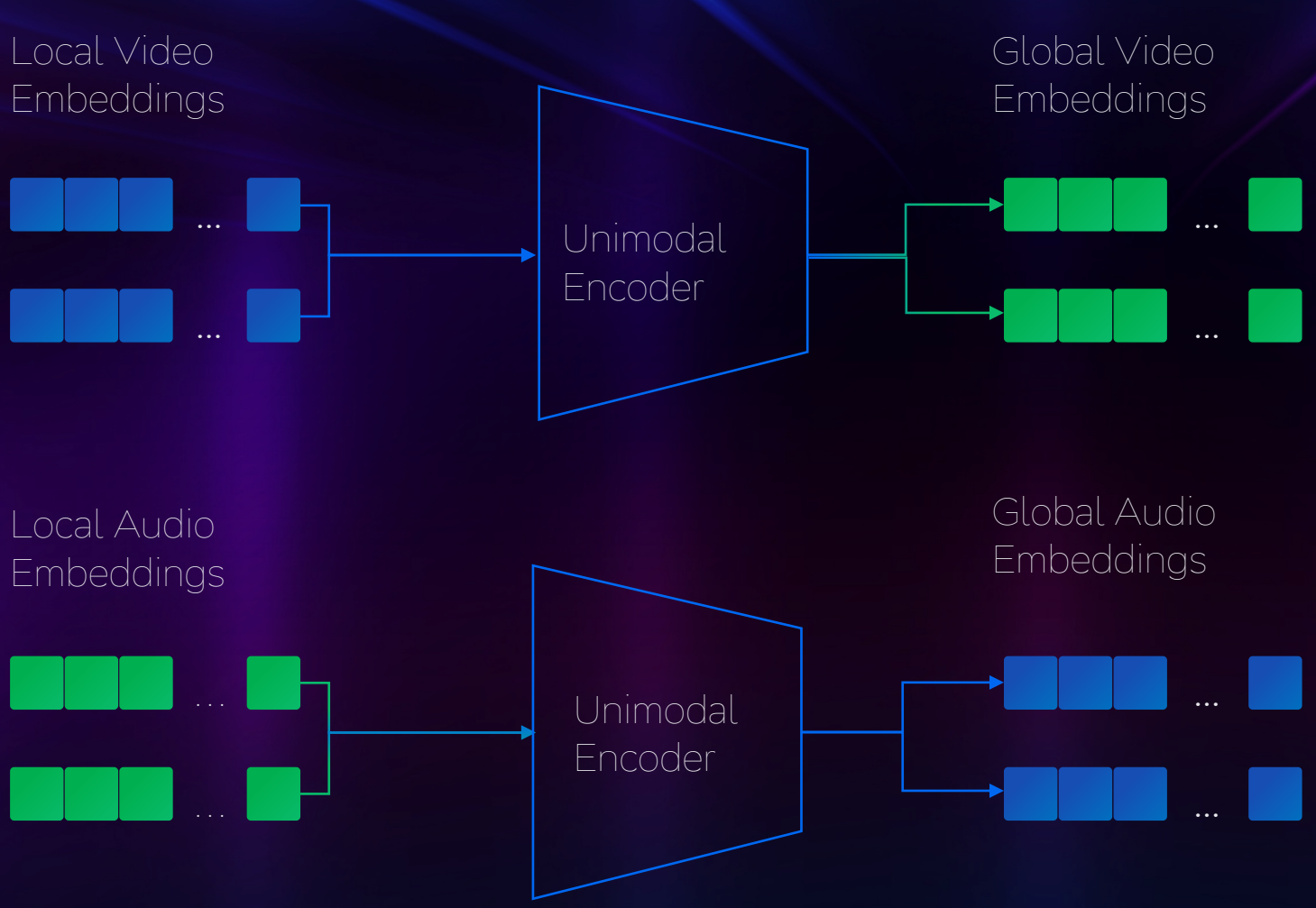
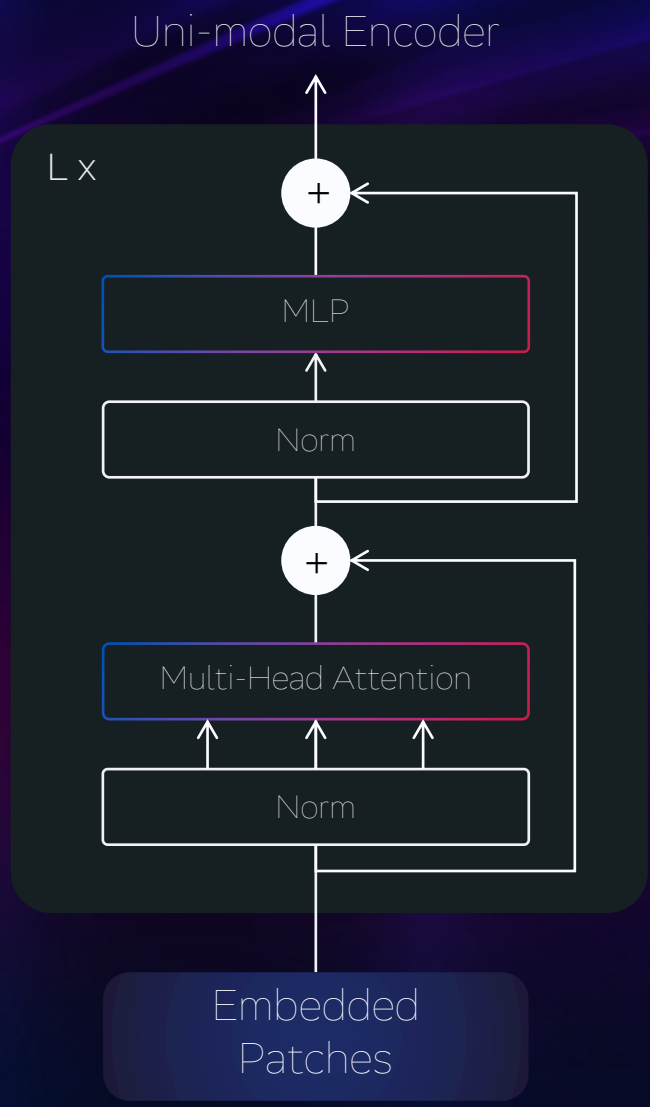
Глобальный контекст





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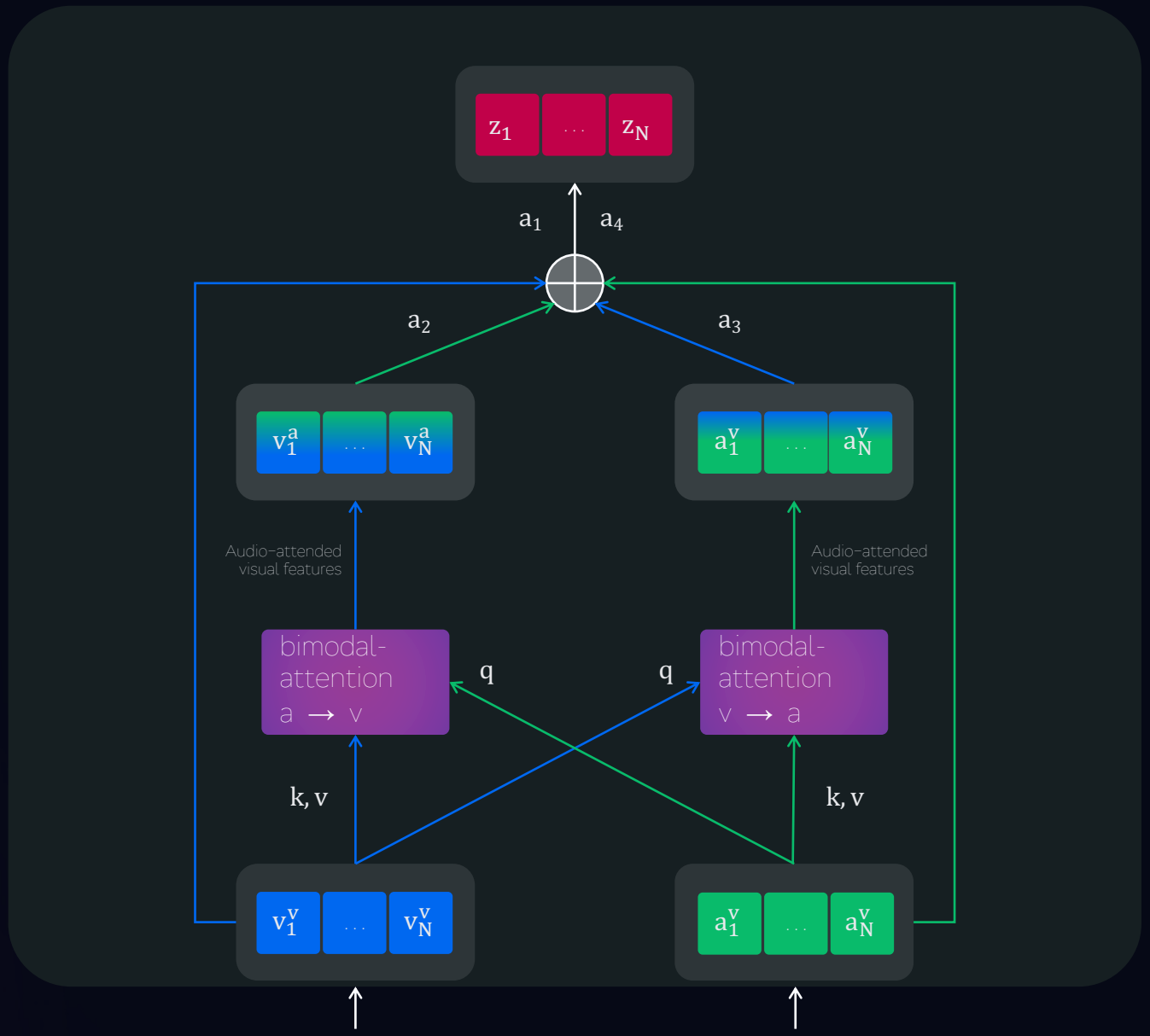
Фьюзинг модальностей

Cross-modal attention



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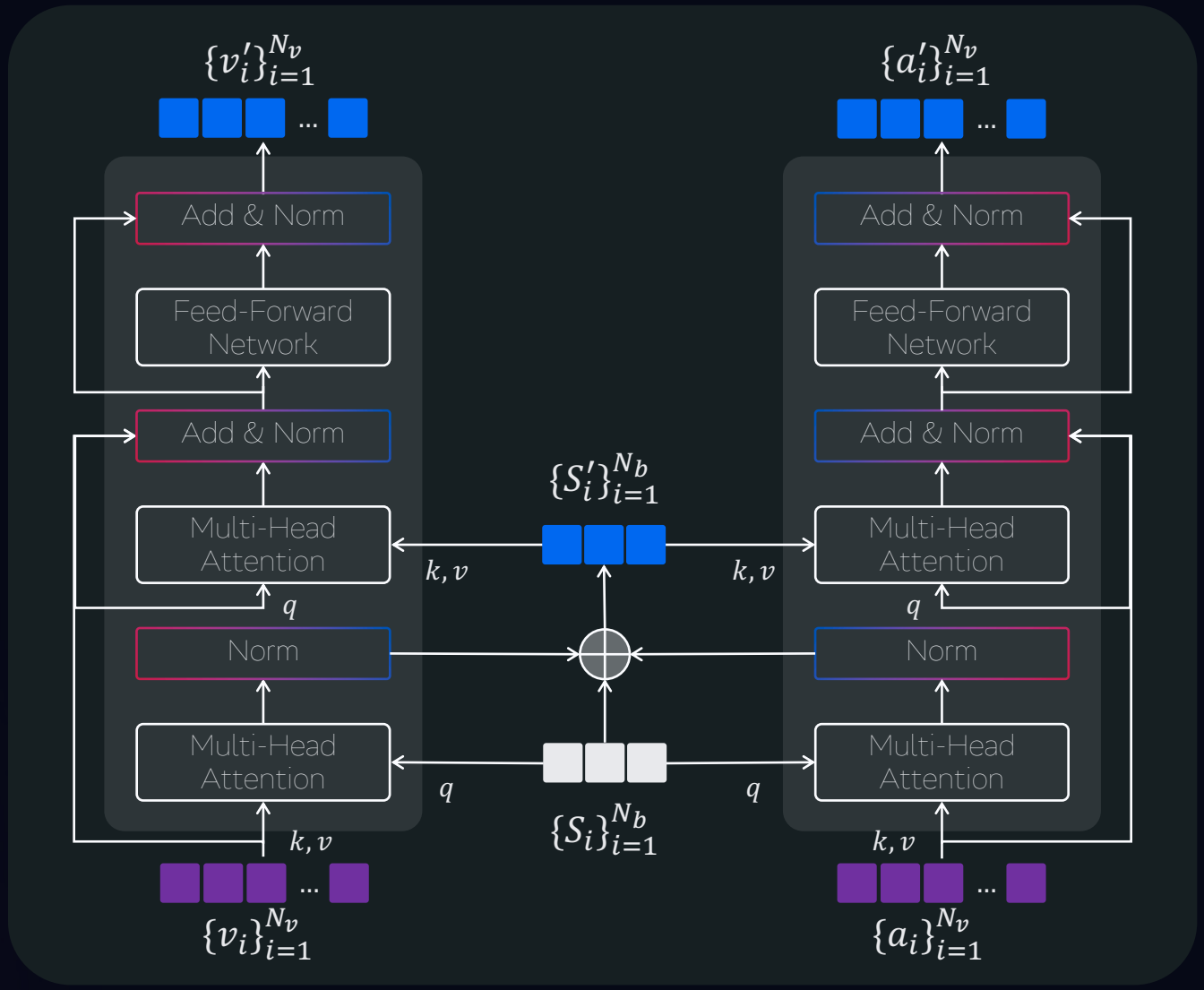
Фьюзинг модальностей

Bottleneck transformer module



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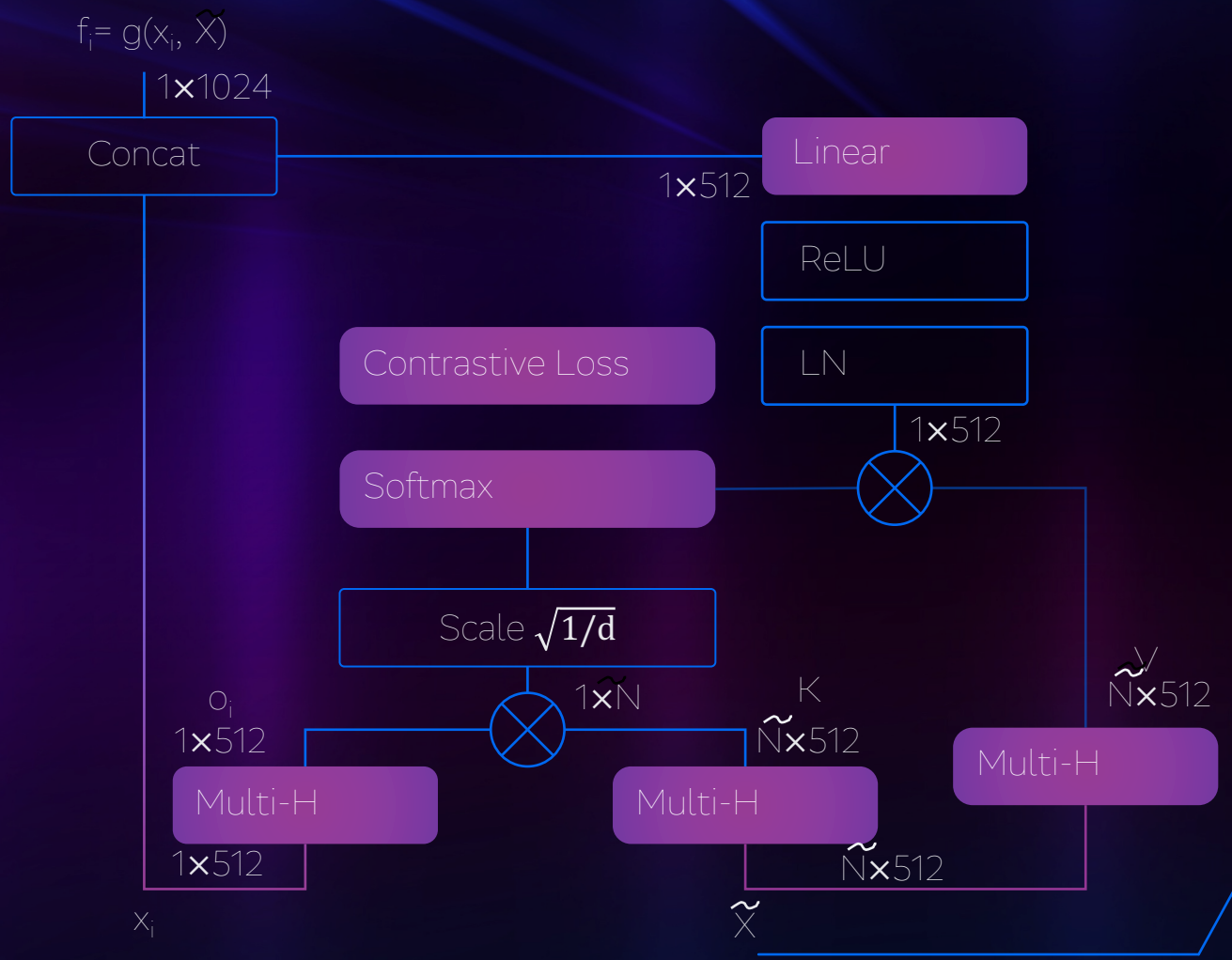
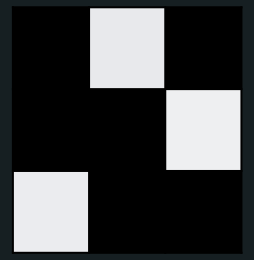
Contrastive attention



Co-Attention block



$$Att_i = \max_{\tau \in N_t} (q_i \circledast m_\tau)$$

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Postprocessing

2

2

15

5

23

41

7

12

32

8

5


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