**2025-2026 academic year Faculty of Television Technologies**

**For 4th year students of the educational direction of Television and Media Technologies on the subject of "AI in Audio Video Processing"**

**FINAL CONTROL QUESTIONS**

1. Define AI in audio and video technologies. (6 points)
2. Explain fundamental concepts and terminology of AI. (10 points)
3. Analyze applications of AI in television and media systems. (10 points)
4. Evaluate the role of machine learning in media processing. (12 points)
5. Justify the importance of AI development in audio and video technologies. (12 points)
6. Define machine learning and its types. (6 points)
7. Explain supervised and unsupervised learning. (10 points)
8. Analyze overfitting and underfitting in models. (10 points)
9. Evaluate the importance of feature selection in media datasets. (12 points)
10. Justify the use of training and testing datasets in AI systems. (12 points)
11. Define deep learning. (6 points)
12. Explain neural network architecture and layers. (10 points)
13. Analyze the role of activation functions in neural networks. (10 points)
14. Evaluate forward and backward propagation in training. (12 points)
15. Justify the use of deep learning for complex audio and video tasks. (12 points)
16. Define Convolutional Neural Networks (CNNs). (6 points)
17. Explain convolution and pooling operations. (10 points)
18. Analyze CNN applications in image and video processing. (10 points)
19. Evaluate advantages of CNNs over traditional methods. (12 points)
20. Justify the role of CNNs in automated media analysis. (12 points)
21. Define Recurrent Neural Networks (RNNs). (6 points)
22. Explain sequence and time-series data. (10 points)
23. Analyze LSTM networks for audio processing. (10 points)
24. Evaluate vanishing gradient and other challenges in RNNs. (12 points)
25. Justify the use of RNNs in speech recognition and audio analysis. (12 points)
26. Define audio signal processing. (6 points)
27. Explain filtering techniques for noise reduction. (10 points)
28. Analyze feature extraction in audio data. (10 points)
29. Evaluate spectral analysis methods for audio signals. (12 points)
30. Justify preprocessing importance for audio AI models. (12 points)
31. Define Automatic Speech Recognition (ASR). (6 points)
32. Explain ASR pipeline from audio input to text output. (10 points)
33. Analyze challenges in speech recognition. (10 points)
34. Evaluate integration of NLP in ASR systems. (12 points)
35. Justify the importance of ASR in media applications. (12 points)
36. Define video data processing. (6 points)
37. Explain frame-based analysis and motion detection. (10 points)
38. Analyze the role of OpenCV in video processing. (10 points)
39. Evaluate challenges in automated video analysis. (12 points)
40. Justify the use of AI for video content understanding. (12 points)
41. Define face and object recognition. (6 points)
42. Explain feature extraction for recognition. (10 points)
43. Analyze recognition techniques: template, feature-based, neural networks. (10 points)
44. Evaluate challenges in real-world recognition systems. (12 points)
45. Justify ethical and practical importance of recognition technologies. (12 points)
46. Define image and video segmentation. (6 points)
47. Explain semantic vs instance segmentation. (10 points)
48. Analyze U-Net and Mask R-CNN architectures. (10 points)
49. Evaluate segmentation applications in media processing. (12 points)
50. Justify the use of segmentation for automated media understanding. (12 points)
51. Define subtitle generation using AI. (6 points)
52. Explain integration of ASR and NLP for subtitles. (10 points)
53. Analyze challenges in text synchronization and formatting. (10 points)
54. Evaluate automatic subtitle generation methods. (12 points)
55. Justify the impact of AI-based subtitle systems in media accessibility. (12 points)
56. Define media enhancement with AI. (6 points)
57. Explain noise reduction, super-resolution, and color correction. (10 points)
58. Analyze neural network techniques for media enhancement. (10 points)
59. Evaluate practical applications of AI-enhanced media. (12 points)
60. Justify the importance of AI in improving media quality. (12 points)
61. Define datasets in AI. (6 points)
62. Explain data collection methods for audio and video. (10 points)
63. Analyze data cleaning and preprocessing techniques. (10 points)
64. Evaluate annotation and labeling approaches. (12 points)
65. Justify the significance of high-quality datasets for model performance. (12 points)
66. Define integration of AI models in multimedia applications. (6 points)
67. Explain deployment methods (APIs, pipelines). (10 points)
68. Analyze challenges in integrating AI with real-time media. (10 points)
69. Evaluate performance considerations in deployed systems. (12 points)
70. Justify the importance of AI integration in modern media workflows. (12 points)
71. Define video quality enhancement using AI. (6 points)
72. Explain super-resolution and artifact reduction techniques. (10 points)
73. Analyze neural network approaches for video improvement. (10 points)
74. Evaluate benefits of AI in broadcast and streaming. (12 points)
75. Justify AI-based methods for professional media production. (12 points)
76. Define overfitting in AI models. (6 points)
77. Explain regularization methods. (10 points)
78. Analyze dropout and data augmentation techniques. (10 points)
79. Evaluate cross-validation strategies. (12 points)
80. Justify importance of optimization for generalization in media AI. (12 points)
81. Define real-time image and video processing. (6 points)
82. Explain latency issues in real-time systems. (10 points)
83. Analyze stabilization and tracking techniques. (10 points)
84. Evaluate constraints and performance optimization. (12 points)
85. Justify the importance of real-time processing in live media. (12 points)
86. Explain methods of visualization and representation of media information. (6 points)
87. Describe graphical representation of features and signals. (10 points)
88. Analyze importance of visualization in model interpretation. (10 points)
89. Evaluate role of visualization in decision-making and media analysis. (12 points)
90. Justify using visualization for debugging and explaining AI models. (12 points)
91. Explain linear algebra and statistics for AI. (6 points)
92. Describe vector, matrix, and tensor operations in media processing. (10 points)
93. Analyze probability distributions for audio/video data. (10 points)
94. Evaluate statistical methods for model evaluation. (12 points)
95. Justify the role of mathematics in AI-based media applications. (12 points)
96. Define AI-based authentication systems. (6 points)
97. Explain voice and facial authentication methods. (10 points)
98. Analyze biometric AI systems in security. (10 points)
99. Evaluate challenges and limitations of AI authentication. (12 points)
100. Justify AI authentication as a tool for secure media applications. (12 points)

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