1. Speech Recognition Basics

- Speech processing
- Speech recognition tasks
- Speech recognition quality metrics
- Speech recognition system based on comparison with standards
- Building recognition systems

2. Traditional speech recognition systems.

- Probabilistic formulation of the recognition problem
- Acoustic model, language model, decoder
- Hidden Markov Models and Gaussian Mixtures
- Weighted final converters, WFST decoder
- Phonemes, triphones, graphemes, G2P

3. Neural acoustic models and end-to-end systems

- DNN-HMM hybrid
- Connectionist Temporal Classification (CTC)
- RNN-Transducer (RNN-T)
- Attention-based Encoder-Decoder (AED)
- Tokenization and BPE
- Ways to integrate language models into E2E systems

4. Semi-supervised and Self-supervised training

- Transfer learning and semi-supervised training
- Pseudo-labeling
- Approaches to self-semi-supervised learning
- Wav2Vec and Wav2Vec2.0
- HuBERT and WavLM

5. Tips&tricks and the most modern systems

- Combating noise and channel distortion
- Acceleration of recognition systems
- Modern architecture
- Brief overview of open toolkits for speech recognition
- Brief overview of open speech recognition systems