



STQ Workshop

# AI-based NC evaluation challenges

Presented by: Ani Chilingaryan | Krisp

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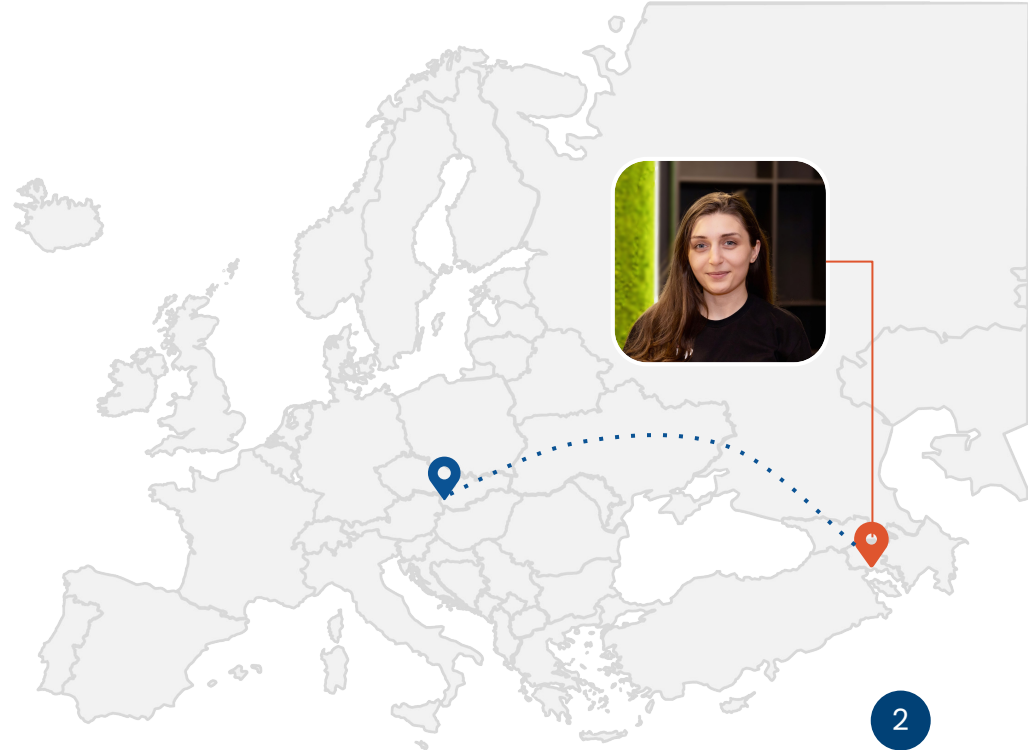


# About Me



## Ani Chilingaryan

- QA Manager at Krisp
- 2+ years in audio quality assurance
- 5+ years in quality assurance
- ISTQB Certified Tester
- Based in Yerevan, Armenia



# Agenda

- Krisp NC Use Cases
- AI-based NC Algorithm
- Testing process
  - In-house evaluations
  - External evaluations
- Testing challenges



# Krisp NC use cases



## Krisp Microphone

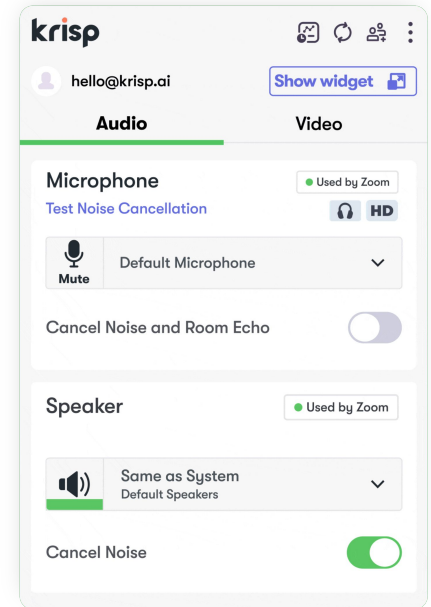
- Single Speaker
- Supports variety of microphones
- Includes de-reverberation

## Background Voice Cancellation

- Cancels background voices along with noises

## Krisp Speaker

- Multi-Speaker
- Handles network distortions
- Keeps useful noises: call ringtones, notif sounds
- Includes de-reverberation

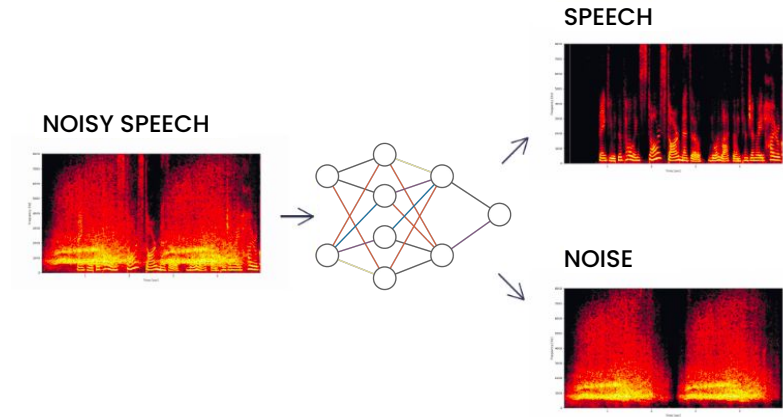


# AI based NC algorithm

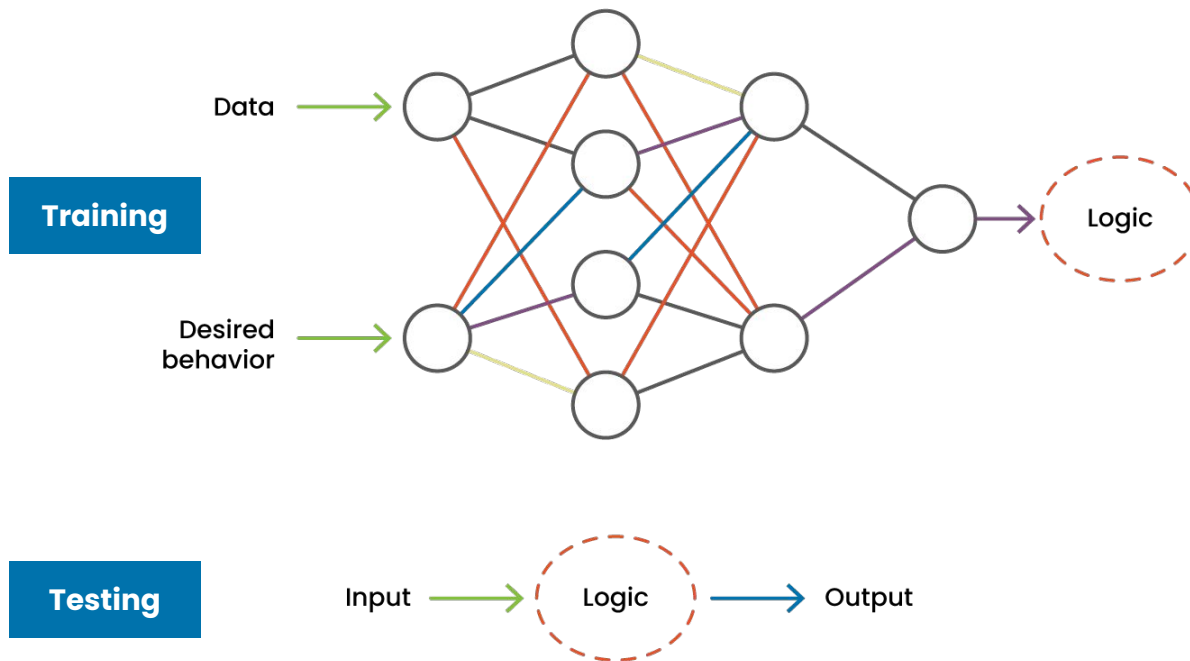


## Our Solution

- Real-Time 
- On-device



# Testing the Logic





# In-house Evaluations

## Data Collection

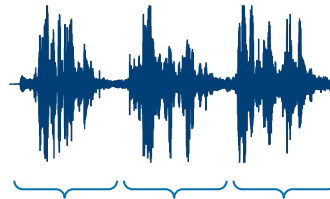
Collecting the test set based on requirements.



## Data annotation

Annotating the data and storing needed information.

- Device name
- Duration
- Environment
- Noise Type
- Level





# In-house Evaluations

## Data Collection

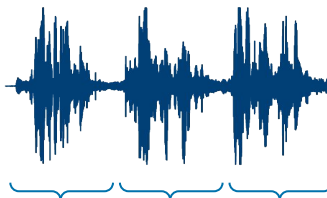
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## Data annotation

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## Assessment

Getting reports of a lot of metrics like PESQ or energy comparison. Listening some samples and assessing subjectively to obtain the conclusion.



# 3QUEST Evaluations

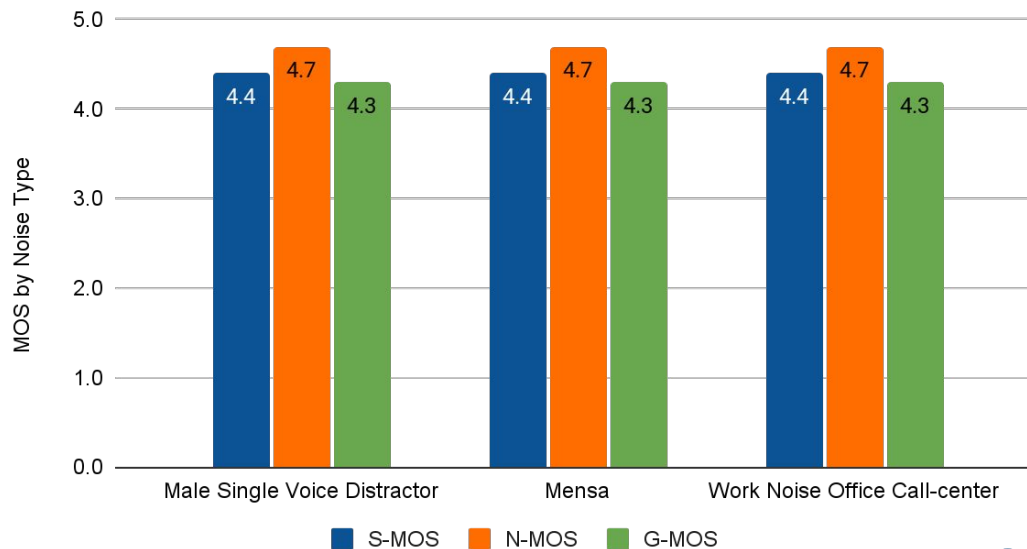


## Test data

Noises: ETSI EG 202 396-1

Voices: ITU-T P.501

### 3QUEST Result



# Real-Time Noise Cancellation



## Testing Challenges



# Trade-offs



## 1. Quality vs Model size

Trade-off between audio quality and the processing time and/or allocated computational resources.



**MOS | CPU**

# Trade-offs



## 1. Quality vs Model size

Trade-off between audio quality and the processing time and/or allocated computational resources.

## 2. Noise Cancellation vs Voice Preservation

Trade-off between cancelling the noise entirely and keeping the speech untouched.



**Noise | Voice**

# Software-based NC Evaluation Flow



Industry-known evaluation metrics and test methodologies are designed either for audio signal transmission or for hardware solutions.

Unified test system for software-based NC evaluations including:

- Database
- Metrics
- Methods



# Any further questions?

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