RISONANZA

VOICE STRESS AND EMOTION DETECTION

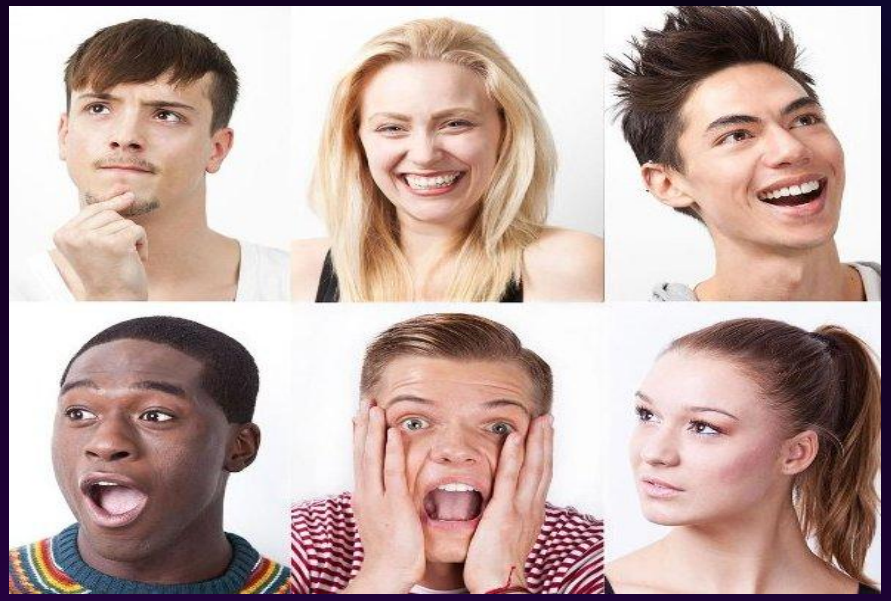
AGENDA

- THE PROBLEM?
- OUR IDEA
- IN ACTION
- TECHNICAL FEATUERS
- REAL-LIFE APPLICATIONS

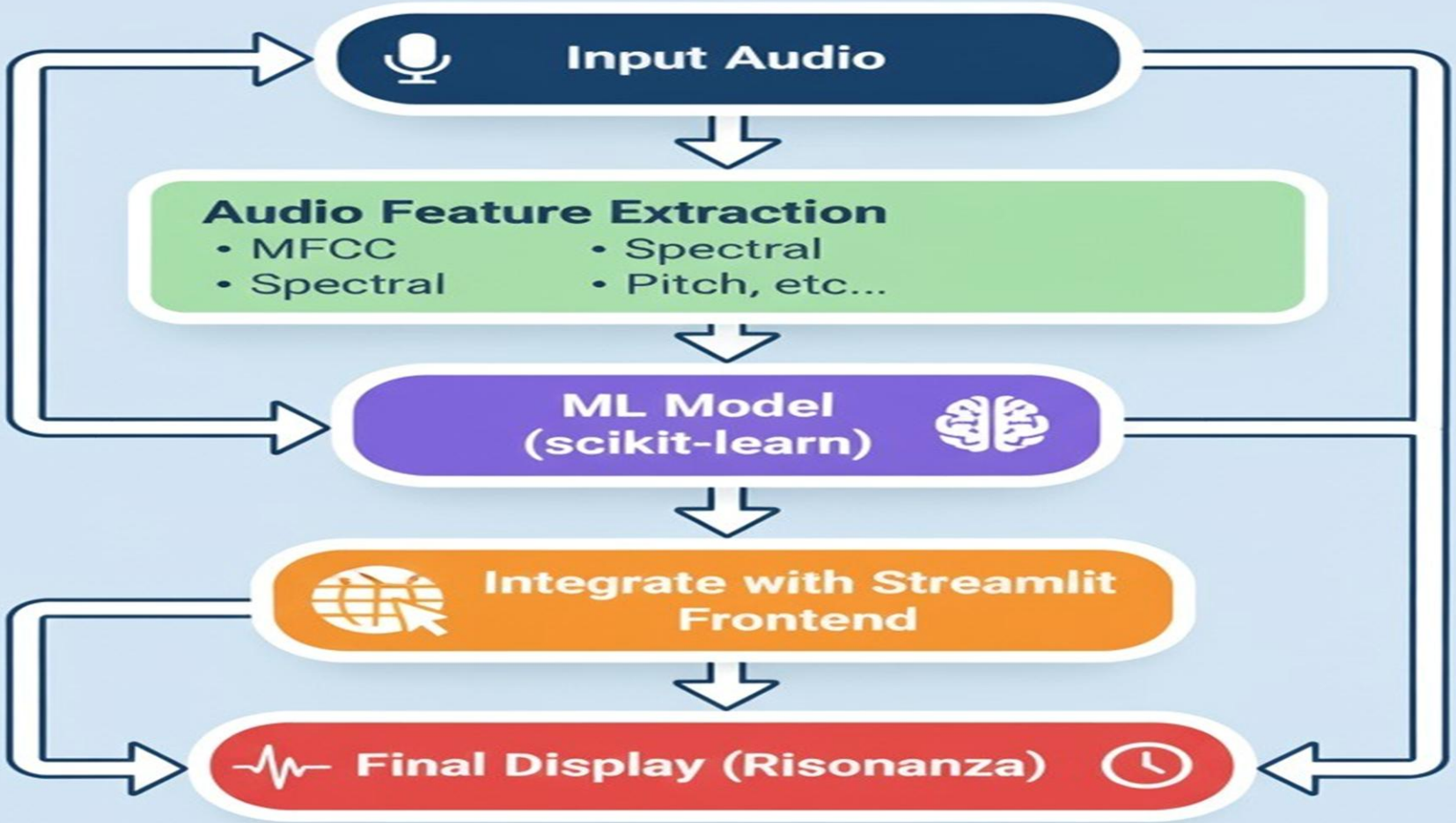
THE PROBLEM.

- People often reveal stress and emotions through their voice, but traditional methods of detecting them are mostly subjective and unreliable.
- Misinterpretation can cause serious issues in areas like security, healthcare, and customer service.
- The problem is the absence of an accurate, automated system that can analyze voice patterns in real time to detect stress and emotions reliably across different speakers and environments.

OUR IDEA



Risonanza: Voice Emotion Detection Workflow



- Realtime Emotion Display
- Stored Audio Analysis

THE INPUTS .

Our system analyzes multiple features of speech to analyze emotions and detect stress :

- 🎙️ **Audio Signal** – raw voice recording
- 📣 **Pitch & Tone** – frequency variations, intonation
- 📢 **Loudness** – energy/intensity of the voice
- ⏱️ **Tempo & Rhythm** – speed and pauses in speech
- 🎼 **Spectral Features** – MFCCs, formants, harmonics
- 🔁 **Voice Modulation** – stress, variation, smoothness

These **speech features** are extracted and then classified into the **8 emotions**:
Neutral, Calm, Happy, Sad, Angry, Fear, Disgust, Surprise.

IN ACTION.

Python – Core implementation language

Libraries & Tools:

1. **Librosa** → Audio feature extraction (MFCC, spectral features)
2. **NumPy** → FFT & spectral analysis, numerical computations
3. **Pandas** → Dataset handling and preprocessing
4. **Scikit-learn** → Machine learning model training & emotion classification
5. **Streamlit** → Real-time web interface for analysis and visualization

TECHNICAL FEATURES

- Lightweight Machine Learning: Based on feature extraction with classical ML models instead of heavy deep learning.
- Efficient Resource Usage: Runs smoothly on normal hardware, making it practical for edge devices (robots, IoT, etc.).
- Privacy-Friendly: No server storage, enhancing data privacy.
- Open Source & Free: Easy to use, share, and extend in both academic and commercial contexts.
- Scalable Design: Modular architecture makes integration into robotics, security, or customer feedback systems straightforward.

REAL-WORLD APPLICATIONS

1. Security → Stress/emotion detection integrated with surveillance for identifying suspicious behavior.
2. Customer Experience → Gauge how users feel about products or services in real time.
3. Healthcare → Stress monitoring for early intervention in mental health contexts.
4. Robotics → Emotion-aware robots that interact more naturally with humans.
5. Workplace Wellness → Continuous monitoring in high-stress environments (e.g., call centers, aviation).

THANK YOU

BY

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