

DIEGODICARLO

SMC8/MMP



ARVISUALMUSIC

Combination of media and pitch information enclosed in a single visual media. Using light and texture, various emotions can be evoked in the media, generally connected strongly to traditional and/or real world video content.



IN PRACTICE

- Color and textured parametric Attraction from the music using the color palette
- Using our own body's movement from the audio wave signal (Biosensor + Arduino)
- Add watermark content in the last image, integrated really (Augmented Reality) according to texture and colors in the media
- Auto-Video synchronization and perspective focus (Autothresholding)



THANK YOU



FUTURE IMPROVEMENTS

- Using AR technology
- Music Emotions Recognition
- Using own body's movement
- Using camera's position
- Adding more media and textures
- Adding more media and textures



AALBORG UNIVERSITET



Artal *f*

DIEGO DICARLO
SMC8/M



ARVISUALMUSIC

Combination of muscle and posture information retinotest and ungrasped reality result three muscle share distribution



IN PRACTICE

- Color, and contrast components detection - from the image themselves (Section 2.1, 2.4, 2.5)
 - High level audio analysis feature extraction from the audio raw signal (Section 2.2, 2.3)
 - joint watermark content as the test image watermark result (Section 2.6)
 - using $\text{height} \times \text{width}$ to feature and patterns in the image
 - Analysis structure orientation and perspective features (with thresholding)



EXTRACTING DATA

- Computer virus problem: many computer viruses exist
 - viruses writing to system and user information control
 - attack file
- Denial of service: can use new method
 - attack users by preventing them from using their system
 - Denial of service: for connected component

Many different types of viruses, just to name a few:
- viruses of the boot sector (B/S) virus,
- file virus,
-宏 virus (MS-DOS and Windows)
- polymorphic?





THANK YOU



FUTURE IMPROVEMENTS

- Minimale Auslastung
- Standardisierte Ressourcen
- Minimale Computer-Mitarbeiter-Auslastung
- überarbeitete Prozesse
- Optimierte Anzahl Dienstleister
- überarbeitete Prozesse
- optimierte Arbeitsabläufe
- überarbeitete Arbeitsaufgaben
- überarbeitete Anwendungssysteme

ARVISUALMUSIC

*Combination of music and picture information retrieval and augmented reality for
real-time music visualization.*

*Using high and low level features extraction from audio/video multimedia, generate
animated imagery in real-time on a real-world video content.*

IN PRACTICE

- Colors and connected components detection from the image (computer vision in MATLAB®).
- High and low level audio feature extraction from the audio raw signal (MIRtoolbox in MATLAB®).
- add multimedia content to the real image: augmented reality (Vuforia UNITY®).
 - moving terrain heights* according to feature and patterns in the texture
- Audio/video synchronization and performance issues (multithreading).

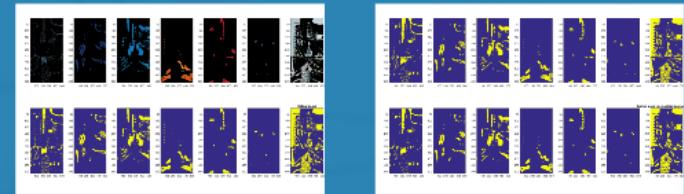
*Credits to **Alex Baldwin** (classmate, friend)



EXTRACTING DATA

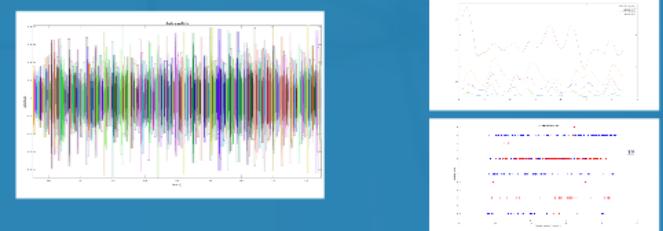
Computer Vision problem: image pattern recognition

- Supervised training with manual color extraction on tuned RGB filters
- Removing small particles with size-base threshold
- Median Filter for smoothing and removing random noise
- Size-based clustering for connected components

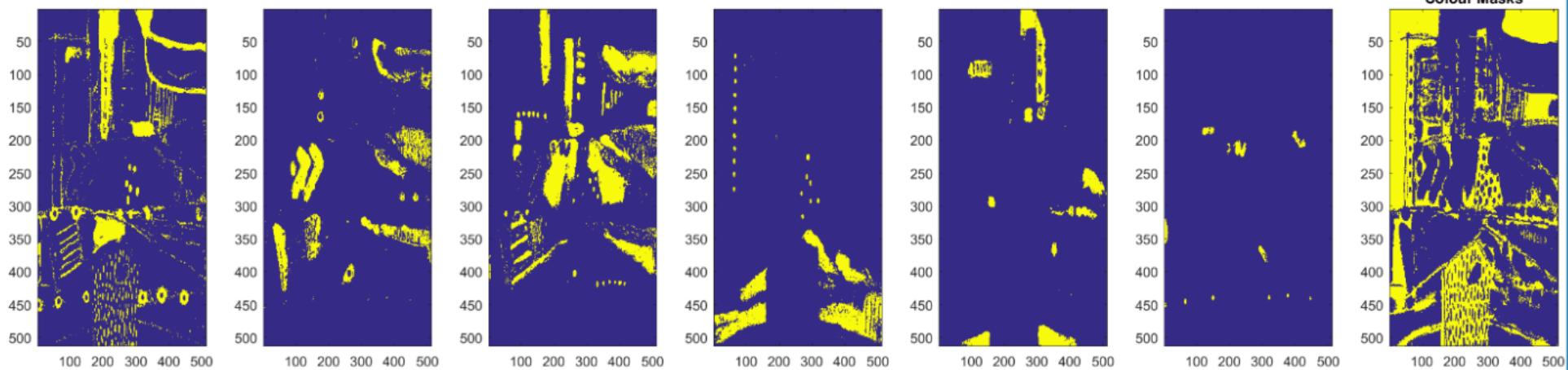
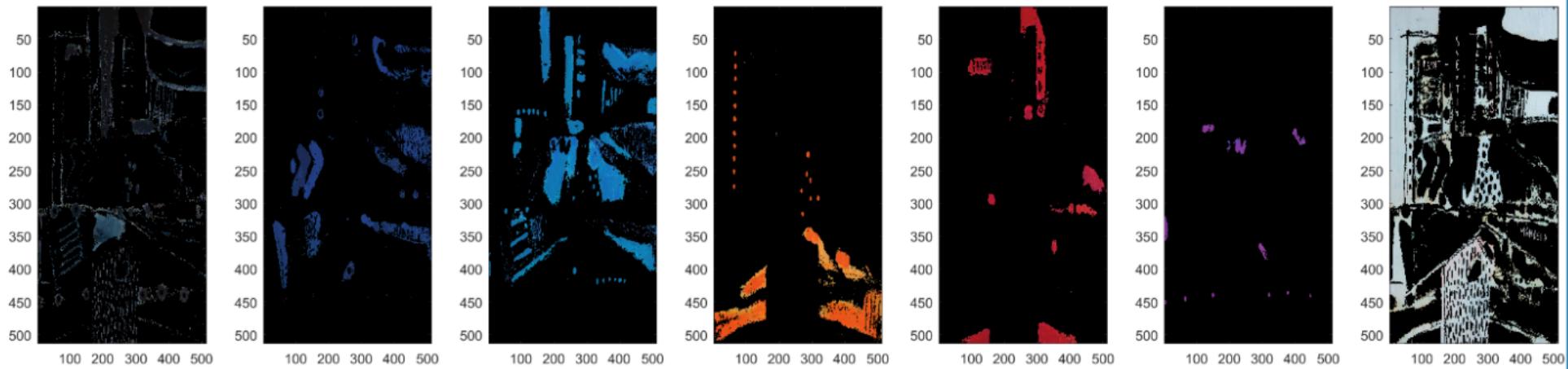


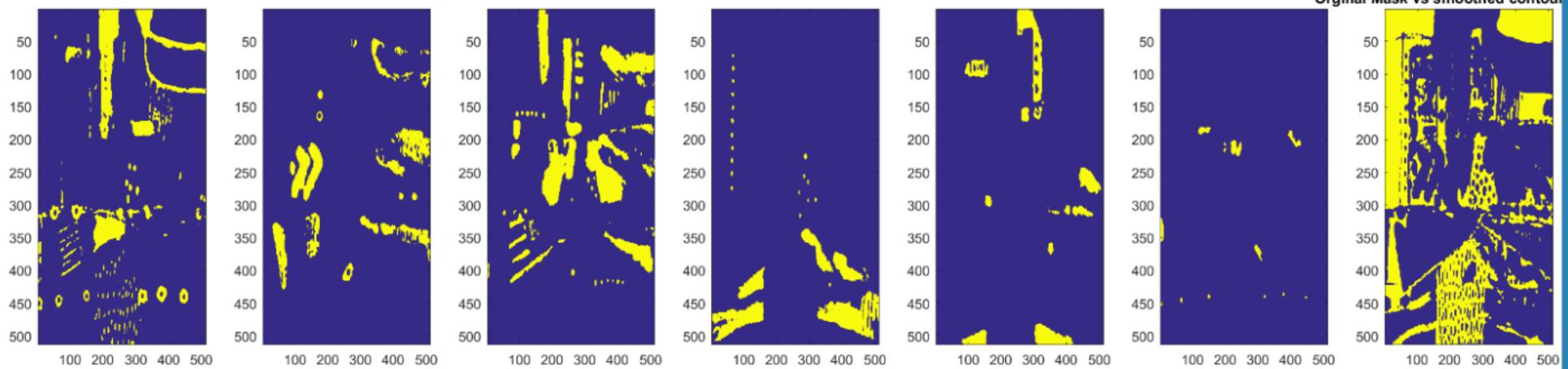
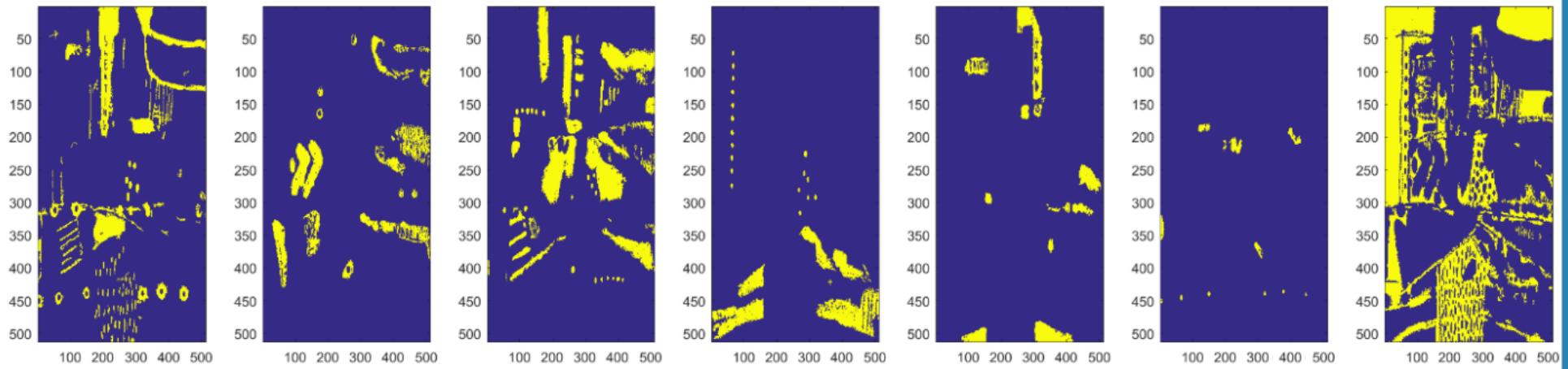
Music Information Retrieval problem: feature extraction

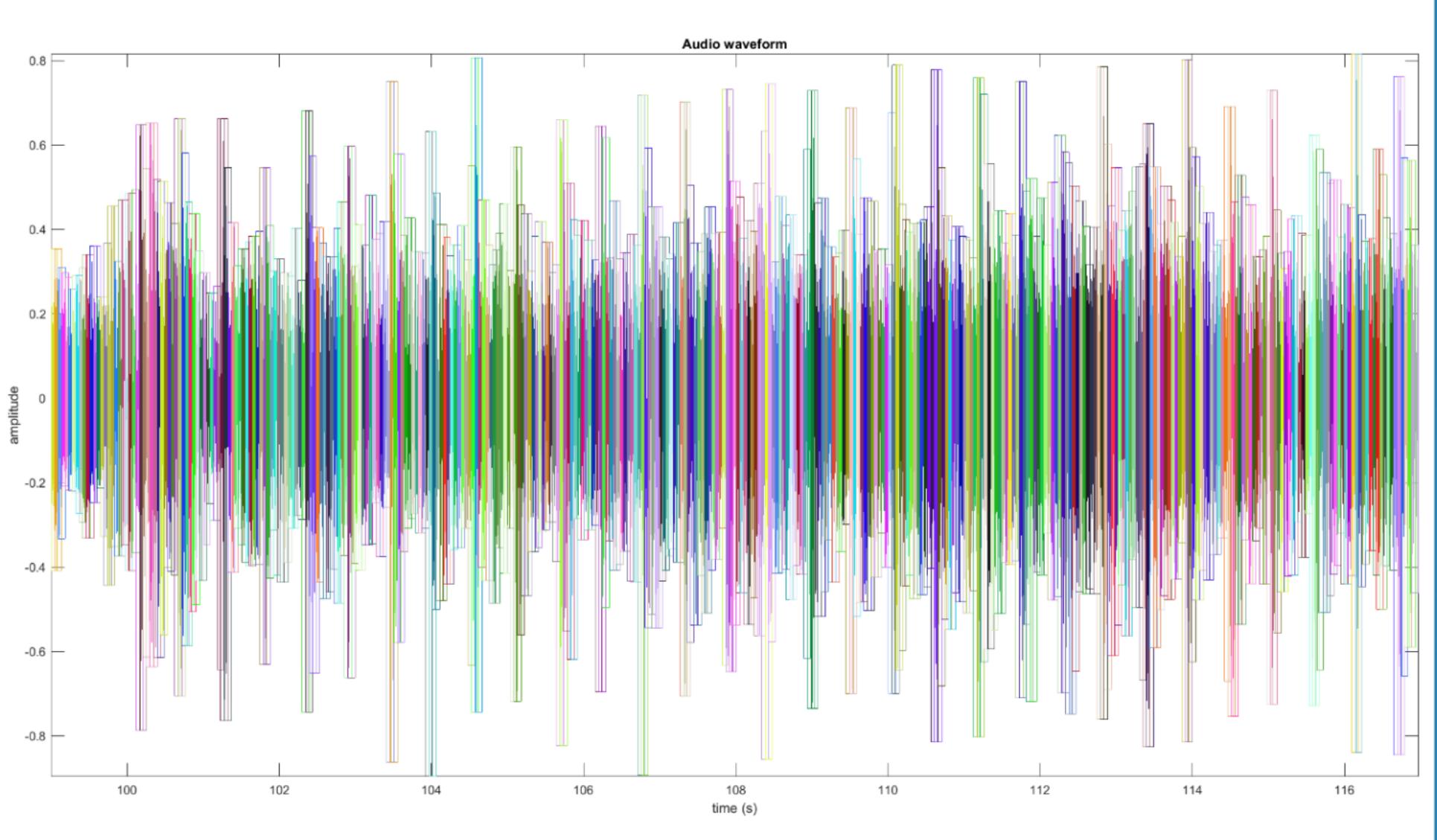
- Energy of the output of a filterbank with 5 filters
- Pitch detection
- Mode* (Major vs Minor) and Key Clarity*
- Roughness*

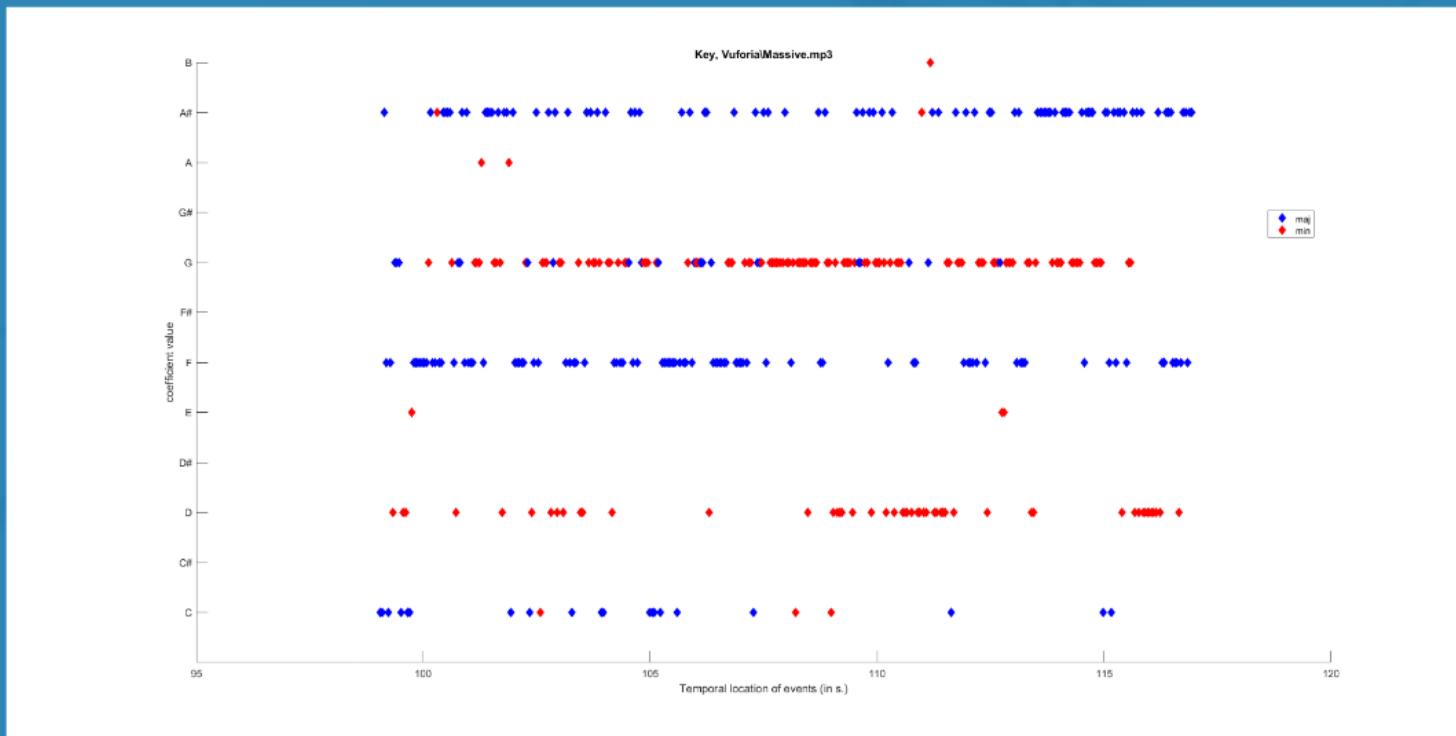
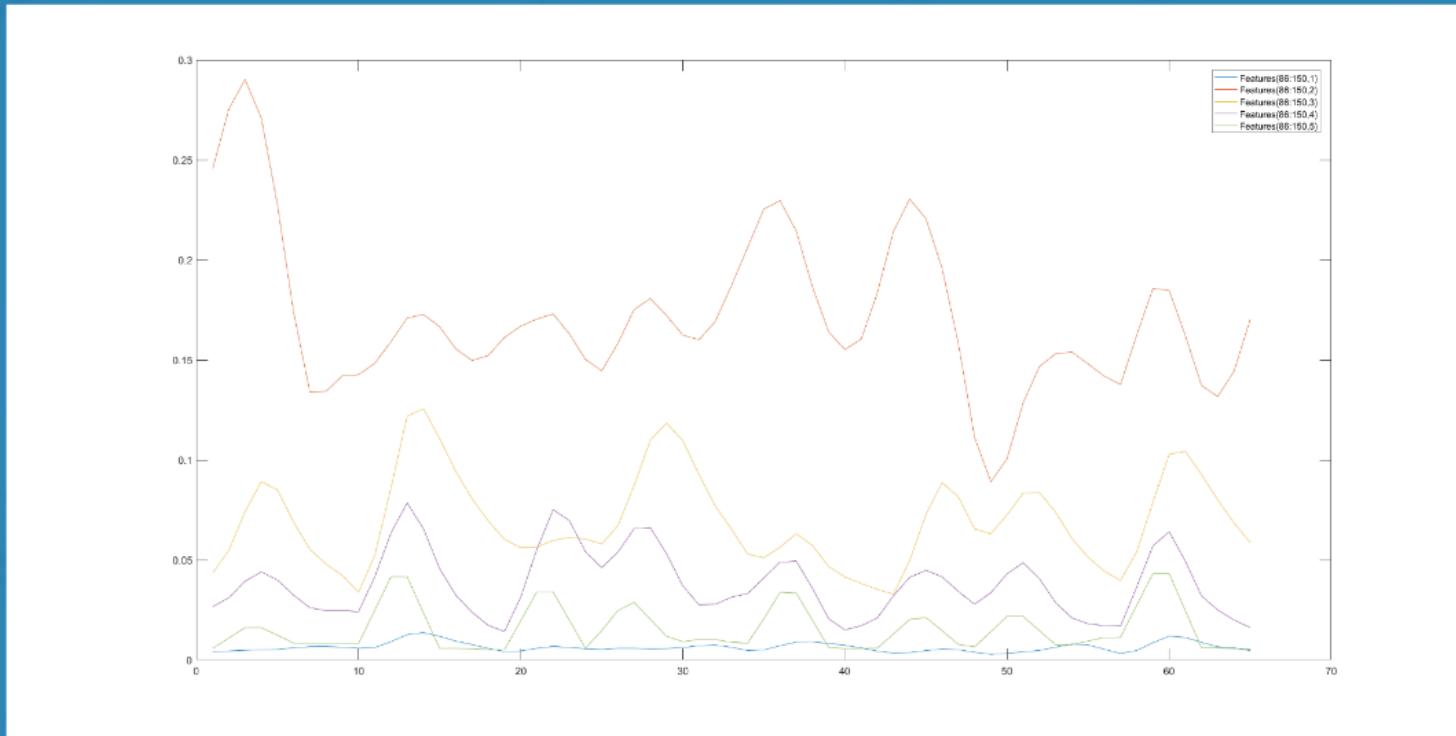


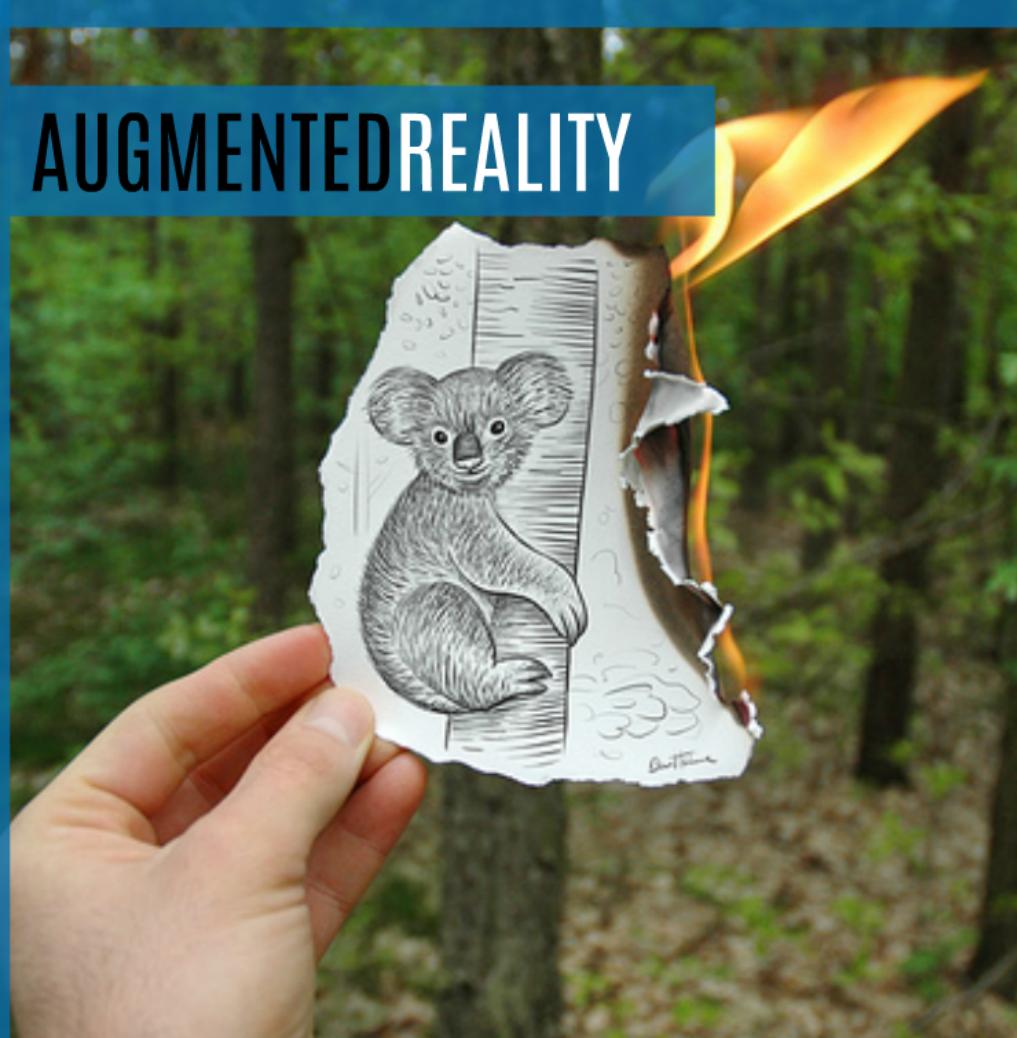
*(only in MATLAB)



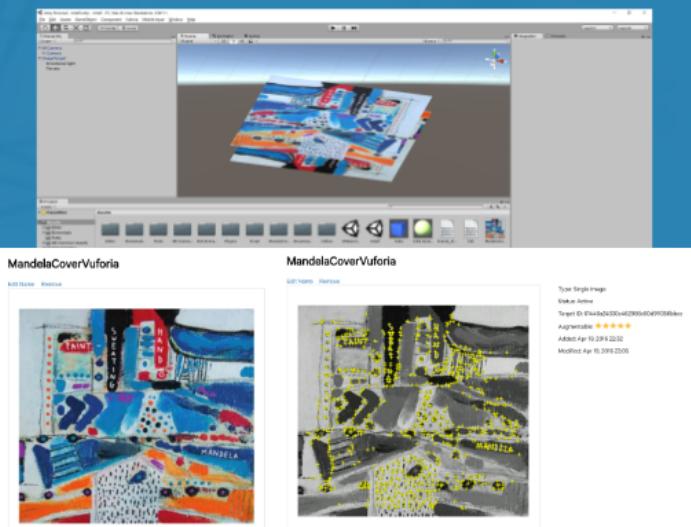








Augmented Reality in Vuforia



Multithreading

```
flattenedTerrain();
// Perform terrain modification on a different thread
terrainModificationThread = new System.Threading.Thread(setHeight);
stopThread = false;

// Test and Debug //
Debug.Log("heightmap resolution: " + xRes + ", " + zRes);
Debug.Log("Number of loaded masks: " + nMasks);
Debug.Log("Number of loaded features: " + FEATURES_FILENAME.Length + ", for " + nFeatures + " samples");
Debug.Log("Terrain loaded: " + terrain.terrainData.name);
}

//----- ** UPDATE | DRAWING ** -----
//-----
```

```
void update() {
    // Sync terrain motion with music; get the right frame index
    int frameIndex;
    if (!isPlaying) {
        int currFrameIndex = (int) Mathf.Floor((audio.time * fs) / frameSize);
        if (currFrameIndex > frameCounter)
            frameCounter = currFrameIndex;
        //Debug.Log("With timeSamples: " + (int) Mathf.Floor(audio.timeSamples/frameSize) + " with "
    }
}
```

Original cover



YouTube

THANK YOU!!

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FUTURE IMPROVEMENTS



- *Online Audio streaming*
 - Soundcloud and BandCamp
- *Online Computer Vision Algorithm*
 - OpenCV (SimpleCV) C++
- *Online Audio Feature Extraction*
 - Essentia C++
- *Online Content Acquisition*
 - BandCamp information and content
- *iOS/Android Implementation*

THANKYOU



Diego Di Carlo.

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IN PRACTICE

- Color and connected components detection from the image
using the OpenCV library
- Using our own code, feature extraction from the audio raw signal
- Feature extraction
- Labelling content in the test image, ingesting really
biggest dataset (around 1000 images) according to feature and policies in the
model
- Auto-Label synchronization and performance issues - In development
- Works in other domains (semantic segmentation)



EXTRACTING DATA

Content analysis - Implementation details
- Python 3.6.5
- TensorFlow 1.13.1
- Keras 2.2.4
- Matplotlib 3.0.3
- NumPy 1.16.4
- Pandas 0.24.2
- TensorFlow 1.13.1
- Keras 2.2.4
- Matplotlib 3.0.3
- NumPy 1.16.4
- Pandas 0.24.2



THANK YOU

