Nintendo DSi Features

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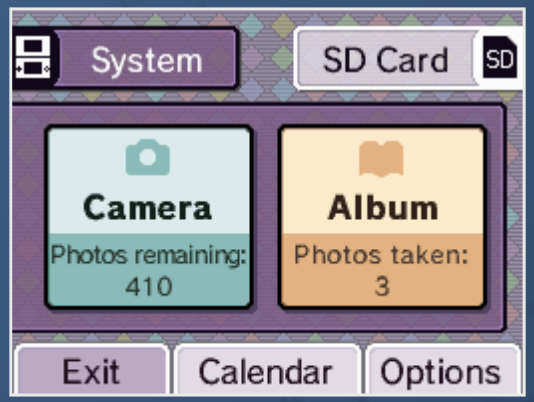
Improved functionalities for the game developer

- Additional Sensor
- Increased Processing Power
- Increased WiFi capabilities

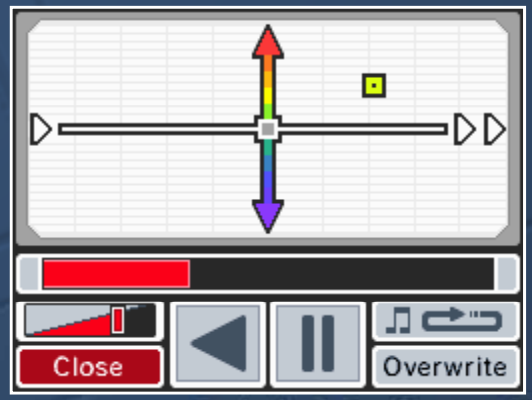
Improved user experience

- Customizable Menu

- Camera application



- Audio player



Chapter 1

New Features and Improvements

NAND Flash Memory Specs

- Size 256 MByte
- Read between 0.8 and 4.0 MByte / sec.
- Write between 0.3 and 2.4 MByte / sec.

SD Card Slot

- SD and SDHC are supported
- For Developers
  - Easy installation of NAND applications
- For Consumers
  - Archive DSiWare games
  - Store Music and Picture data

Performance Notes

- CPU Clock-up 134 MHz
- MEM 16 MByte
- Graphics chipset is the same
  - Exception: CPU -> VRAM bus is 32 bit wide

WiFi Spec

- More WiFi data can be send
  - Transmit additional data
  - Support more players

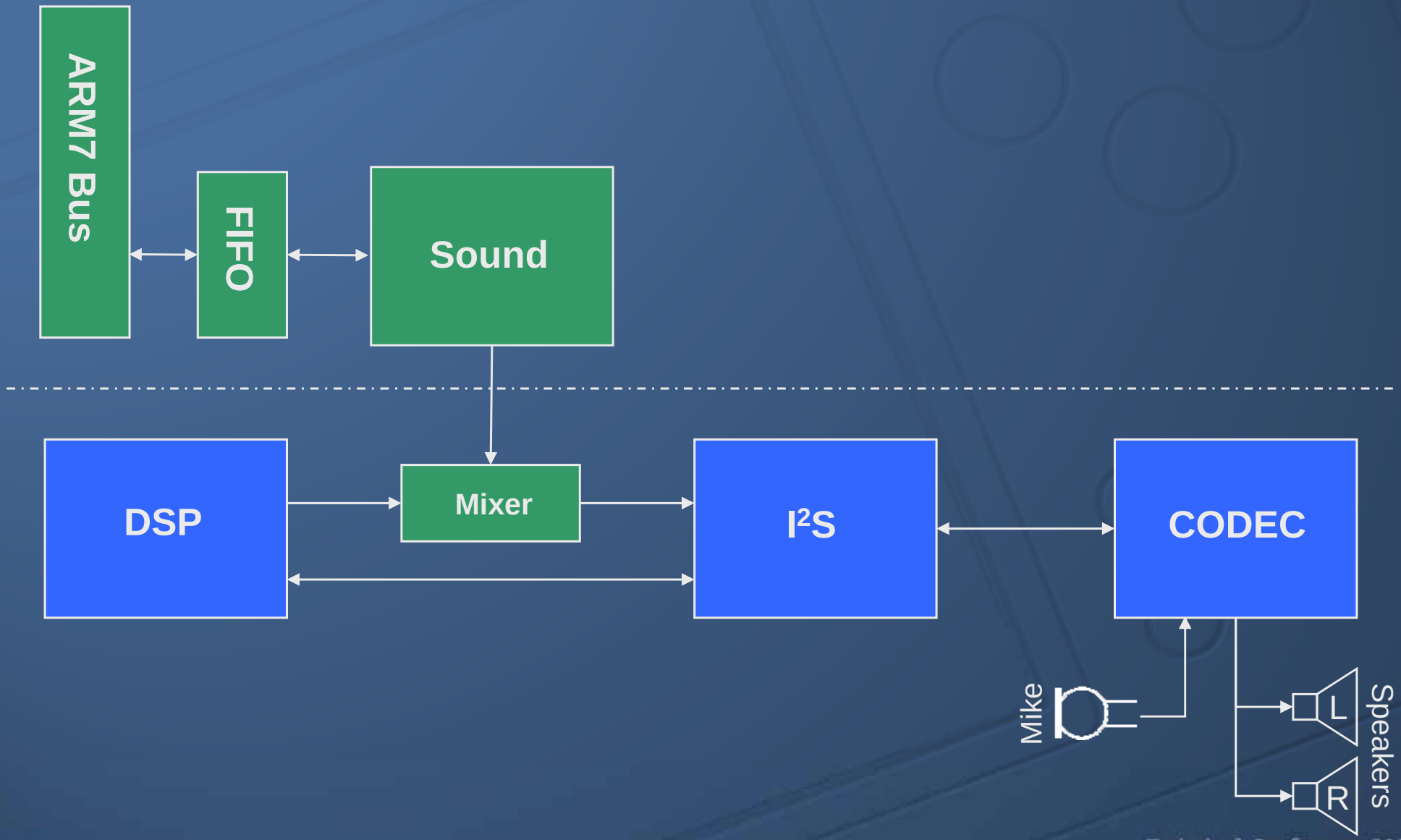
WiFi Spec
Additional Security Modes

- NITRO: WEP mode
- TWL: + WPA, WPA2 modes

DSP

- 134 MHz CEVA XpertTeak core
- Can be utilized by SDK functions
  - Scaling Graphics
  - Playback of audio samples
  - Codec function
  - etc.

Sound hardware



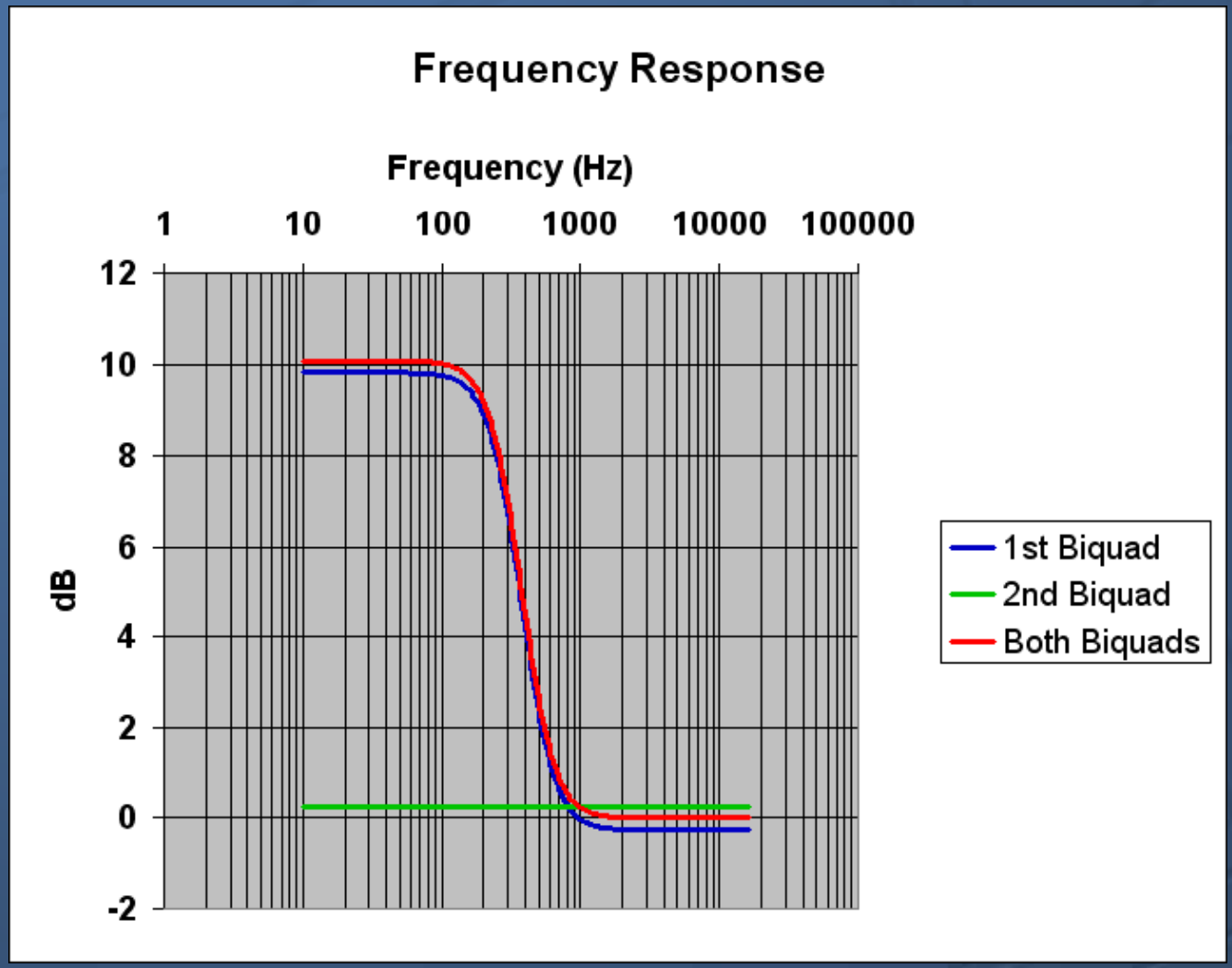
SNDEX library

- TWL-specific library for enhanced sound features
  - Check Connection of headphones
  - Control Speaker Volume
  - Control CPU/DSP audio mix rate
  - IIR Filter

IIR Filter

- Shelf filter
- EQ Filter
- Butterworth Filter

SNDEX Demo
Bass-Shelf



fc = 300 Hz

10 dB Gain

Chapter 2

New Input Device - Camera

Nintendo DS is full of sensors

Camera is an additional Sensor

- Image Processing
  - Distinguish Light Levels
  - Determine Ambient Color
- Face Recognition
- It can also take photos

Specs

- Inside / Outside CCD sensor
- Max. Resolution VGA 640 x 480
- Max. Frame Rate 30 frames / sec.

Specs

- Pan focus at largest aperture (f/2.8)
- Focal length 20cm – Infinity
- Output formats
  - YC_RC_B
  - RGB555
- Can switch between 2 configurable contexts

Camera - Effect Processing

Normal

Monochrome

Sepia

Inverse

Camera - Flipping

Normal

Flip horizontal

Flip vertical

180° rotation

Photo Mode Settings

- Text Capture
- Portrait
- Landscape
- Night View
- Night Snap

Further Settings

- Exposure Settings
  - Details of the time and f-number used
    - Automatic Mode
    - Manual Mode: 10 levels
- Sharpness Settings
  - 8 levels

How to program with the camera?

- When showing movie
  - use low resolution
  - fast screen refresh rate
- When capturing picture
  - use higher resolution
  - process screen analysis etc.

Picture archive

- Pictures stored in internal archive
- Used by Built-in camera application
- Picture archive can be used in DSiWare
  - Direct access is prohibited
  - Developers need to utilize TCL library

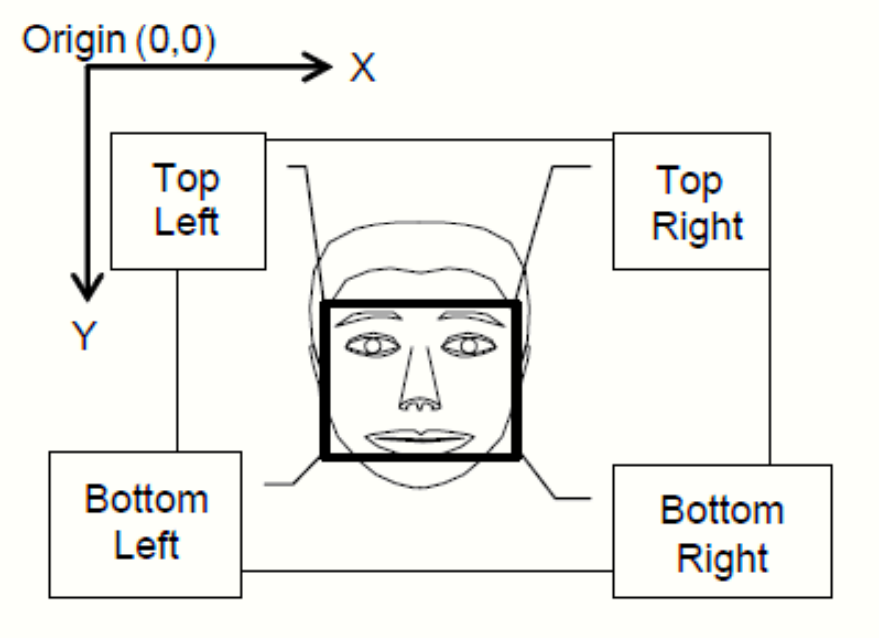
Face Recognition library

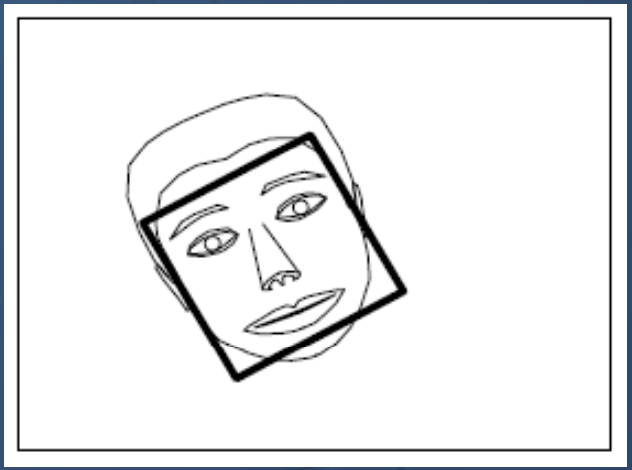
- Single-face
  - Single person with the highest face recognition is automatically selected
- Multi-face
  - Analyze faces of multiple persons

Face Recognition library

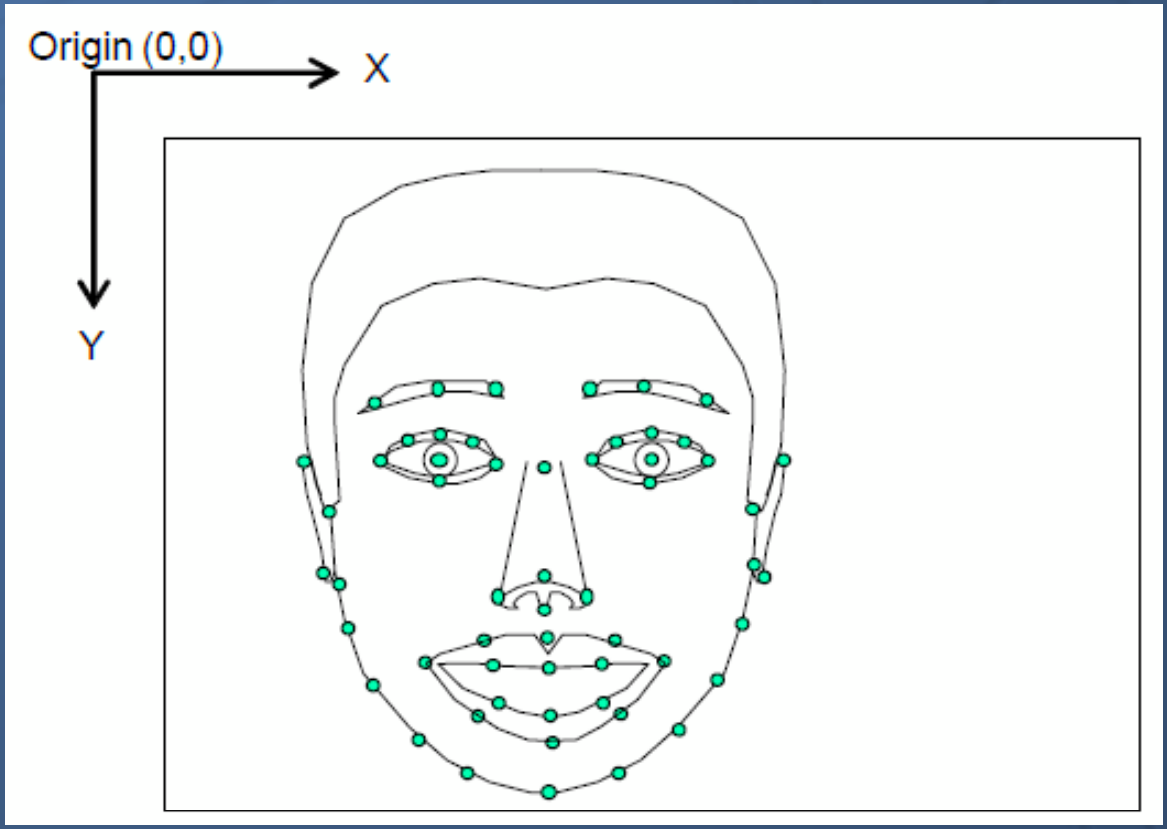
- General features of the library
  - Extraction of Face region
  - Extraction of Facial features
  - Facial Features Tracking
  - Individual Recognition

1. Face Region Extraction





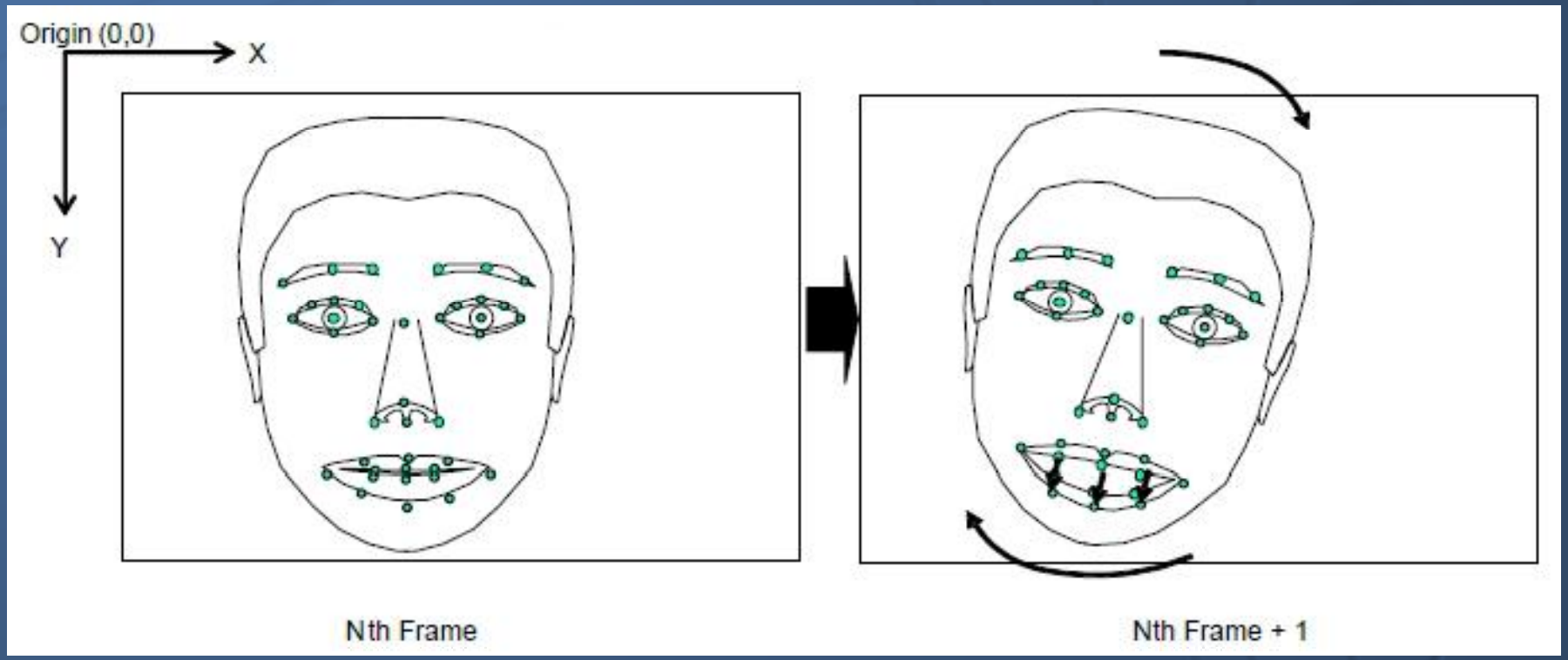
2. Facial Features Extraction



2. Facial Features Extraction

Level	Extracted Features	Points
0	None	0
1	Eye	14
2	+ Eyebrow	20
3	+ Mouth	34
4	+ Nose	39
5	+ Contour/Ears (quick)	56
6	+ Contour/Ears (high precision)	56

3. Facial Features Tracking



4. Recognizing Individuals

- Identify Individuals
  - Using pre-registered User Data
  - Even works with multi-face

Summary

- Concept of My Own DS
- Additional Sensor
  - Face Recognition
- Internal NAND Memory
  - DSiWare games
- CPU Clock-up
- Additional memory
- Improved WiFi
- Improved Sound

Thanks for your attention

Questions

Contact support@noa.com