R.O.A.R.S.

Real-time Object and Atmosphere Reconstruction System

Managing Video Files

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CfAO™

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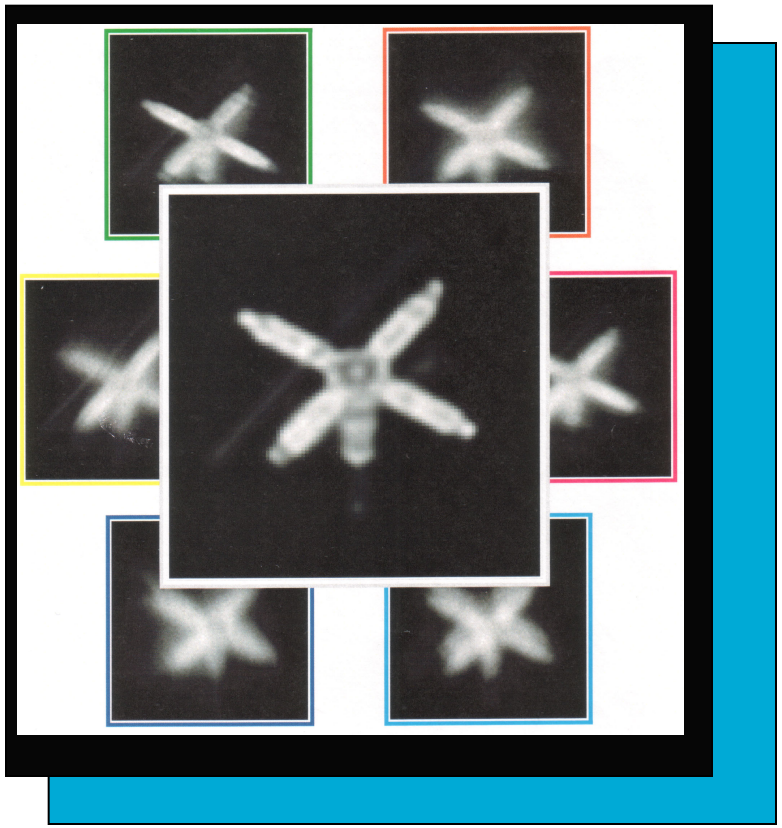
NSF

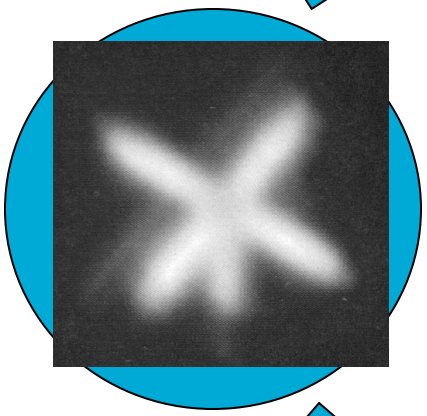
TEXTRON Systems

What is R.O.A.R.S. ?

- Real-time
  Object and
  Atmosphere
  Reconstruction
  System
- A g.u.i. program that performs both:
  - Image Reconstruction
  - Image Analysis



BASIC MODEL OF HOW THE ROARS PROGRAM WORKS

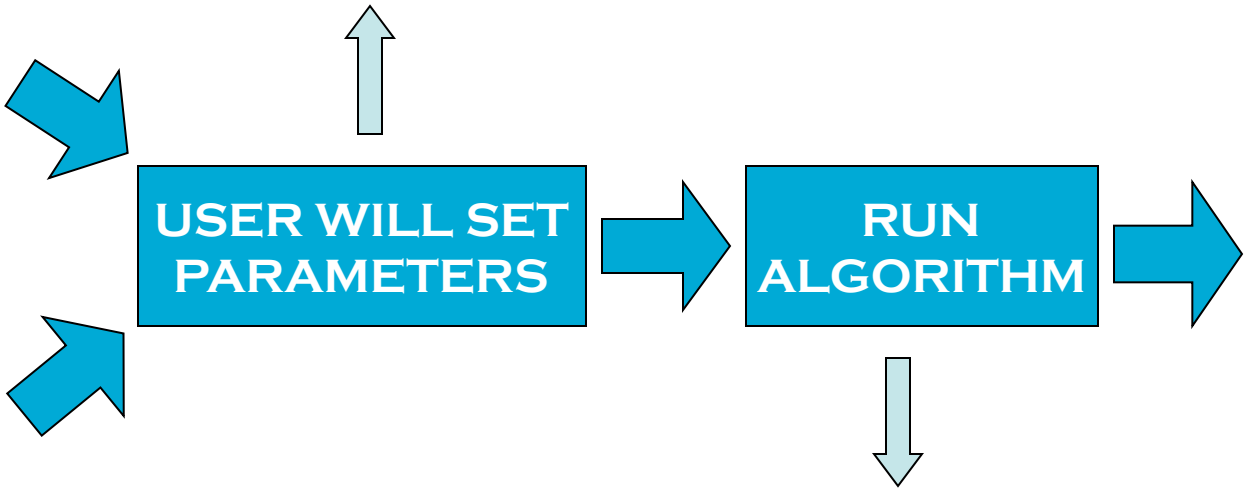


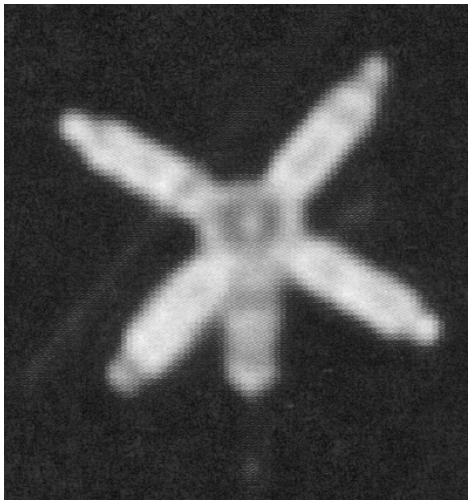
Multi-Frame Blind Deconvolution → removing atmospheric Blur and corruption

Superresolution → improve image resolution in a camera jitter/rotation.

BASIC MODEL OF HOW THE ROARS PROGRAM WORKS

Inputs, Calibrations, Tracker, Optical System are model parameters

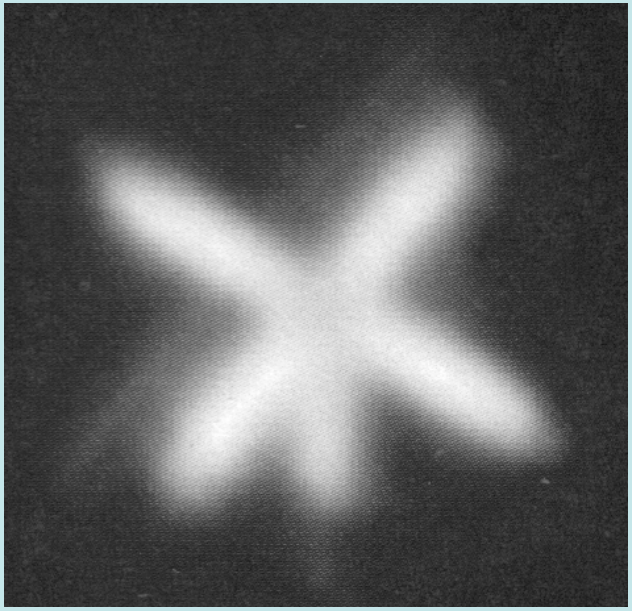




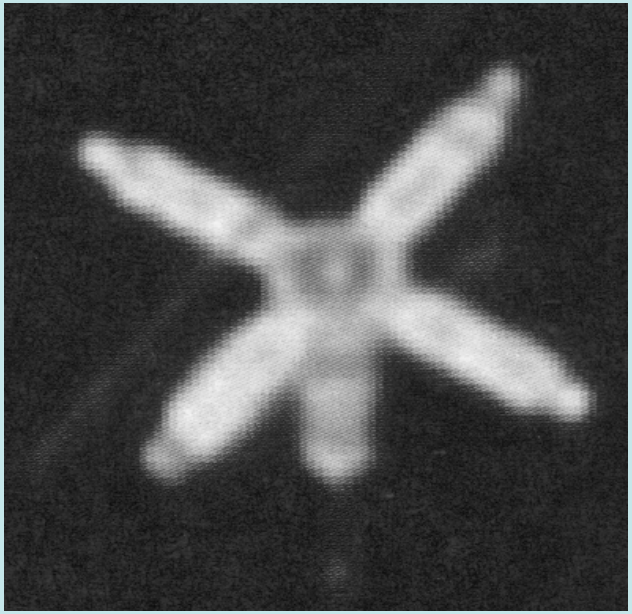
Runs the algorithm that is based on the parameters

Results of the ROARS program

Input

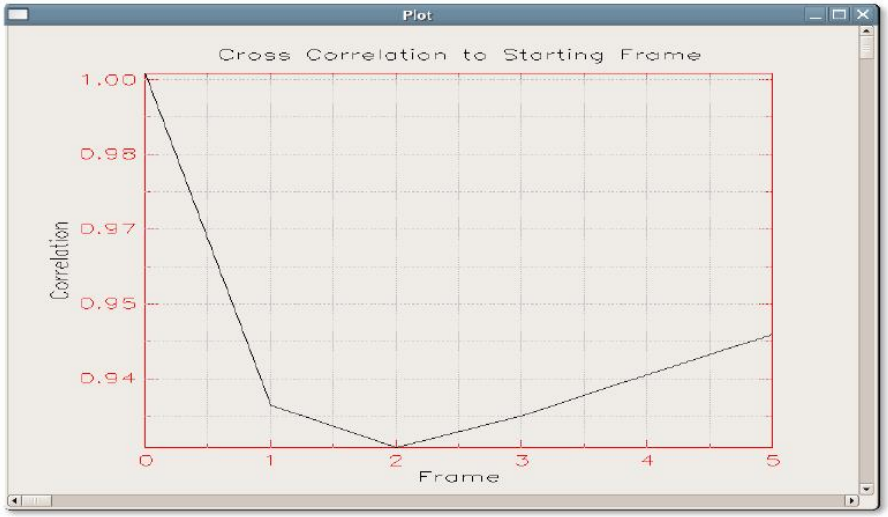


Output



BASIC MODEL OF HOW THE ROARS PROGRAM WORKS

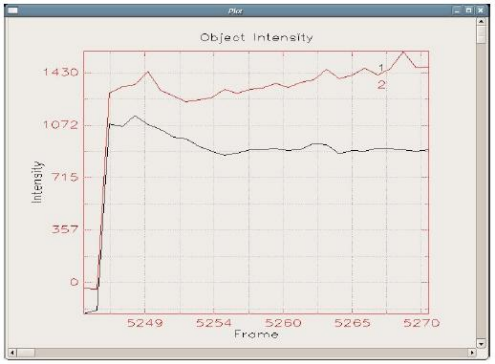
PLOTS USED TO ANALYZE A METRIC VALUE

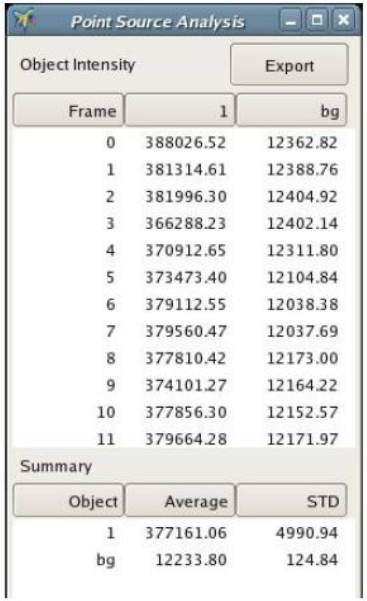


DATA IMAGE ANALYSIS

MANAGING, CREATING AND CONVERTING VIDEO FILES.

POINT SOURCES USED FOR METRICS COMPUTATION AND TRACKING OBJECTS





Frame	1	bg
0	388026.52	12362.82
1	381314.61	12388.76
2	381996.30	12404.92
3	366288.23	12402.14
4	370912.65	12311.80
5	373473.40	12104.84
6	379112.55	12038.38
7	379560.47	12037.69
8	377810.42	12173.00
9	374101.27	12164.22
10	377856.30	12152.57
11	379664.28	12171.97

Summary

Object	Average	STD
1	377161.06	4990.94
bg	12233.80	124.84

Objective

Reads any Video File
As an input .

Gives information
About the video file.

Randomly accesses any frame
In the video file.

C/C++ sample program that will manage video files

Saves each desired frame
Or links the chosen frames
Together into one video file.

Converts any video file
into a Mpeg-4 format.

Approach/steps in designing the program

- **Flow of the program**
  - Initialize required libraries and variables
  - Read input file
  - Access desired frames
  - Set mpeg-4 parameters
  - Link frames together
  - Write to output file
  - Free all allocated memory

FFMPEG
Multimedia System

- **Incorporate functions from the ffmpeg library**

- **C/C++ Programming Language**
  - Compatible with existing code
  - Xemacs
  - Linux Compiler

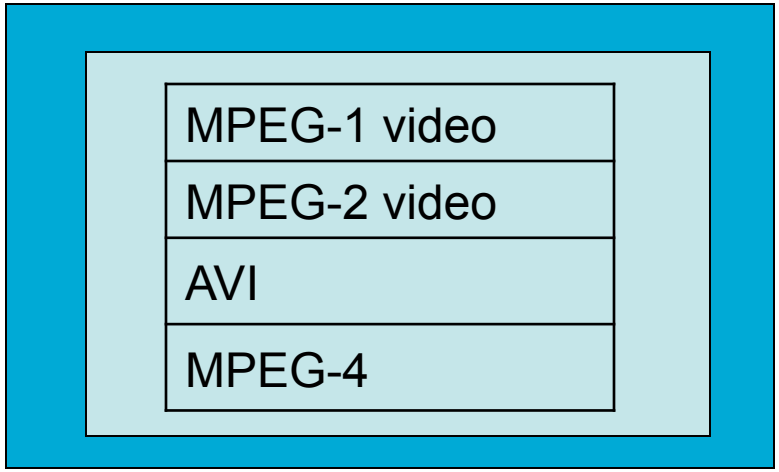
Supports any video format as an input

Explanation of feature

- Supports up to 70 different types of video formats.

Testing and verification

- Tested four common video formats by performing error checking.



Displays information about the input file

Explanation of feature

- Displays video information such as
  - Type of video file
  - Duration
  - Bit-rate
  - Frames per second
  - Size of video file

Testing and verification

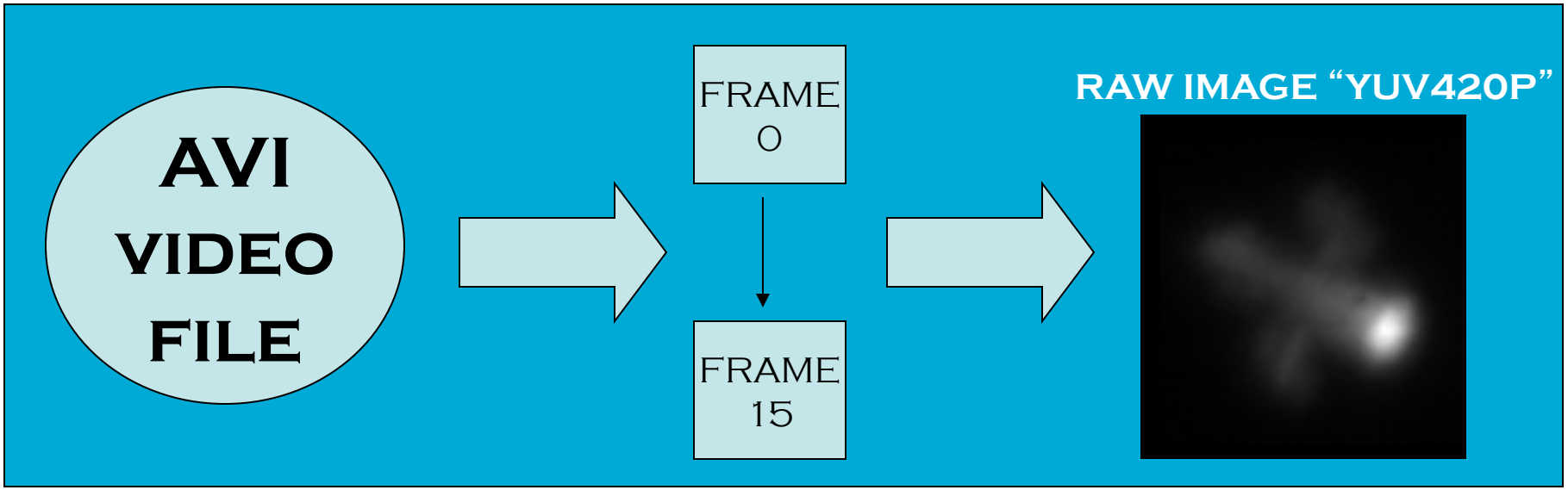
```
Input #0, avi, from '<null>':
  Duration: 00:00:01.5, start: 0.000000, bitrate: 353 kb/s
  Stream #0.0, 10.52 fps(r): Video: rawvideo, pal8, 64x64
encoding frame   1 (size=    0)

There are 1 save frames.
```

Randomly accesses frames

Explanation of feature

- randomly access any frame within the video file
- desired frame is chosen and a mpeg-4 file can be created

Testing and verification



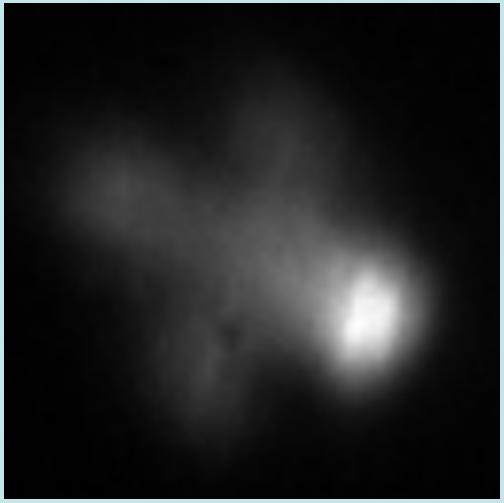
Link frames into a mpeg-4 video file

Explanation of feature

- Link all desired frames
- Combine into one mpeg-4 file.

Testing and verification

Input: "Avi file" (66kb)

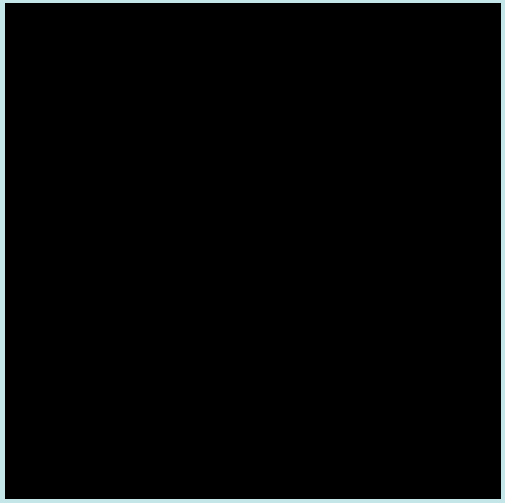


DEMO

PROGRAM

EXAMPLE

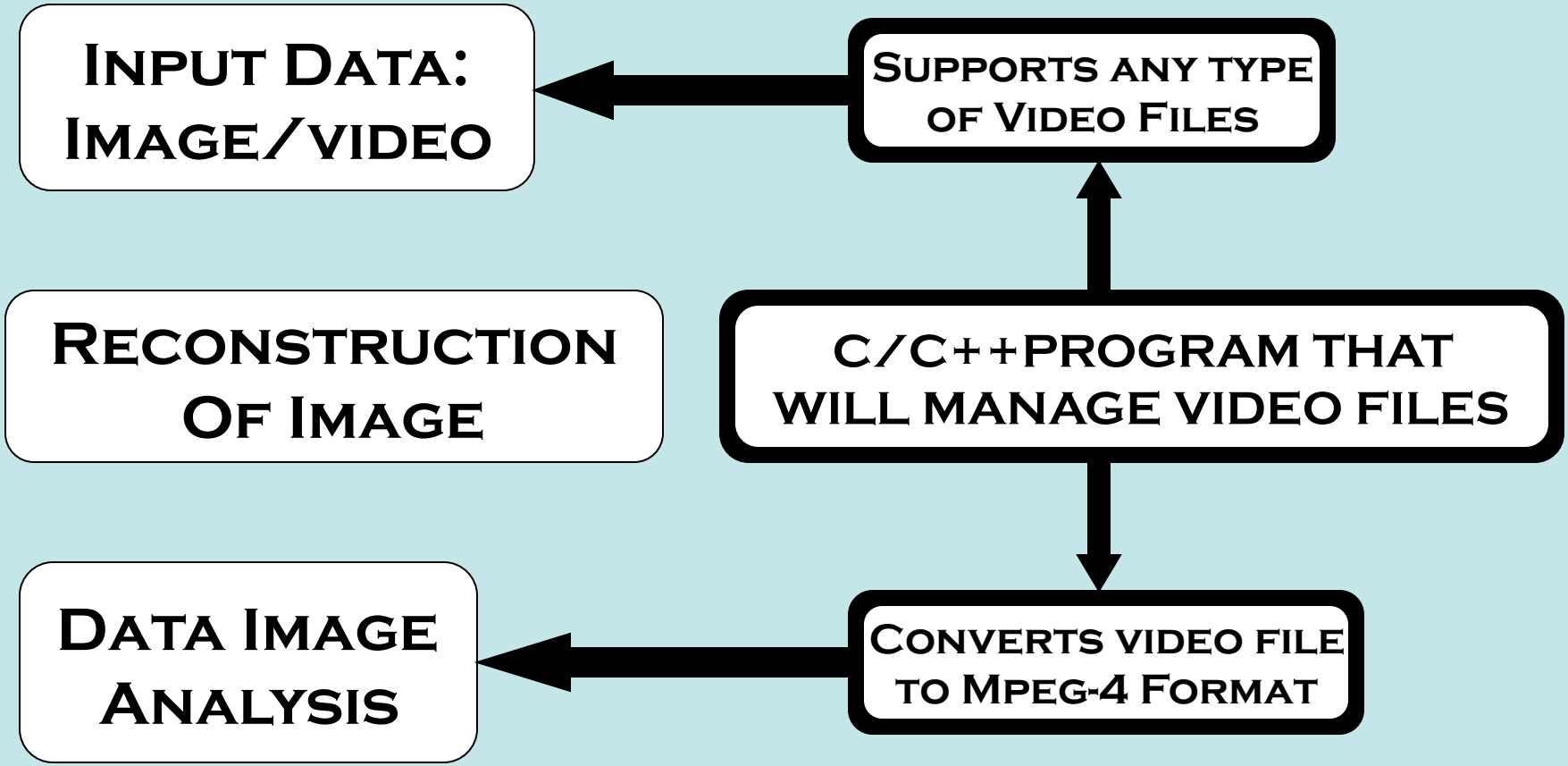
Output: "Mpeg-4 file" (4kb)



Future Plans

R.O.A.R.S. Program

Graphical User Interface



Acknowledgements

- Images were provided by Textron Systems
- FFMPEG libraries/functions were provided at **<http://ffmpeg.mplayerhq.hu>**
- Thank you to everyone who supported this project.

ANY QUESTIONS