

A Gentle Introduction to High Performance Computing (HPC)

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Agenda

HPC is About ...

**Injecting Concepts
Injecting Terminology**

HPC Applications

Computer Architecture

Parallel Paradigms

Heterogeneous Computing



HPC MULTIDISCIPLINARITY

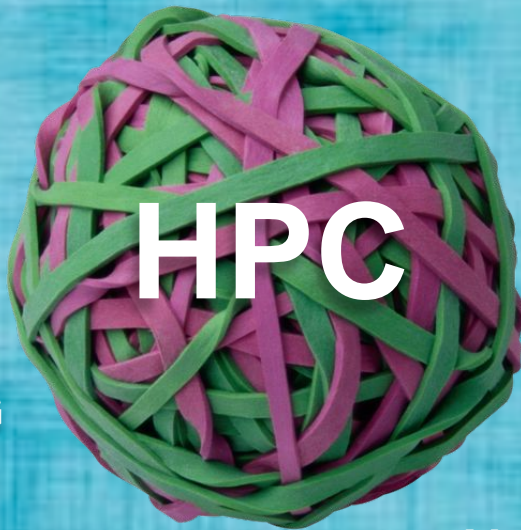
HIGH PERFORMANCE COMPUTING INTERDISCIPLINARY

TOPIC

NETWORKING

COMPUTER
PROGRAMMING

DYNAMIC
PROGRAMMING



OTHERS ...

COMPUTER
ARCHITECTURE

OPERATING
SYSTEMS

ALGORITHMS

BLAH

blah
blah
blah

BLAH

4 BLAH

BLAH

Blah BLAH

BLAH

blah

BLAH

BLAH

BLAH

blah

B

BLAH

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Blah

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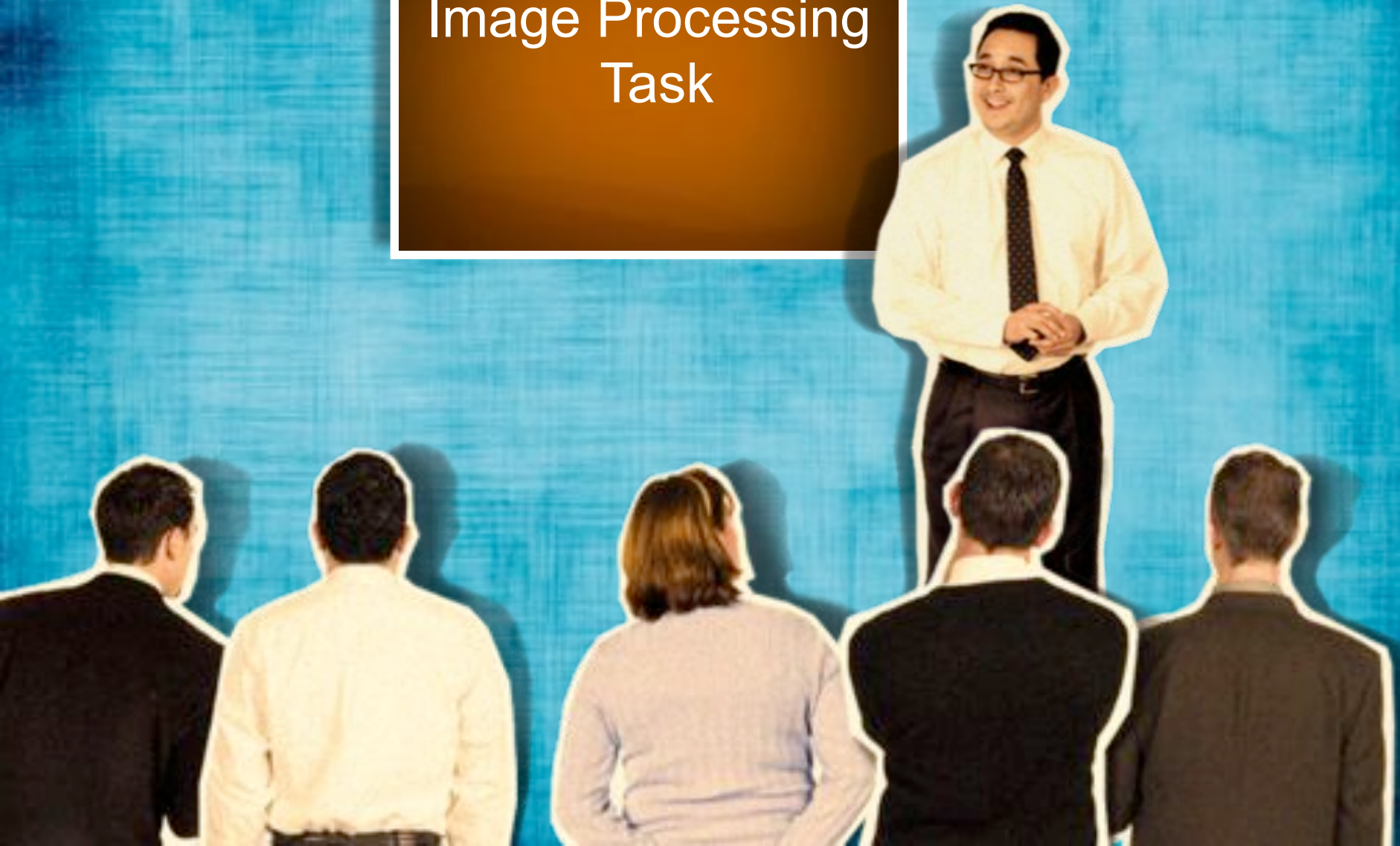
BLAH

HPC IS A

APPROACH



Image Processing Task



NOISY IMAGE

IMAGE PROCESSING



IMAGE DENOISING ALGORITHM

CONVOLVE FILTER WITH IMAGE

IMAGE PROCESSING

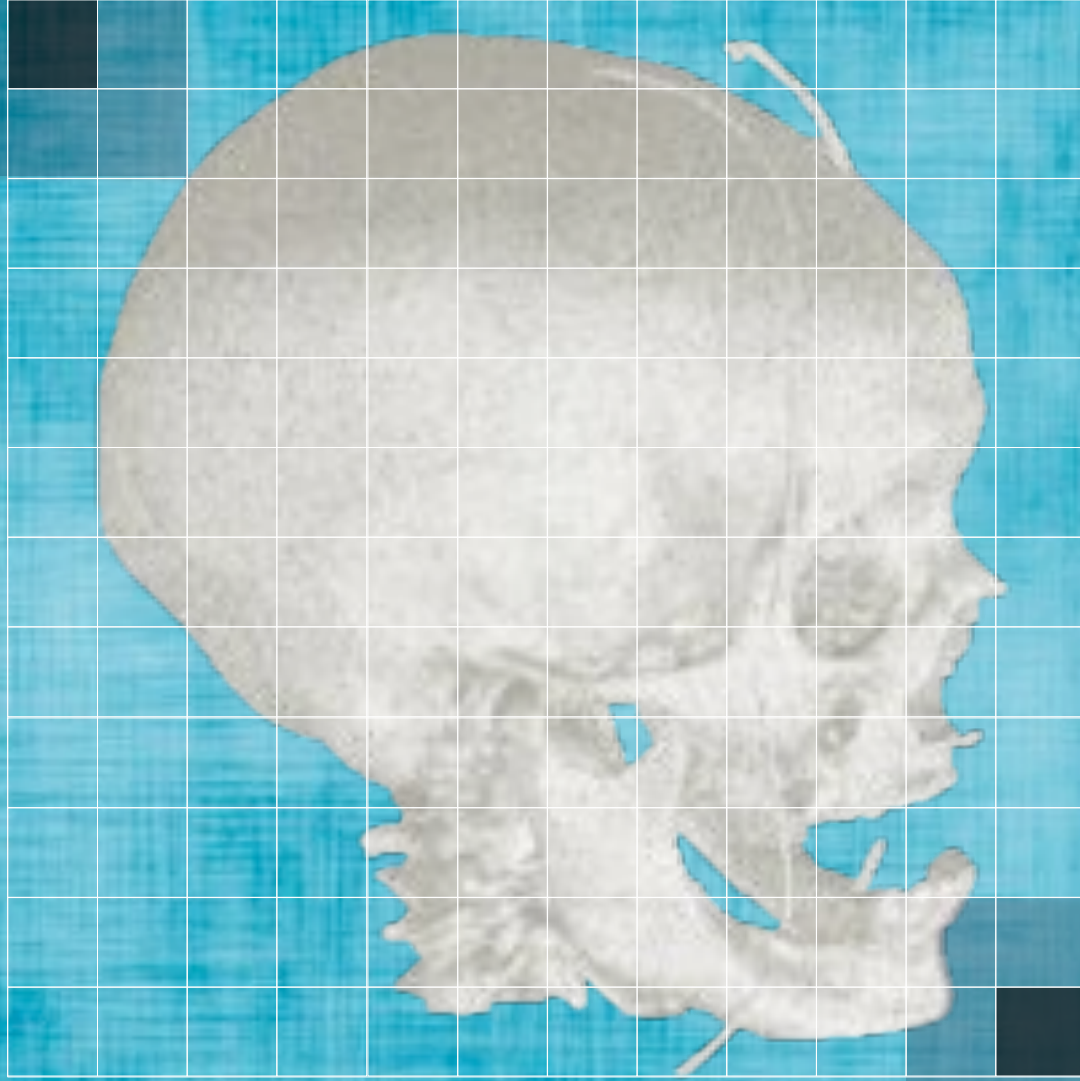
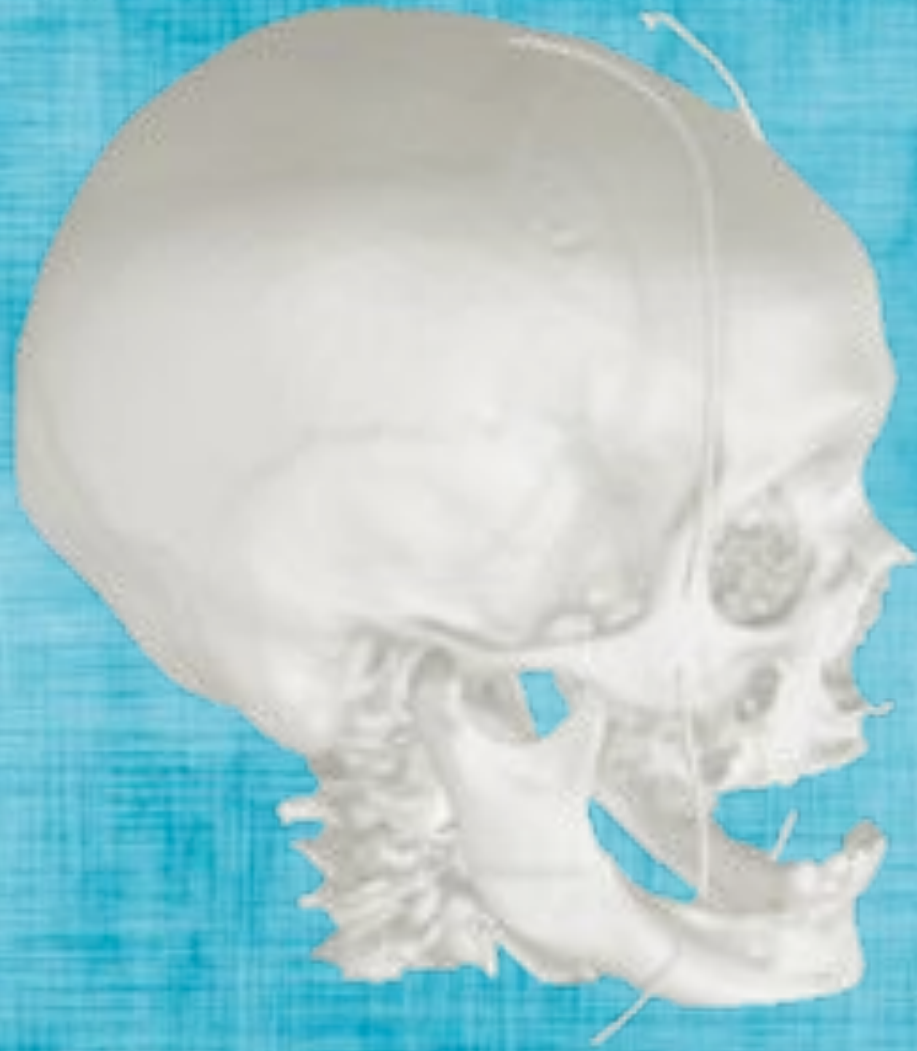


IMAGE PROCESSING



RESULT

ONE MORE **COLORING IMAGE**

IMAGE PROCESSING

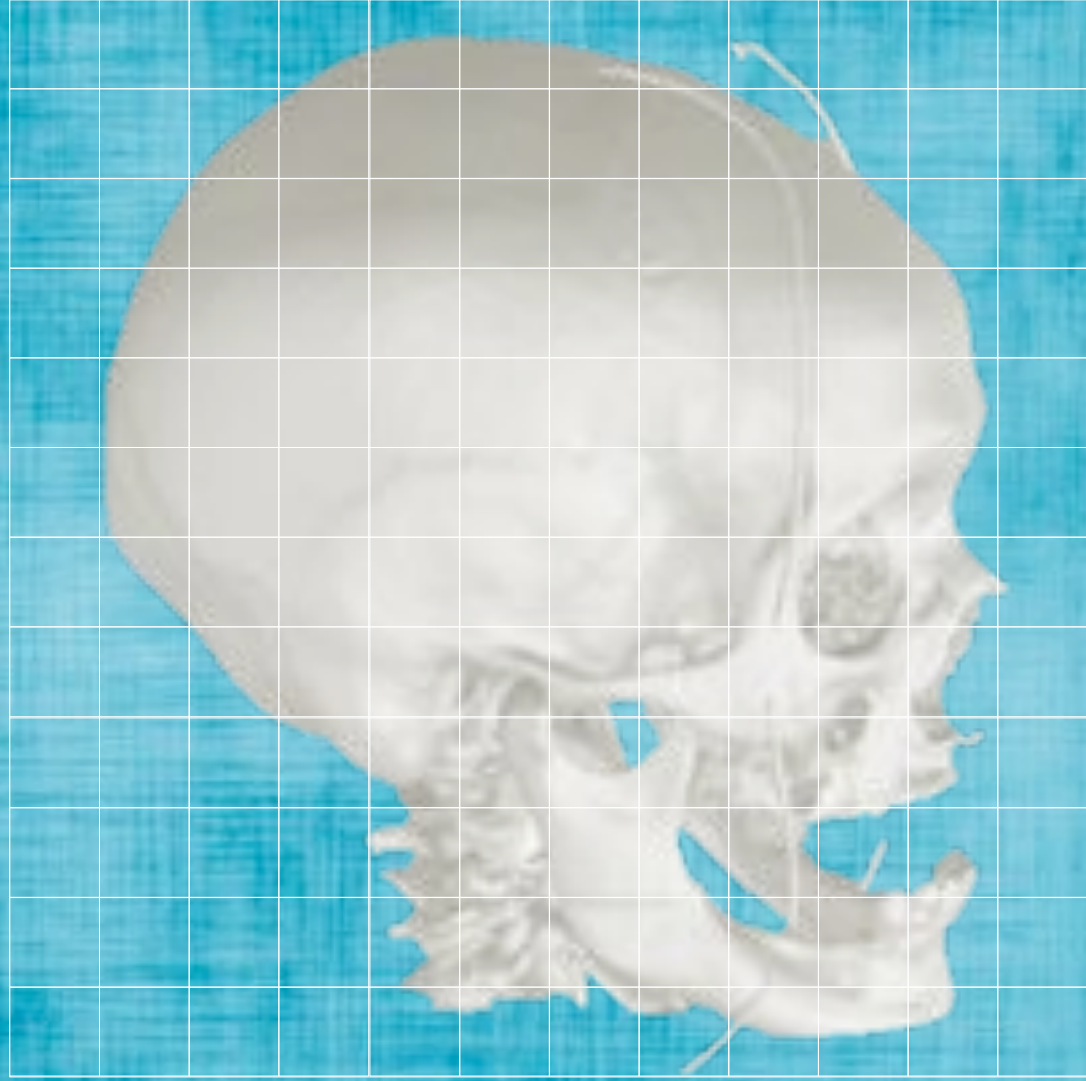


IMAGE PROCESSING

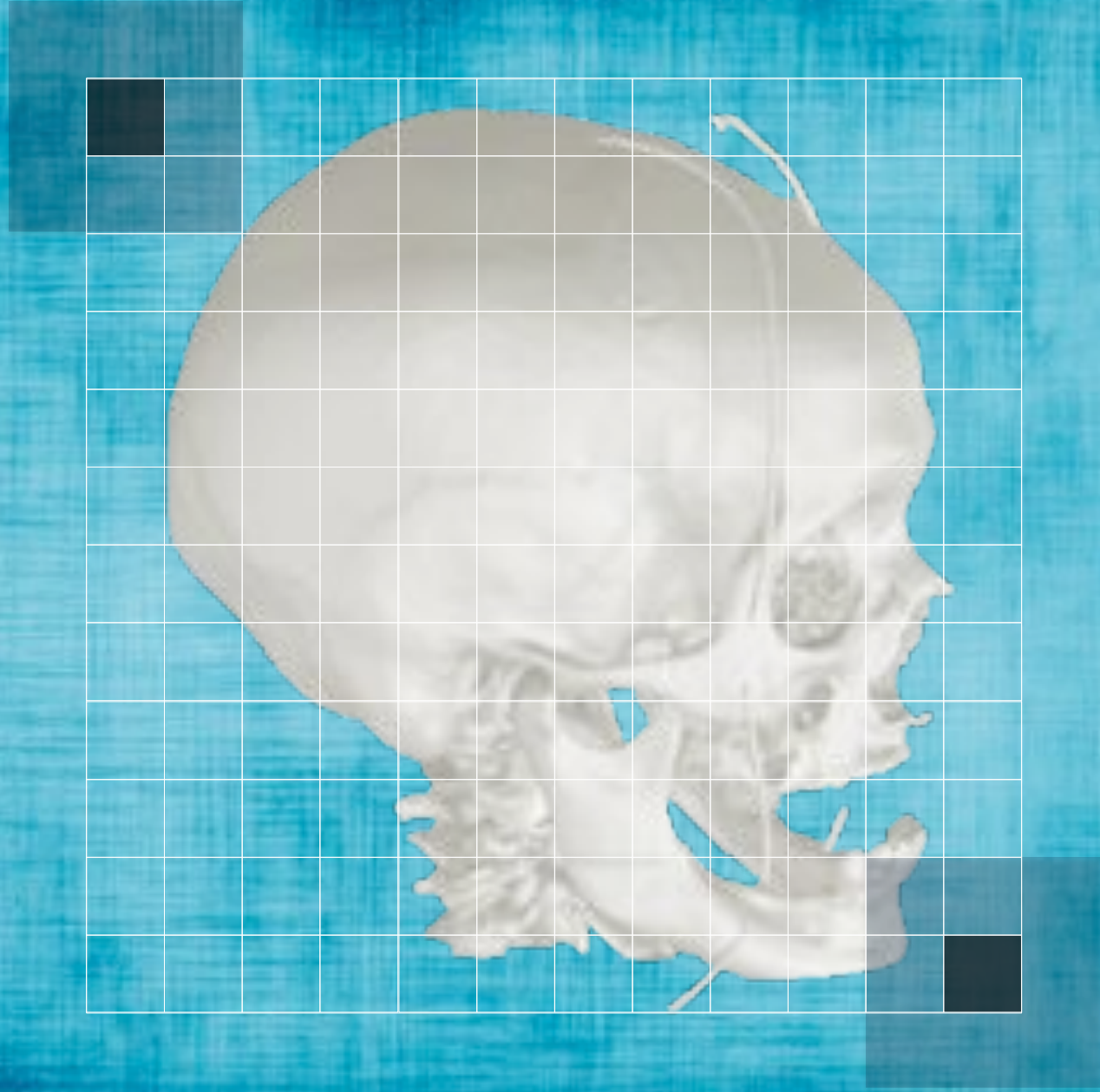


IMAGE PROCESSING



ALGORITHM IMPLEMENTED
SUCCESSFULLY

BUT

TIME NEEDED TO SOLVE
PROBLEM

20 MINs



IDEA





ALGORITHM IMPLEMENTED
SUCCESSFULLY

AND

TIME NEEDED TO SOLVE
PROBLEM

~~25~~
4

MINs



WRAP UP

PROBLEM IMAGE PROCESSING
SUCCESSFUL SOLUTION

TIME CRITICAL FACTOR
PERFORMANCE SO BAD

SOME GREAT **IDEA** + **CONCEPTS**

RESOURCES AFFORDABLE

IDEALLY **SPEED UP** $\approx 4X$ *AMDAHL'S