EURECOM
Sophia Antipolis

Graduate school and research center in digital science

Hold The Line

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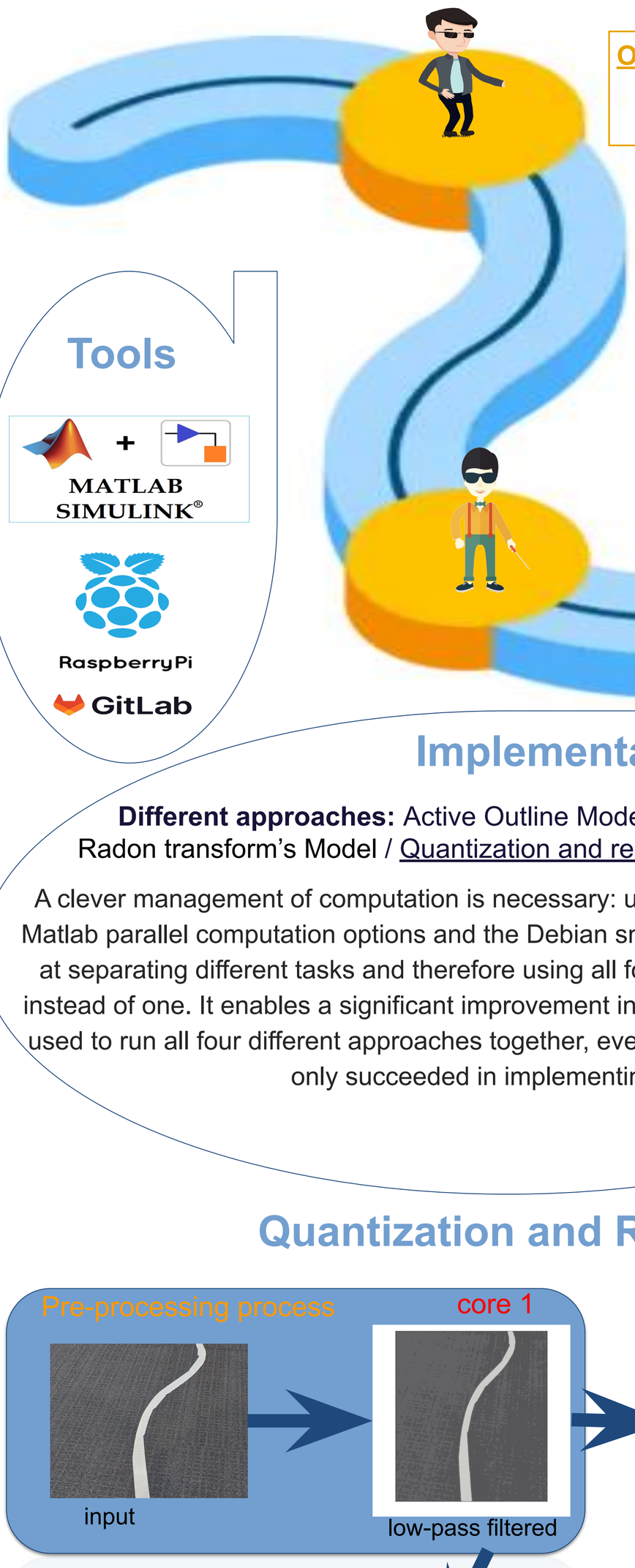


Objective: Develop a system capable of guiding a vision impaired person through an obstacle course by getting a visual input, and providing an audio output using a line following algorithm.

Setup

A Rasberry Pi camera module 2: Get the visual input to analyse the scene
Raspberry Pi 4 model B 2 GB RAM powered by a PIJuice Hat: Develop the algorithm
Headphones: Provide spatial location by getting audio feedback

Tools

MATLAB SIMULINK®

RaspberryPi

GitLab

Implementation

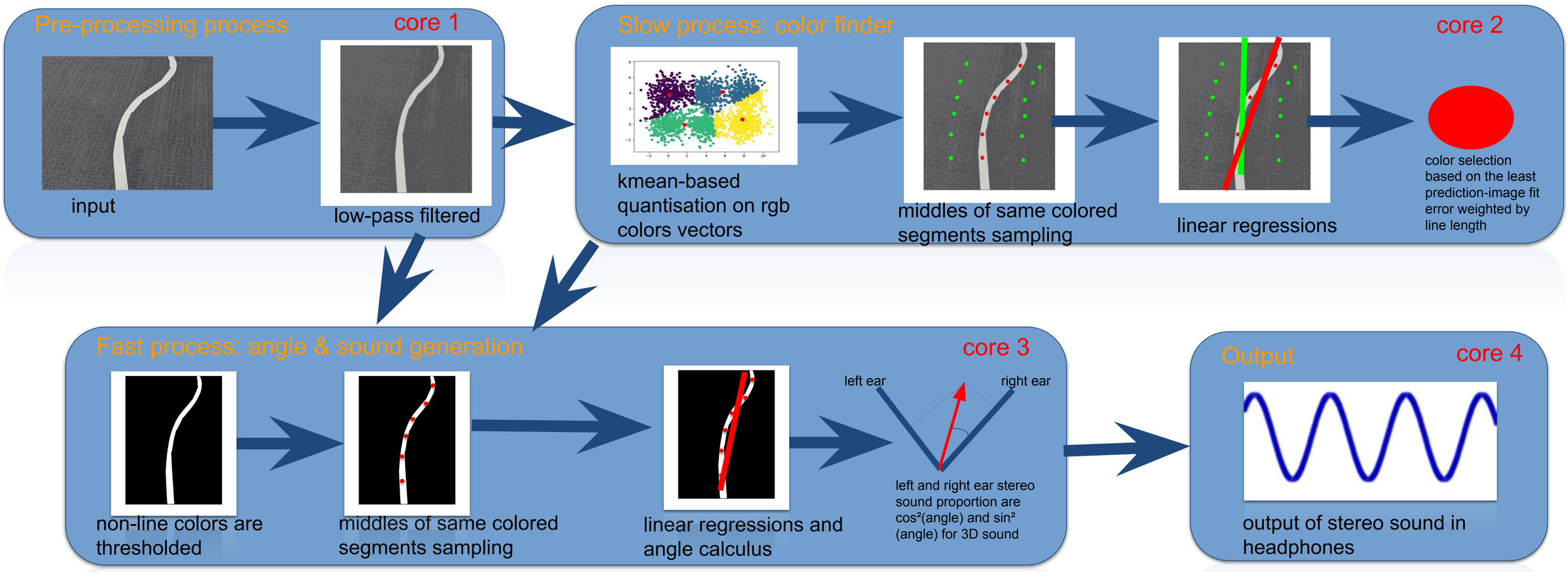
Different approaches: Active Outline Model / Middle Edge Model / Radon transform's Model / Quantization and regression Model

A clever management of computation is necessary: using different tasks and using Matlab parallel computation options and the Debian smart gestion of tasks, we arrive at separating different tasks and therefore using all four cores of the Raspberry Pi instead of one. It enables a significant improvement in system efficiency. Multicore is used to run all four different approaches together, even if, for the moment, we have only succeeded in implementing one.

Results

After having experimented with this system and set up parameters, all 20 tries have been successful. The processor is at 20% of its capacity, and the RAM is almost empty. The Raspberry Pi is overpowerful for this job.

Quantization and Regression Model



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