TREE RING PROJECT - PRELIMINARY IDEAS

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SYSTEM OVERVIEW

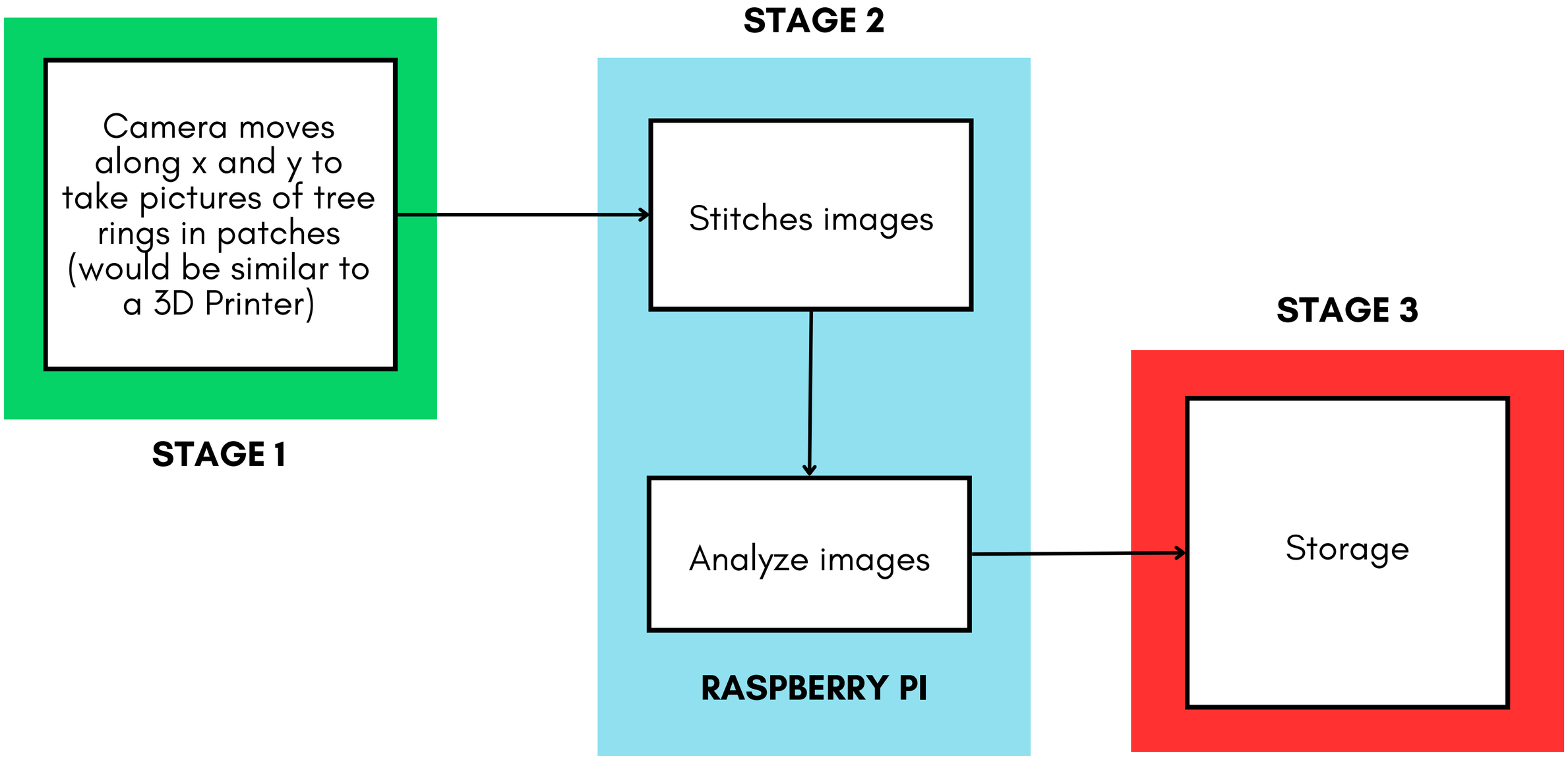
GOAL

- **Purpose:** Measuring and analyzing tree cookies and core in batch
  - Diameters vary from several mm to 50cm
  - Want both data and images
  - Parameters extraction: distance between tree rings
- **Space:** 1/3 of a lab bench ideally
- **Speed:** Similar or faster than CaptuRing and Skippy
- **Storage:** Server space & External storage
- **Life Cycle:** 3+ years?

LINKS

- **Current Options:**
  - CaptuRing: https://www.sciencedirect.com/science/article/pii/S1125786522001011
  - Skippy: https://www.wsl.ch/en/services-and-products/research-instruments/skippy.html
- **Working Repository** (Nothing on there yet...): https://github.com/soleil-nocturne123/TreeRing

SYSTEM OVERVIEW - BLOCK DIAGRAM



STAGE 1

MECHANICAL (3D Print?)

1. Camera Holder
2. Rails
    - Try taking pictures of tree rings to determine the range of vertical distance
    - Try small horizontal rails with a fixed vertical axis

ELECTRICAL

1. Choosing motor
2. Control the camera movements and data storage
    a. Using Raspberry Pi
        - A lot of wiring! Limitation in movements.
        - Don't have to worry too much about communication between the 2 boards.
    b. Using a separate microcontroller (Preferred)
        - Neat wiring.
        - Communication between Raspberry Pi and this microcontroller.
        - Battery.

STAGE 2

DATA STORAGE

1. How much data can be stored and processed on Raspberry Pi at times

IMAGES STITCHINGS AND ANALYSIS (Try stitching and analyzing tree ring images using the following options)

1. OpenCV
2. PTGui
3. ImageJ
4. Other libraries/packages as long as it can be automated on Raspberry Pi

STAGE 3

STORAGE OPTIONS

- Server and/or External Storage?
- Compatible (ie. easy data transmission) with Raspberry Pi
- Try saving tree rings images to see how much data we need

CURRENTLY...

Sylvia

- 3D filament
- Raspberry Pi
- Some other microcontrollers
- Elec lab equipment: DC supply, oscilloscope, function generator, breadboard, etc.
- Unfortunately, the 3D Printer Sylvia has access to is broken :'(Will try to find alternatives

In the lab

- Camera

Where can we find...

- Tree cores and cookies