

High-Level Sprout Geometry Extraction

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1. INTRODUCTION

The objective of this program is to extract the high-level geometric features of blood vessel in pictures. The high-level geometry of a blood vessel comprises of a bead and several sprouts.

In addition to the High-Level Sprout Geometry (HLSG) Extractor, a driver is implemented to perform feature extraction on sample images and analyze the extracted features.

2. DATA STRUCTURES

The following data structures are used to implement the HLSG Extractor.

2.1 Bead Feature

A bead feature is an abstraction of the transverse view of the primary blood vessel from which other blood vessels sprout from. The geometry of the bead is described by the descriptor below.

Bead
center
radius
sprouts

Figure 1: Bead Descriptors

2.2 Sprout Feature

A sprout feature is an abstraction of the blood vessels that sprout from a designated bead. Subsequently, sprout feature extraction is dependent upon bead descriptors.

2.3 Driver

The Driver is responsible for parsing input from the client and emulating the encoded actions as functions of the HLSG Extractor. That is, the Driver acts similar to a REPL (Read-Eval-Print-Loop) that reads input from the client, evaluates the input and prints the corresponding output in a loop. The set of commands available to the client is outlined Table 3.

Sprout
bead
centroid
length
width
branches

Figure 2: Sprout Descriptors

Command	Output	Description
extract [file]	HLSG of file	Extracts the HLSG of the given file.
extract [files]	HLSG of files	Extracts the HLSGs of the given files.
exit	Goodbye	Exits the program.

Table 1: Commands

3. SYSTEM ARCHITECTURE

1. A

4. PSEUDO CODE

This section outlines the pseudo-code for the Driver and HLSGExtractor operations.

4.1 Driver

The following pseudo-code outlines the Driver which reads input from the client, evaluates the input as a command, prints the output as a consequence of executing the command and then repeats this sequence of operations.

Note that the driver executes while the running flag is true. Consequently, the File System is responsible for setting this flag false.

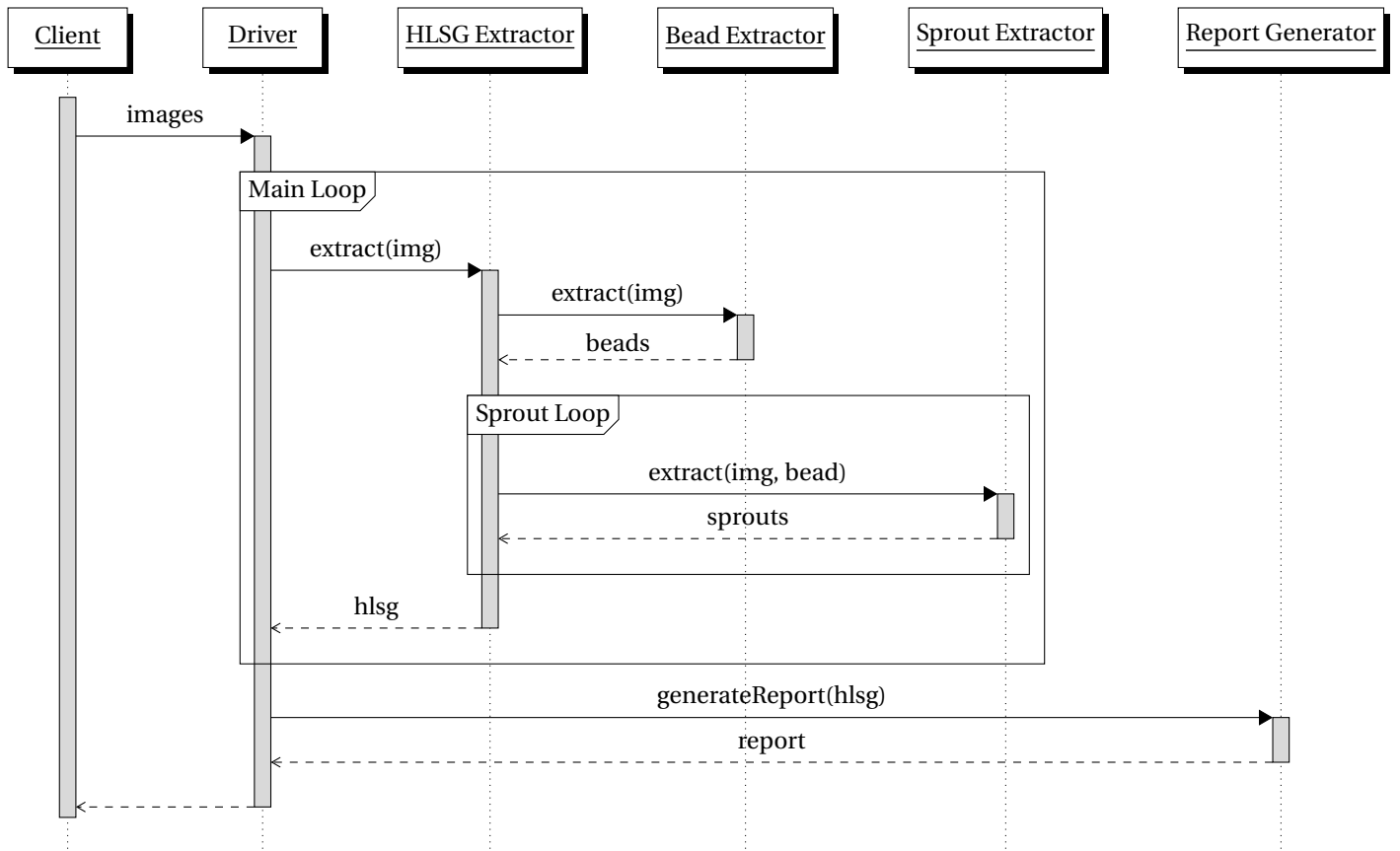


Figure 3: High-Level Architecture

Algorithm 1 Driver

```

procedure DRIVER
  running  $\leftarrow$  True
  while running do
    input  $\leftarrow$  read_input()
    command  $\leftarrow$  parse(input)
    output  $\leftarrow$  HLSGExtractor.execute(command)
    print(output)
  end while
end procedure
  
```
