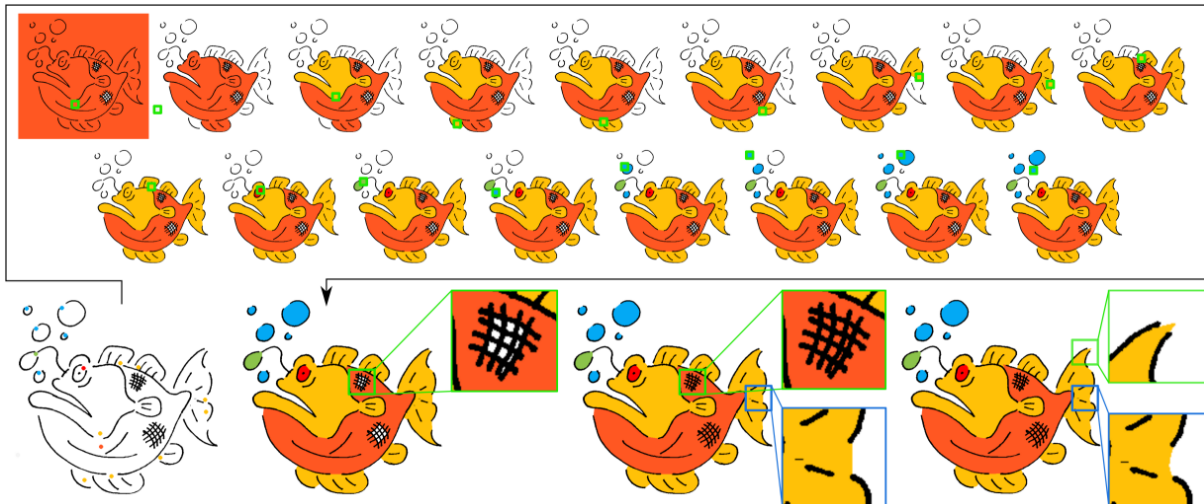# Colouring sketches with gaps

Description:

Colouring raster contour images, such as line arts, is an essential step in many image manipulation tasks. Flood-fill, applied by the bucket filling tool present in most standard software such as Microsoft Paint or GIMP, is a simple solution for colour filling. Unfortunately, it cannot handle contours with gaps, although gaps are a common error in hand-drawn line art. In this project, the primary objective is to implement the extension (as in [1]) of the "Delaunay grouping" idea introduced in [2] further by including:

1. Colour diffusion (to spread colours inside small uncoloured regions such as hatches)
2. Aesthetic contour completion (to finish the gaps in a visually pleasing manner)

If found interesting, the students can also think of how to extend this Delaunay grouping to handle temporal consistency - how to propagate colours from one image to another (as in LazyBrush [2]) so that colouring different frames in a 2D animation movie will be easier.

Implementation difficulty: It should be easy and straightforward since I will be giving the C++ code for "Delaunay grouping"

Prerequisite: Good programming skills in C++ and need basic knowledge in OpenCV and CGAL

Supervisor: Amal Dev Parakkat (amal.parakkat@telecom-paris.fr) - Assistant Professor, LTCI - Telecom Paris, IP Paris

References:

[1] Amal Dev Parakkat, Pooran Memari, Marie-Paule Cani, "Delaunay Painting: Perceptual image coloring from raster contours with gaps", Computer Graphics Forum (to appear) - email me for a copy

[2] Amal Dev Parakkat, Prudhviraj Madipally, Harihara Gowtham, Marie-Paule Cani, "Interactive Flat Coloring of Minimalist Neat Sketches", Eurographics 2020 short paper

[3] Daniel Sykora, John Dingliana, Steven Collins: Lazybrush: Flexible painting tool for hand-drawn cartoons. Computer Graphics Forum 28, 2 (2009)

[4] Lvmin Zhang et al., "User-guided line art flat filling with split filling mechanism", CVPR'21