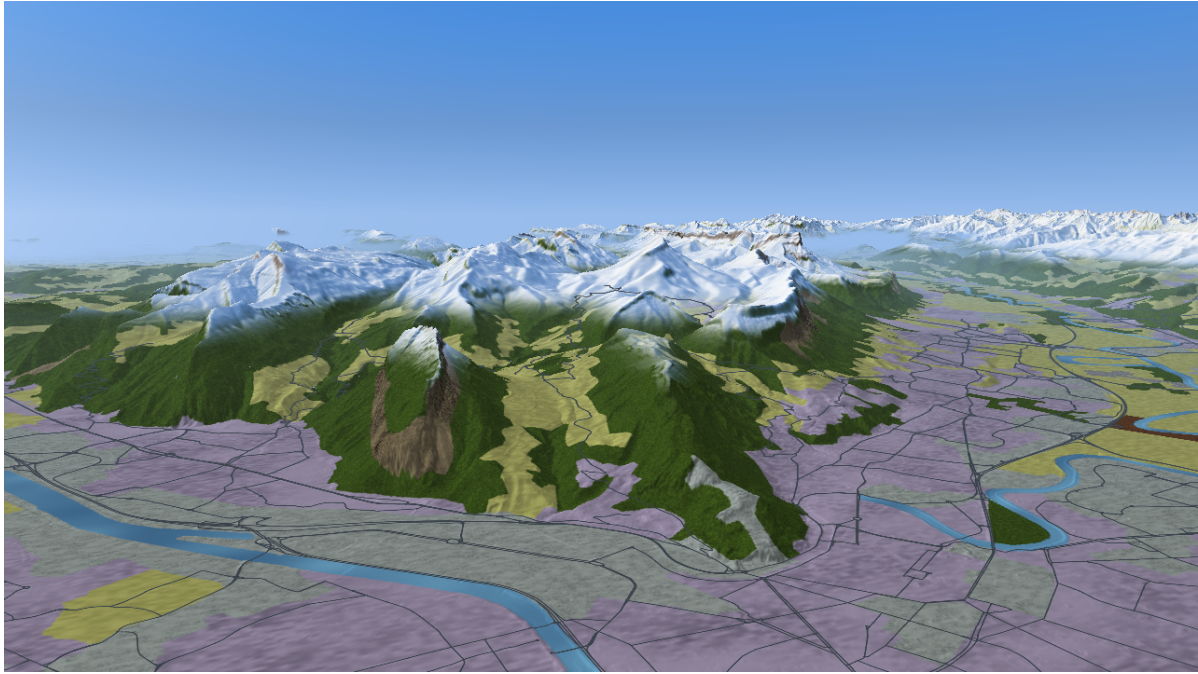# Deep stylization of panorama maps

The internship will take place in the [Maverick](#) team at Inria Grenoble and be supervised by Romain Vergne, Jolle Thollot, Nolan Mestres and Thibault Tricard

Context

Panoramas are a specific type of map that transcends the boundary between cartography and art. They are excellent pictorial devices for visualizing landscapes, especially ski areas, for which the panorama has become a cartographic standard. However, very few artists or cartographers are able to draw visually pleasant and efficient panoramas. Indeed, a realistic view, or even a photograph, of a landscape does not provide the same legibility as a map. Therefore, drawing a panorama requires specific skills: the ability to understand and represent a landscape in 3D in a style that lies in between a painting and a 2D map.

With the availability of full GIS (geographic information systems), we now have access to cartographic data that can be used to produce panoramas using a computer. The recent progress in computer graphics research allows the production of realistic renderings of 3D landscapes. However, the specific style of the best panoramists is still not fully reproduced by the scientific community.

In this project, our goal is to design a process to produce panoramas starting from cartographic and topographic data as can be provided by [IGN](#) or [OpenStreetMap](#). For that, we collaborate with Arthur Novat in order to understand and formalize the various steps of the drawing of a panorama. Arthur is the son of Pierre Novat who founded [The Atelier Novat](#) in the 60's that became the French standard for mountain panoramas.

Internships project: Neural style transfer for stylizing panorama maps

The goal of this project will be to explore neural transfer methods to stylize panorama maps. While many style transfer networks exist to manipulate images or videos, the main difficulty here will be to precisely control how each cartographic element is rendered. For instance, a road must be at the right location after being rendered, and the final image should be legible, whatever the style used.

To that end, the network will rely on G-buffers, to guide the stylization process. Our current system is able to extract numerous information such as depth/normal maps, roads, lakes, nature of the terrain, type of trees, etc. The student will be able to select among these data to obtain the desired result. After a bibliographic stage, he will propose an architecture to produce various map styles.
One of the key aspect of the internship, will be to adapt recent architectures from the state of the art so that the style transfer doesn't affect the legibility of the stylized result nor its topological accuracy.
To achieve this the student will be involved in the definition of metrics to compare real world data, and stylized results.

Geographic inputs   Stylized result
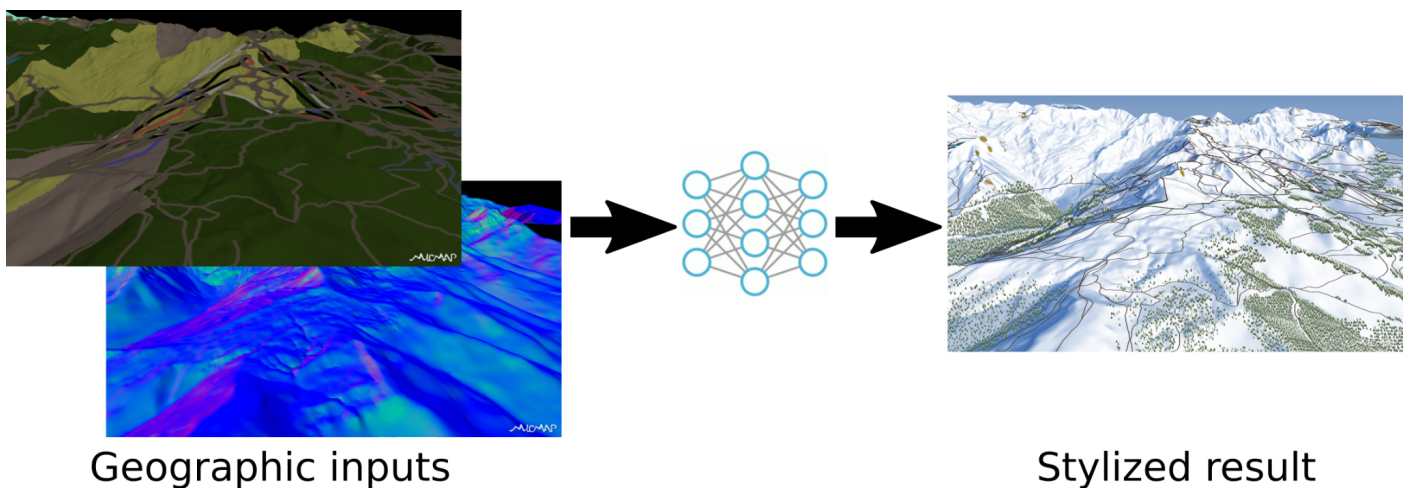
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