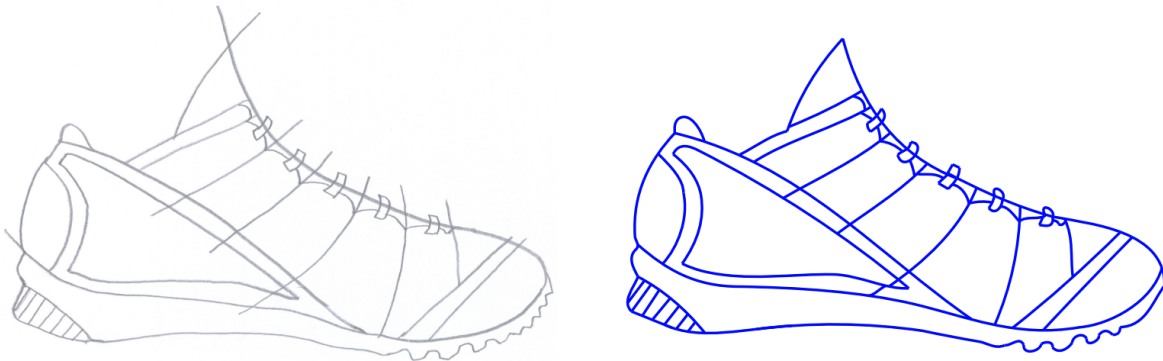# Bezier curve fitting



**Description:**

As explained in the IGR202 class, we have a special interest in vector graphics (where shapes are represented by a set of parametric curves - usually Bezier curves) due to their compactness, editability and crispiness. But unfortunately, for a novice user, it is easier to create raster drawings (where the shape is represented by a set of pixels). So, the main objective of this project is to convert a given raster contour drawing into a set of easily editable vector curves while preserving two properties:

1. Fidelity: The parametric curves should approximate well the input drawing.
2. Simplicity: The result should be composed of a small number of curves with few control points to preserve the compactness and editability of vector graphics

Though the project's primary goal is to adapt the methodology from "Fidelity vs. Simplicity: a Global Approach to Line Drawing Vectorization" paper (concentrating only on the fitting part, assuming that a skeleton with open curves is given), the generic curve fitting is an open and unsolved research problem. So there are many scopes (from a research perspective) to come up with many clever, intuitive and better solutions if the students are interested in working further.

**Implementation difficulty:** It should be easy and straightforward
**Prerequisite:** Good programming skills (preferably in C++), basic knowledge of optimization

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**References:**

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[2] Mikhail Bessmeltsev and Justin Solomon. 2019. Vectorization of Line Drawings via Polyvector Fields. ACM Trans. Graph. 38, 1, Article 9 (February 2019) DOI:https://doi.org/10.1145/3202661
[3] Stanko, Tibor; Bessmeltsev, Mikhail; Bommes, David; Bousseau, Adrien (2020). Integer-Grid Sketch Simplification and Vectorization. Computer graphics forum, 39(5), pp. 149-161 DOI:http://dx.doi.org/10.1111/cgf.14075