Empirical study of the topology and geometry of deep networks (Supplementary material)

1. Paths
Figure 1: **Scenario 1.** Classification regions (shown with different colors), and illustration of different paths between images $x_1, x_2$. **Left:** The convex path between two datapoints might not be entirely included in the classification region (note that the linear path traverses 4 other regions). **Right:** Illustration of a nonconvex path that remains in the classification region. The image is obtained by stitching normal cross-sections spanned by $r(x_1)$ (adversarial perturbation of $x_1$) and $p_i - p_{i+1}$ (two consecutive anchor points in the path $\mathcal{P}$).

Figure 2: **Scenario 2.** Classification regions (shown with different colors), and illustration of different paths between images $x_1$ and $x_2 = \tilde{x}_2 + r$, where $r$ is the targeted adversarial perturbation. **Top:** The convex path between two datapoints might not be entirely included in the classification region. **Bottom:** Illustration of a nonconvex path that remains in the classification region. The image is obtained by stitching normal cross-sections spanned by $r$ and $p_i - p_{i+1}$ (two consecutive anchor points in the path $\mathcal{P}$).
Figure 3: **Scenario 3.** Classification regions (shown with different colors), and illustration of different paths between images $x_1, x_2$. **Top:** The convex path between two datapoints might not be entirely included in the classification region. **Bottom:** Illustration of a nonconvex path that remains in the classification region. The image is obtained by stitching normal cross-sections spanned by $r(x_1)$ (adversarial perturbation of $x_2$) and $p_i - p_{i+1}$ (two consecutive anchor points in the path $P$).