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November 2022

What if there is uncertainty in the probability itself?

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What if there is uncertainty in the probability itself?

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We usually use probability to quantify our statement on the uncertain events in our daily life. If we look at the following Figure 1, at your first glance, does it look like a rabbit or duck? Then turn to Figure 2 to answer the same question. You may find that your answer on "whether it is more like a rabbit or duck" is different for these two figures, but actually, they are the same except for the difference in rotation angle. Under different rotation angles, our probability assessment of these two figures will be different.

We can see that sometimes there indeed exists uncertainty in the *probability* itself. In statistics, it is formally called *model uncertainty*. We have developed a new framework called the semi-*G*-structure to better quantify this kind of uncertainty and it will bring a new theoretical perspective to the study of model uncertainty.
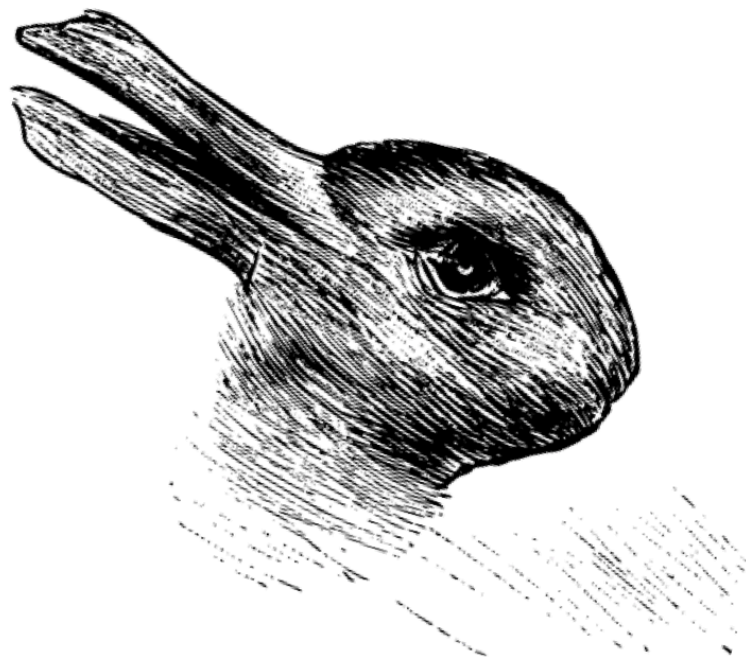
Figure 1: Rabbit-duck illusion: at your first glance, does it look like a rabbit or duck?
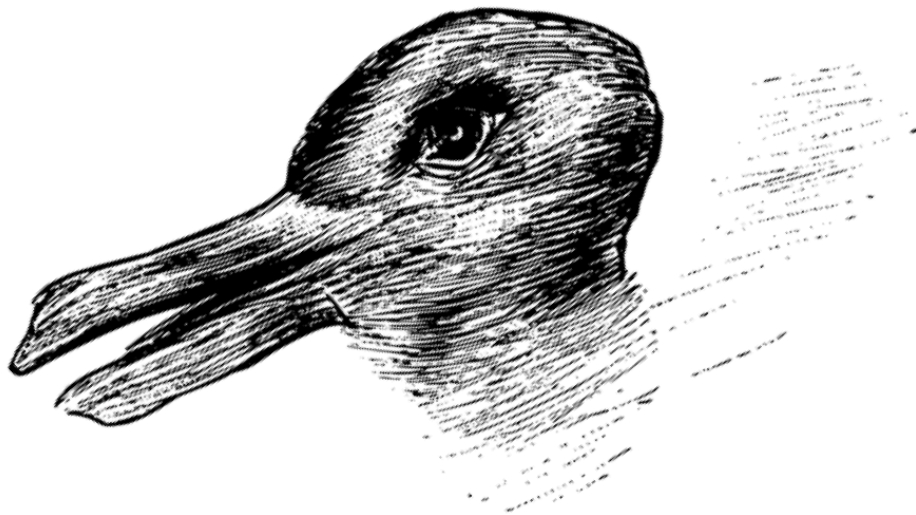
Figure 2: Rabbit-duck illusion: at your first glance, does it look like a rabbit or duck?