AI in Medicine I
WiSe 2022/23

Technical University Munich
Department of Informatics

I31 - AI in Medicine and Healthcare
I32 - Computational Imaging in AI and Medicine

Theoretical exercise 9 — 12. Dec. 2022

Probabilistic ML

The solutions will be discussed in the tutorial session

15. Dec 2022, 4-6 p.m. in lecture hall 5901.EG.051

For questions regarding this exercise sheet, please contact: `g.kaisis@tum.de`
For general questions, please contact: `course.aim-lab@med.tum.de`

1. Question 1
   (a) Define the following terms:
   - Probability Distribution
   - Probability Density/Mass Function
   - Cumulative Distribution Function
   - Likelihood
   - Random Variable

   (b) What is the relationship between the Probability Density Function and the Cumulative Distribution Function?

2. Question 2

   Name and briefly describe the two kinds of uncertainty.

3. Question 3
   (a) Describe the three components of the "Probabilistic Process".

   (b) Describe the four components of the Bayesian Modelling framework.

4. Question 4 **(Thursday content)**

   Briefly describe (in your own terms) what it means for a predictor to be well calibrated.

5. Question 5 **(Thursday content)**

   Name one advantage and one disadvantage for each, a *sampling*-based and an *optimisation*-based approach to approximate inference?