Ethics and AI Bias Awareness

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. When an AI gives unfair or less accurate results for some groups, this is called:
   (a) clustering **(b)** efficiency **(c)** abstraction **(d)** bias

2. A training set has 400 examples: 192 voices of children, 96 voices of adults, 112 voices of older people. What percentage are voices of children?
   (a) 52% **(b)** 192% **(c)** 58% **(d)** 48%

3. A training set has 400 examples: 80 photos taken in the day, 208 photos taken at night, 112 photos taken indoors. The model will probably make the most mistakes on the group with the fewest examples. Which group is that?
   (a) photos taken in the day **(b)** photos taken at night
   (c) photos taken indoors **(d)** all groups equally

4. A model was tested on 25 voice clips of children (25 right) and 25 voice clips of adults (19 right). On which group is it less accurate?
   (a) cannot be worked out **(b)** voice clips of children
   (c) equally accurate on both **(d)** voice clips of adults

5. A model was tested on 50 day photos (39 right) and 50 night photos (29 right). How many percentage points apart are its accuracies on the two groups?
   (a) 15 **(b)** 10 **(c)** 20 **(d)** 25

6. What problem is most likely with a handwriting reader trained only on neat writing?
   (a) it may misread messy writing **(b)** it may predict winter badly
   (c) it may misread everyday chat and slang **(d)** it may fail more often at night

7. Which is a responsible use of AI or data?
   (a) checking an AI tool’s answer in a textbook
   (b) agreeing to share data without reading what it is for
   (c) trusting an AI tool’s answer without checking
   (d) testing a model only on the examples it was trained on

8. Which is NOT a responsible use of AI or data?
   (a) reading what data an app collects before agreeing
   (b) checking an AI tool’s answer in a textbook
   (c) testing a model only on the examples it was trained on
   (d) testing a model separately on each group of examples

Section B — Short answer — 8 × 2 = 16 marks

9. What is bias in AI?

10. A training set has 400 examples: 200 photos taken in the day, 72 photos taken at night, 128 photos taken indoors. What percentage are photos taken at night?

11. A training set has 50 examples: 27 voices of children, 13 voices of adults, 10 voices of older people. The model will probably make the most mistakes on the group with the fewest examples. Which group is that?

12. A model was tested on 50 recordings from quiet rooms (42 right) and 25 recordings from noisy rooms (25 right). On which group is it less accurate?

13. A model was tested on 25 recordings from quiet rooms (17 right) and 25 recordings from noisy rooms (13 right). How many percentage points apart are its accuracies on the two groups?

14. What problem may each have: (a) a face-unlock model trained mostly on daytime photos (b) a speech model trained mostly on adults' voices

15. A model is tested on 100 pictures of fruit it has never seen. It labels 79 of them correctly. What is its accuracy?

16. A child shares a photo with 4 friends. Each of them shares it with 4 new people, and so on, for 2 rounds of sharing in all. How many people (not counting the child) have received the photo?

Section C — Word problems — 4 × 4 = 16 marks

17. A training set has 180 day photos and 20 night photos. (a) What percentage are night photos? (b) What problem may the model have? (c) Suggest a fix.

18. A model was tested on 50 samples of neat handwriting (49 right) and 25 samples of messy handwriting (20 right). (a) What is its accuracy on samples of neat handwriting, as a percentage? (b) On samples of messy handwriting? (c) On which group is it less accurate?

19. A training set has 50 examples: 19 pictures of red apples, 15 pictures of green apples, 16 pictures of yellow apples. (a) What percentage are pictures of red apples? (b) What percentage are pictures of green apples? (c) Which group has the fewest examples, so the model may make the most mistakes on it?

20. Match each with its likely problem: (a) a fruit sorter trained only on red apples (b) a face-unlock model trained mostly on daytime photos (c) a translation tool trained mostly on formal writing. Choose from: it may misread everyday chat and slang; it may fail more often at night; it may reject good green apples.

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Answer key

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Q	Answer	Working
1	**(d) bias**	—
2	**(d) 48%**	192 ÷ 400 × 100
3	**(a) photos taken in the day**	fewest: 80 of 400
4	**(d) voice clips of adults**	voice clips of children: 100%, voice clips of adults: 76%
5	**(c) 20**	day photos: 39/50 = 78%; night photos: 29/50 = 58%
6	**(a) it may misread messy writing**	—
7	**(a) checking an AI tool's answer in a textbook**	—
8	**(c) testing a model only on the examples it was trained on**	—
9	**When an AI system gives unfair or less accurate results for some people or groups, often because of its training data.**	—
10	**18%**	72 ÷ 400 × 100
11	**voices of older people**	fewest: 10 of 50
12	**recordings from quiet rooms**	recordings from quiet rooms: 84%, recordings from noisy rooms: 100%
13	**16**	recordings from quiet rooms: 17/25 = 68%; recordings from noisy rooms: 13/25 = 52%
14	**(a) it may fail more often at night (b) it may misunderstand children**	—
15	**79%**	79 ÷ 100 × 100
16	**20**	4 + 16: once shared, a post is hard to take back
17	**(a) 10%. (b) It may make more mistakes on night photos. (c) Add many more night photos so both groups are well represented, then test on each group.**	—
18	**(a) 98%; (b) 80%; (c) samples of messy handwriting**	49/50 × 100 and 20/25 × 100
19	**(a) 38%; (b) 30%; (c) pictures of green apples**	each count ÷ 50 × 100; fewest: 15
20	**(a) it may reject good green apples (b) it may fail more often at night (c) it may misread everyday chat and slang**	—

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