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| **Lesson Title** |
| How AI labels the world (AI Classification Systems) |
| **Introduction**  |
| Classification systems are a fundamental type of AI that sorts data into predefined categories based on patterns it has learned. It uses a *supervised learning* technique where models are trained on labelled datasets. Given new, unseen data, the model predicts which category it belongs to. This approach is widely used, e.g. in spam filtering, medical diagnostics, facial recognition, and self-driving cars.**Example:** A spam filter is trained on thousands of emails labelled as "spam" or "not spam." When it encounters a new email, it classifies it based on patterns learned from the training data. Understanding how AI Classification models work will help learners to appreciate the power and limitations of AI-driven decision-making. This lesson introduces students to how the models work, their real-world applications, and ethical considerations. |
| **Materials required** |
| * One device with internet access (e.g. teacher laptop connected to smart screen)
* Access to either [Google Teachable Machine](https://teachablemachine.withgoogle.com/) or [GenAI Teachable Machine](https://tm.gen-ai.fi/image/general) (a non-commercial version developed by educators in Finland)
* Individual devices for learners **only** if doing the optional “Save the Rhinos” activity
* Access to a webcam (if doing the Teachable Machine activity with your own ‘Blorps and Glixers’ drawings) – alternatively you can use the ‘Apples vs tomatoes’ version of the activity.
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| **Learning Outcomes** |
| * Identify real-world examples of AI classification systems, including for good (cancer detection, wildlife conservation, detecting financial fraud, spam filters).
* Understand how AI learns to classify data, including training with labelled examples, and how skewed data sets can lead to classification errors.
* Recognize the potentially dangerous consequences of classification errors.
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| **Curriculum Links** |
| Links to CfE Es & Os (To be filled in presently…) |

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| **Lesson Outline** (with rough timings if appropriate) |
| 5 min | **Introduction:** Slides covering how AI Classifiers work and listing real-world examples. |
| 30 min | **Defend the Rhino interactive live lesson (Optional, Online)** This activity requires individual devices for learners (or one per pair) with internet access. |
| 5 min | **Classify Like an AI:** Look at training images to learn how to tell two fictional alien species apart. |
| 30 min | **Train your own Classifier with Teachable Machine (Online):** Use the provided materials on the fictional alien Blorps and Glixers, or use [Raspberry Pi’s materials on “apples vs tomatoes”](https://projects.raspberrypi.org/en/projects/apple-vs-tomato/4), or use the “AI midge project” lesson in the RAI computing pack. |
| 10 min | **Discussion:** discussion prompts and 3 min video. |

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| **Additional resources** |
| You may wish to discuss some topical Case Studies:* *Facial Recognition Bias:* Studies have found that facial recognition algorithms can exhibit significant biases, particularly against darker-skinned women, with error rates as high as 34%. [news.mit.edu](https://news.mit.edu/2018/study-finds-gender-skin-type-bias-artificial-intelligence-systems-0212?utm_source=chatgpt.com)
* *Federal Study on Algorithmic Bias:* A federal study revealed that many facial recognition algorithms are less accurate for certain demographics, leading to concerns about their use in law enforcement and security. [theverge.com](https://www.theverge.com/2019/12/20/21031255/facial-recognition-algorithm-bias-gender-race-age-federal-nest-investigation-analysis-amazon?utm_source=chatgpt.com)
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