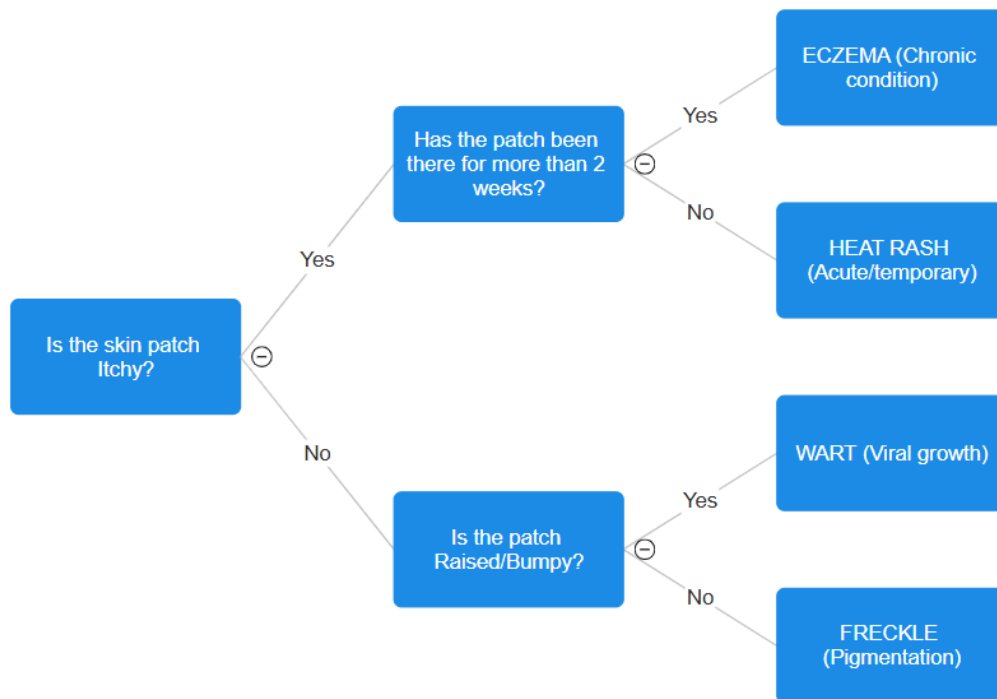


AI and machine learning – Challenge

Challenge 1 - follow the decision tree

You are the AI. Use the decision tree to classify the four "Test Patients" who have just entered the clinic.



Patient ID	Symptom 1: Itchy?	Symptom 2: Observation	Your AI prediction
001	Yes	"I only noticed it this morning."	
002	No	"It's a flat brown spot on my arm."	
003	Yes	"I've had this itchy patch for a month."	
004	No	"It's a small, hard lump on my finger."	

Extension: The hospital wants to expand the "Dermato-Logic" AI to distinguish between a **freckle** and a **dysplastic nevus** (a "pre-cancerous" mole that looks like a freckle but is dangerous). Currently, the "Not Itchy" path leads to "Freckle" or "Wart" based only on whether it is raised. Both a freckle and a pre-cancerous mole are often **flat** and **not itchy**. This model is currently failing to tell them apart.

1. Look at the "New Data" below
2. Identify a **new feature** (a question) that can separate the two.
3. Draw the decision tree with the new branch on your decision tree to include this check. OR use <https://app.smartdraw.com/>

Sample A (Freckle): Flat, Brown, Perfectly Circular, Single colour.

Sample B (Pre-Cancerous): Flat, Multi-coloured (brown/black), Jagged edges, Growing larger.

Challenge 2: Debugging task 1 - The "snow leopard" tracker

Find the **4 errors** that are causing the issues with the AI model. Add to the status column if the data would be OK or cause an error. If an error is generated, describe why the error occurs.

Image ID	Labelled as...	Visual evidence - What is in the photo	Status and description
IMG_101	Snow Leopard	A clear, spotted cat in the snow.	
IMG_102	Snow Leopard	A grey, jagged rock with a similar pattern to fur.	
IMG_103	Blue Sheep	A herd of sheep on a mountain ridge.	
IMG_104	Blue Sheep	A person wearing a grey woollen coat.	
IMG_105	Snow Leopard	Image is blurry/out of focus.	
IMG_106	[EMPTY]	A snow leopard jumping over a stream.	

Extension: How can the error be fixed?

Debugging Task 2 – The emergency room

A hospital is using AI to predict which patients with respiratory issues, like Asthma or COPD, are at high risk of needing an emergency bed. If the data has errored the AI will make dangerous mistakes. The AI is crashing or giving 'unknown' results for these patients. Can you find and fix the 4 data integrity errors?

Patient ID	Age	Oxygen level (%)	Breathing rate	Label (risk level)	Status
P_001	72	94	18	High Risk	✅ OK
P_002	24	105	12	Low Risk	❌ Error 1
P_003	45	92	"Very Fast"	High Risk	❌ Error 2
P_004	-5	98	15	Low Risk	❌ Error 3
P_005	31	95	20	[MISSING]	❌ Error 4

Error	Description of error	How could it be fixed?
1		
2		
3		
4		

Extension: If we did not fix Patient P_002's oxygen level, and the AI just ignored them because the data was not as expected, what happens to that patient?

Challenge 3: Optional extension (tuning the threshold)

An AI model predicts a pollution score from 0 to 100 and follows the rule: if the score is over 70, the school cancels outdoor PE to protect students with asthma.

The problem is that yesterday, the AI gave a score of 65. The school held PE outside. Three students had asthma attacks because the air was actually quite bad.

The school is now considering whether to move the 'Danger Trigger' to 50 or 90. Consider the two arguments and outline your thoughts to share as a group.

1. *Moving to 50:* We catch more "Danger Days" (Higher Safety), but we might cancel PE unnecessarily (Higher False Alarms).
2. *Moving to 90:* We rarely cancel PE, but we might miss a very dangerous day.

Real-World Showcase – AI for Social Good (10 mins)

Focus Area	The AI's Job	The Real-World Benefit	Who Benefits?
Vision & Health	Detecting diabetic retinopathy	AI scans photos of the retina to find tiny bleeds that lead to blindness. It can do this in rural areas where there are no eye doctors.	Millions of people with diabetes, especially in developing nations.
Cancer Care	Early breast-cancer detection	AI spots "micro-calcifications" (tiny white dots) on mammograms that are nearly invisible to the human eye.	Patients who can now start treatment months earlier, significantly increasing survival rates.
Wildlife	Conservation ai cameras	Automated cameras in the wild identify endangered species, like Snow Leopards, and alert rangers to poachers in real-time.	Endangered ecosystems and biodiversity conservation teams.
Environment	Modelling air pollution	AI combines traffic data, weather patterns, and sensor readings to predict "pollution spikes" on specific streets.	Children with asthma; schools can plan indoor PE on high-risk days to prevent attacks.
Accessibility	Improving tools for disabled users	AI "sees" the world through a phone camera and narrates what it sees. For example, "A friend is smiling," or "The sign says 'Exit'".	Visually impaired or blind individuals gaining independence in daily life.
Agriculture	Identifying plant disease	A farmer takes a photo of a leaf; the AI identifies the fungus or pest and suggests a cure immediately.	Small-scale farmers protecting their crops and ensuring food security for their communities.

Select one row that interests you and consider the following questions:

Who benefits most?

What is the biggest risk?

Why does it matter?

Reflection

Use the space below to reflect on what you have learnt from these activities.

- Complete this sentence to share with the group:

If I could build an AI to solve one problem in my community, I would ...

- What is one thing you have learnt today?
- One question you still have?