



OUTCOME 4 REQUIREMENTS

Lecturer: Mark Gillan

OUTCOME 4



Unit Context: Moving from theoretical concepts to practical implementation in the AI model lifecycle.



Objectives: Designing, building, and validating a functional AI system to solve a defined problem.

STANDARDS & PERFORMANCE CRITERIA

EVIDENCE BASED



- **Core Tasks:** You must select an appropriate model, prepare a clean dataset, execute the training phase, and perform rigorous testing.
- **Evidence:** Success is measured by your ability to document the process from problem definition to model modification.

PHASE 1 – PROBLEM DEFINITION & MODEL SELECTION

- **The Problem-Solving Approach:**
Your project should address a familiar but meaningful problem and an unfamiliar project too (ideally 2 projects)
- **Model Types:** (Different Projects)
 - Recognition (Images, Audio, Poses)
 - Prediction (Data-driven forecasting).



PROJECT IDEAS:

IMAGE & VISUAL RECOGNITION

- **Medical/Environmental:** Identifying types of plant diseases or classifying cell types in biological samples.
- **Retail/Inventory:** Developing a system to distinguish between various consumer products for automated checkout.
- **Safety:** A model that detects if a worker is wearing correct PPE (Personal Protective Equipment).



PROJECT IDEAS:

AUDIO & NATURAL LANGUAGE

- **Accessibility:** Training a model to recognise specific vocal commands for hands-free device control.
- **Security:** Voice-print recognition to distinguish between authorised and unauthorised users.
- **Customer Service:** Sentiment analysis that categorises customer feedback into 'Happy', 'Frustrated', or 'Neutral'.



PROJECT IDEAS:

PREDICTIVE DATA MODELLING

- **FinTech:** Predicting loan eligibility or salary brackets based on demographic and career data.
- **Healthcare:** Forecasting potential illness risks based on a cluster of reported symptoms.
- **Sustainability:** Predicting energy consumption patterns based on historical usage data.



DATA SOURCING & PREPARATION STRATEGIES



- **The Data Lifecycle:** You can source existing professional datasets or curate your own primary data.
- **Dataset Integrity:** Training data must be large, varied, and include both familiar and unfamiliar contexts to ensure the model is robust.

UNDERSTANDING THE TRAINING PROCESS

The "Black Box": Applying machine learning paradigms—such as supervised learning—to map inputs to desired outputs.

Optimisation: Recognising how volume and diversity in data directly impact the model's reliability.

VERIFICATION & VALIDATION (THE TEST PLAN)

- **The Test Plan:** Creating a systematic approach to check if the model meets its objectives.
- **Execution:** Testing the model against new, unseen data to determine its real-world accuracy.



ITERATIVE IMPROVEMENT & FINAL EVIDENCE

- **Modifications:** Using test results to identify areas for enhancement and refining the model accordingly.



- **Portfolio Requirements:**

Your submission must include:

- A description of the purpose
- The training process
- A demo of the model
- The final test results