CLASSIFICATION OF SURFING IMAGES

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- **Marking scheme:** Experimentation-based

Aims and Objectives

Aims

- Create, as well as evaluate, models that can interpret images of surfing locations and determine whether the conditions at the time are suitable for surfing.

- Develop models using different machine learning algorithms and determine which algorithm works best for this task.

Objectives

- Develop a model that can classify images from a single surfing location.

- Enhance this model to classify images from multiple surfing locations.

- Bonus: Make the model provide a rating rather than a binary classification.

Background

- Background research was carried out on the machine learning process, algorithms, types, and technologies.

- Commonly used algorithms for image classification include:
  - Convolutional Neural Networks (CNN)
  - Support Vector Machine (SVM)
  - Random Forest (RF)
  - K-nearest Neighbors (KNN)

Requirements

- The system must load images from folders and preprocess them.
- The system must allow models to be trained and tested using one of the provided datasets.
- The system must provide information describing how well a model performs on a dataset.
- The system must allow different models to be compared using appropriate performance metrics.
- The system must allow models to be saved and loaded.

Methodology and Technologies

Agile Methodology
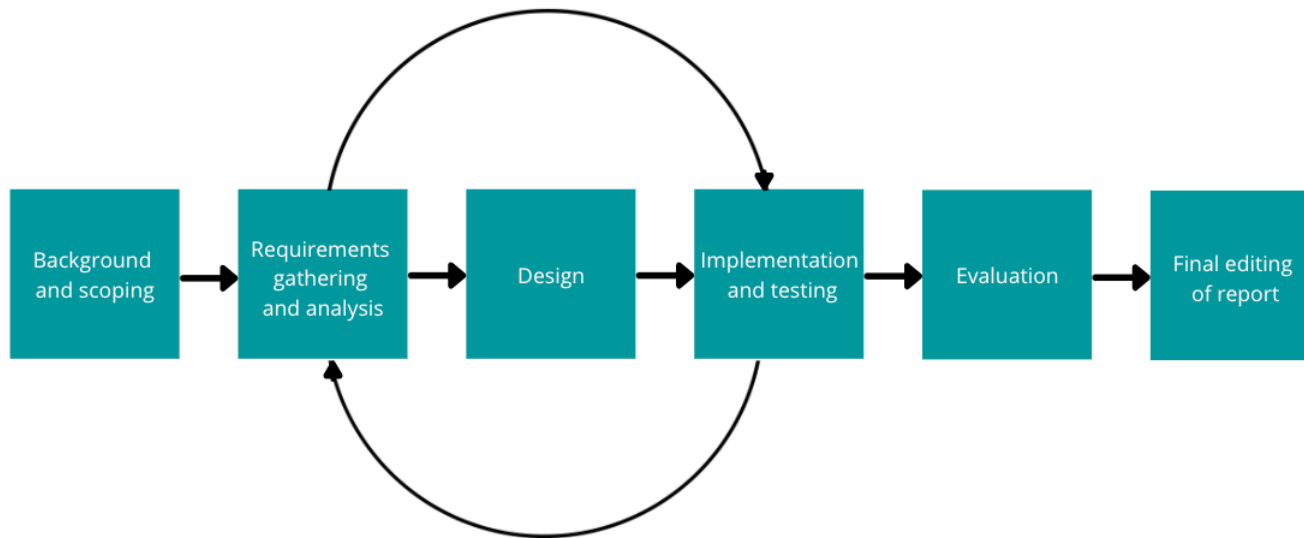
Technologies

Implementation

- Collected 300 images of the Bantham beach in Devon.
- Added functionality to load images from folders and preprocess them.
- Created 4 models that can classify images from this surfing location.
- Tested the models using different splits of the dataset.

- CNN: 100%
- SVM: 98%
- RF: 95%
- KNN: 73%

Evaluation Plans

Phase 1

- Use a set of images from the same website.

- Evaluate and compare the models based on accuracy, precision, and recall.

- Compare models that use the same algorithm with different parameters, as well as models that use different algorithms.

Phase 2

- Repeat the process using a different set of images.

Project Plan and Progress

	1	2	3	4	5	6	7	8	9	10	11	i	ii	iii	iv	v	vi	1	2	3	4	5	6	7	8	9	10	11
Technology/Background		X	X	X	X	X	X	X	X																			
Collect images				X	X	X	X	X								X	X			X								
Progress Report							X	X	X	X																		
Preprocessing/Basic model													X	X	X													
General model																X	X											
General model with rating																				X	X	X						
Evaluation																							X	X	X			
Write-up																									X	X	X	