

# 281.756 Image and Video Processing

## Algorithm Development Project

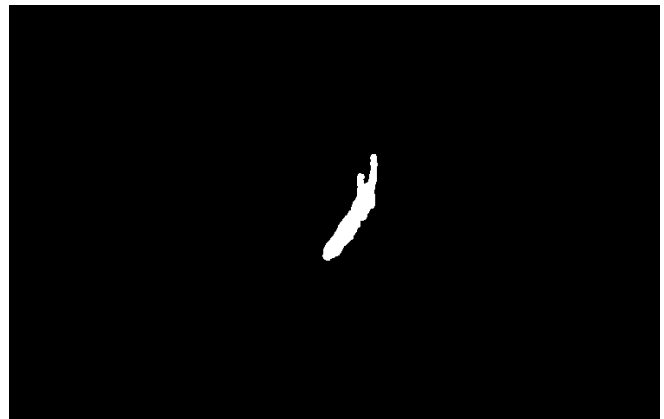
Due **Friday 1 October, 2021**, midnight, via Stream.

**Task:** Develop a prototype algorithm to locate and track stoats in the video sequence, and distinguish stoats from other animals and activity.

- You are provided with 7 short video sequences, captured of animals.
- Not all images within the sequence have animals, and not all sequences have animals.
- There are a number of confounding effects: wind, rain, moving sunlight, etc.
- You may use any image analysis system that you believe will be suitable for the task (eg VIPS, Matlab, etc).
- You are to develop an algorithm, written as a macro in the macro language your imaging system uses that does the following:
  - 1) For each image in the sequence, shows the detected animal (if any)
  - 2) For a sequence, shows a track of the animal (the path that the animal took through the image)
  - 3) Identify the type of animal based.



Input image



Detected animal

Identification: Stoat

Suggested algorithm approach:

1. Detect the animal within each frame.  
How do you distinguish the animal from the background?
2. Identify the type of animal.  
What are the different characteristics of different animals?  
How can you make use of the multiple frames within the sequence?

You may work on this assignment in **groups of 2 or 3**, however, each person is to submit an **individual report** that will be graded. Note that the grade will not be based purely on your results, but also on your approach and analysis of the problem. It is unlikely that your algorithm will work on all of the images provided, but you must know why it fails when it doesn't work. Your report should include the following:

1. Title page (which also lists the other members of your group)
2. Abstract, and introduction to the problem
3. The approach you have taken and how your algorithm works  
A block diagram of your algorithm will generally be easier to follow than pages of text!  
For any classifications, what features did you use, and how did you set the limits?  
You should also include the key assumptions you have made, and comments on their validity
4. The results produced by your algorithm on the test sequences.  
Don't show every image – just some examples, and summarize the performance with a table  
What are the error rates for detecting the animal, and recognising the animal?
5. The robustness of your algorithm. Questions to ask are:  
What are its limits? How reliable are the results?  
What causes the algorithm to fail? What happens when it fails?
6. Conclusions about the task, and your algorithm
7. An appendix containing a commented listing of your algorithm.

Marking:

		Out of
Abstract		5
Introduction		5
Approach	Description, Block diagram	15
	Features, Thresholds	10
	Assumptions	10
Results	Examples	10
	Summary, Performance	10
	Robustness	10
Conclusions		5
Listing		10
Structure	Grammar, Spelling, etc	10
		100