PASCAL Project Presentation

Idea from the 2006 PASCAL Visual Object Classes Challenge

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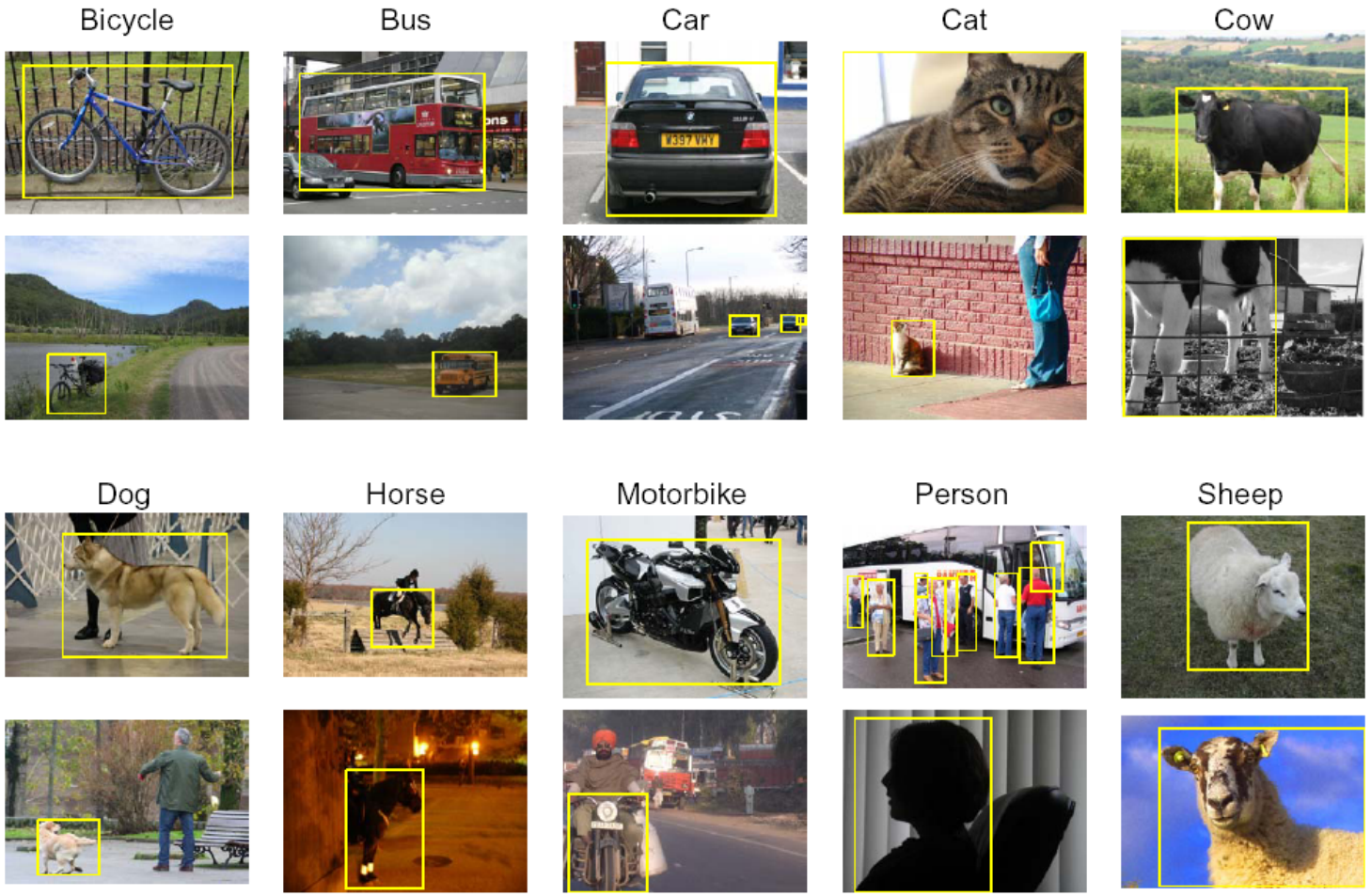
http://www.pascal-network.org/challenges/VOC/voc2006/index.html

PASCAL Project: Examples



PASCAL Challenge 2006

- 22 participants submitted results
  - 14 different institutions: Oxford, Cambridge, MIT, QMUL, INRIA, etc
- 28 different methods
  - 19 for classification task only
  - 4 for detection task only
  - 5 for classification and detection
- Pascal Challenge 2012
  - More objects: 20
  - More images: +10000
  - More challenges

PASCAL Project: Objective

Object Classification in realistic images

- Ten object classes

  - Bicycle, bus, motorbike, car, cat, cow, dog, horse, sheep, person

- Classification

  - Predict whether at least one object of a given class is present

Image Dataset (PASCAL 2006)

- Images taken from three sources
  - Personal photos contributed by Edinburgh/Oxford
  - Microsoft Research Cambridge images
  - Images taken from “flick” photo-sharing website
- Annotation
  - Bounding box
  - Viewpoint: front, rear, left, right, unspecified
  - “Truncated” flag: Bounding box != object extent
  - “Difficult” flag: objects ignored in challenge

Our Image Dataset

	train		val		trainval		test	
	img	**obj**	**img**	**obj**	**img**	**obj**	**img**	**obj**
Bike	25	32	28	32	53	64	53	65
Bus	18	23	16	23	34	46	36	46
Car	54	85	56	85	110	170	108	170
Cat	38	42	38	43	76	85	77	85
Cow	20	31	20	31	40	62	39	63
Dog	37	42	35	42	72	84	74	84
Horse	25	32	23	32	48	64	50	64
Motorbike	23	27	23	27	46	54	46	54
Person	63	115	69	115	132	230	135	230
Sheep	23	42	26	42	49	84	47	84
Total	255	475	268	475	523	950	537	950

Classification Task

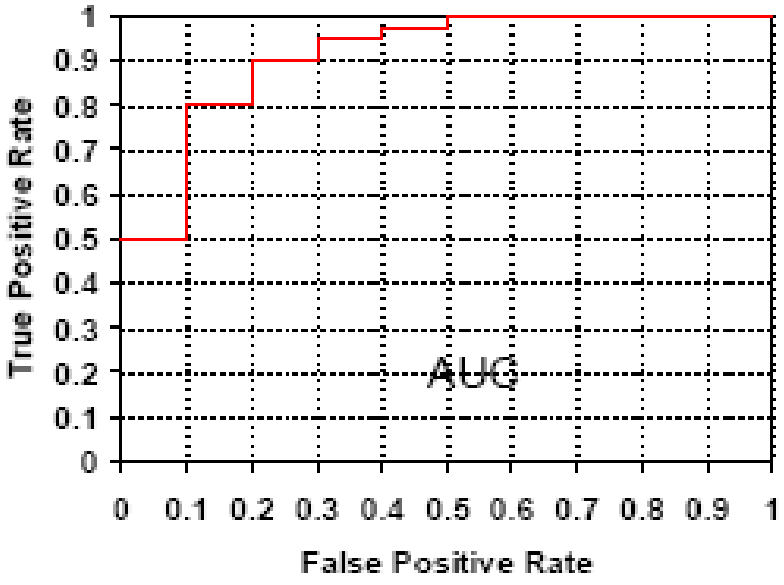
- Predict whether at least one object of a given class is present

	Confidence
Is there a Bike? YES	0.85

Is there a Bike? NO	0.05

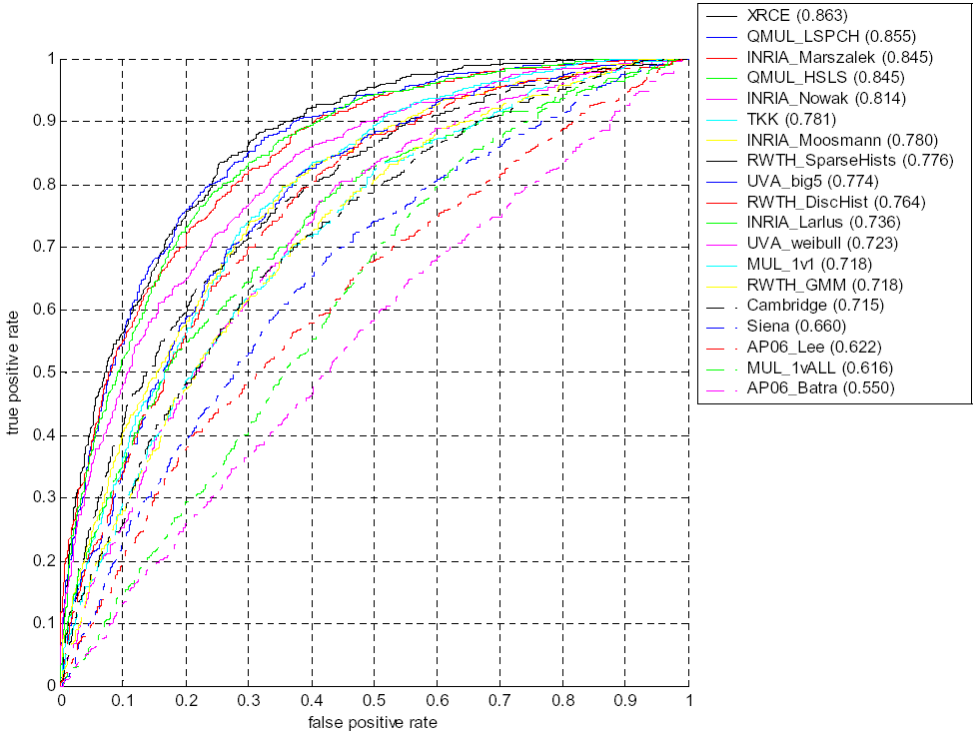
Classification Task: Evaluation

- Receiver Operating Characteristic (ROC)
  - Area Under Curve (AUC)



Classification Task: Evaluation

- Receiver Operating Characteristic (ROC)
  - Area Under Curve (AUC)



Classification Task

- Train on the supplied data
  - Choose a good strategy
  - Choose the appropriate features / classifiers
  - Which methods perform best given specified training data?
- Test the classifiers on the supplied data
  - Provide results for each object class

PASCAL Project: Coursework

- What do we expect?
  - Problem comprehension and understanding
  - Analysis, design and implementation of at least one strategy (BoW)
  - Results evaluation
  - Academic presentation (writing doc)
- Scheduling

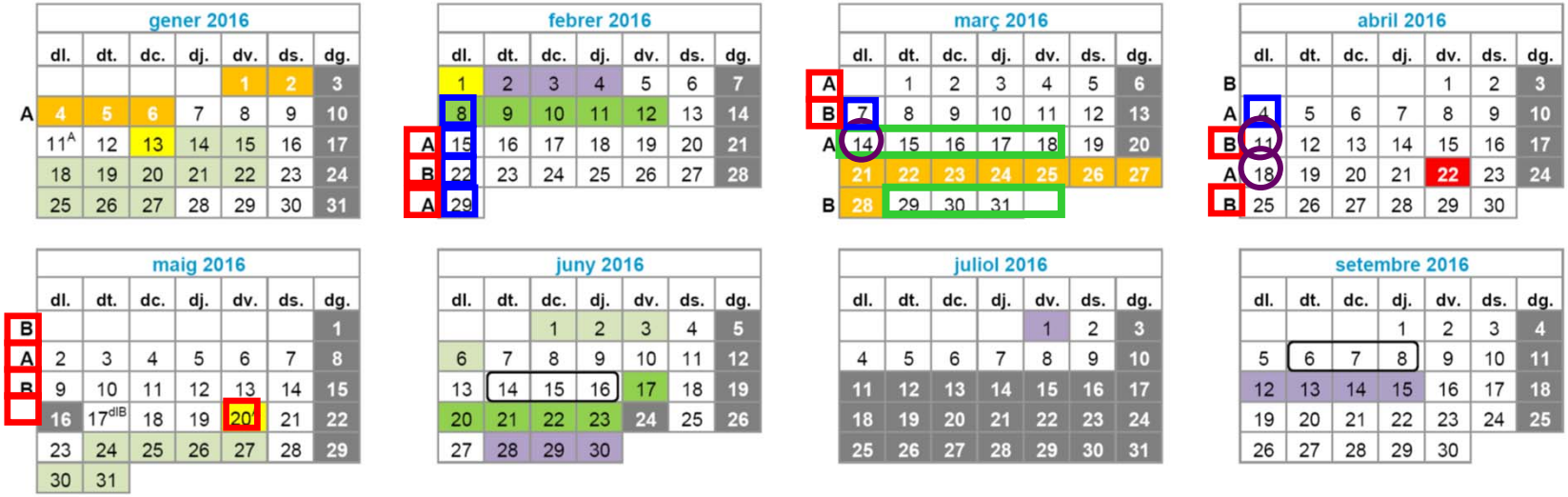
Scheduling

Lectures

Seminars

Lab sessions

Lecture given by students



Pascal deadline!!!

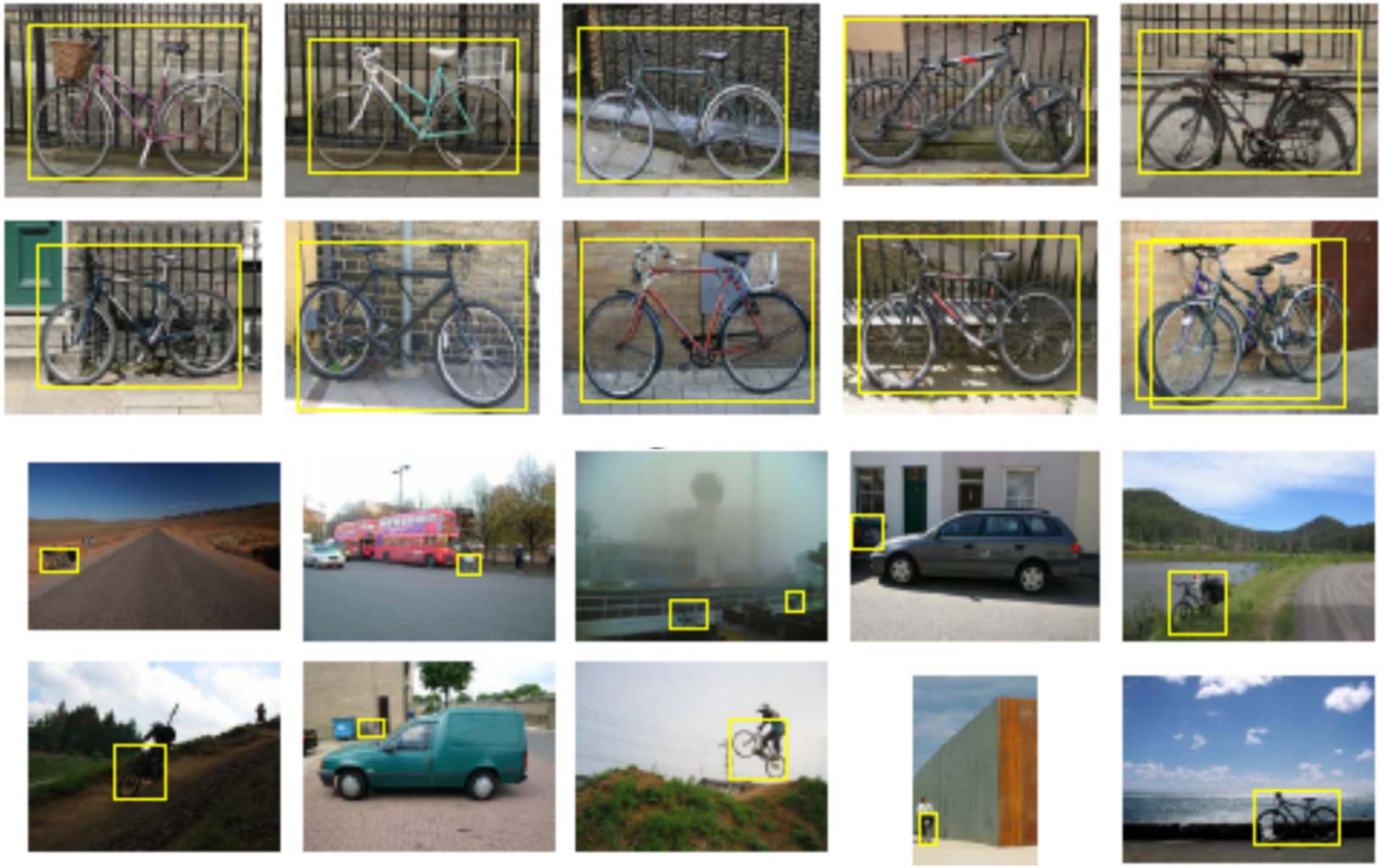
PASCAL Project

FINAL MARK= 30% from P1&P2 + 40 % from PASCAL PROJECT + 30% by Lectures given by the students

Criteria:

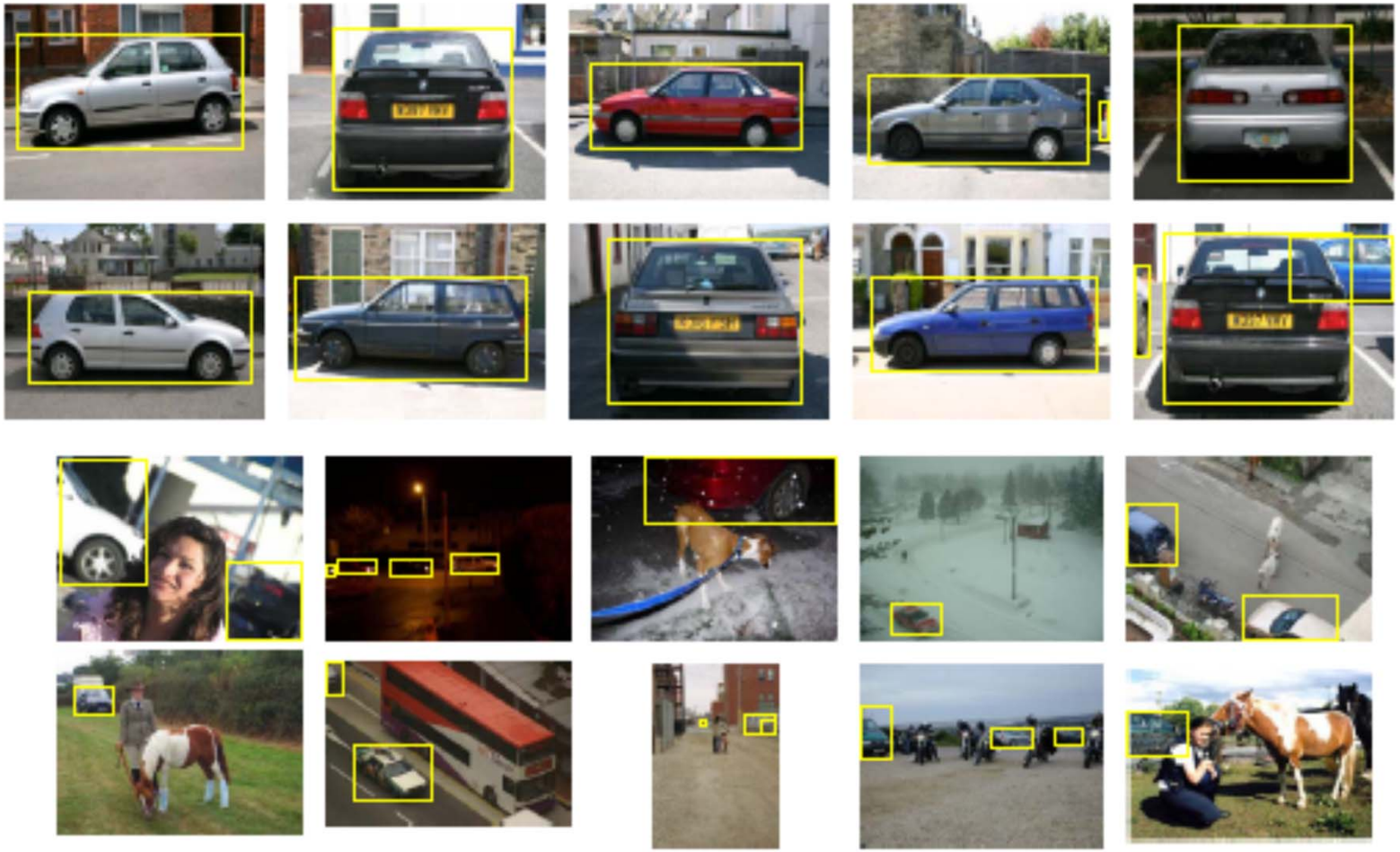
- From P1 & P2: 70% strategy and results + 30% document
- From PASCAL PROJECT: 70% strategy and results + 30% document
- From Lectures given by students: 50% document + 50% presentation and interaction

Examples: Bycicle

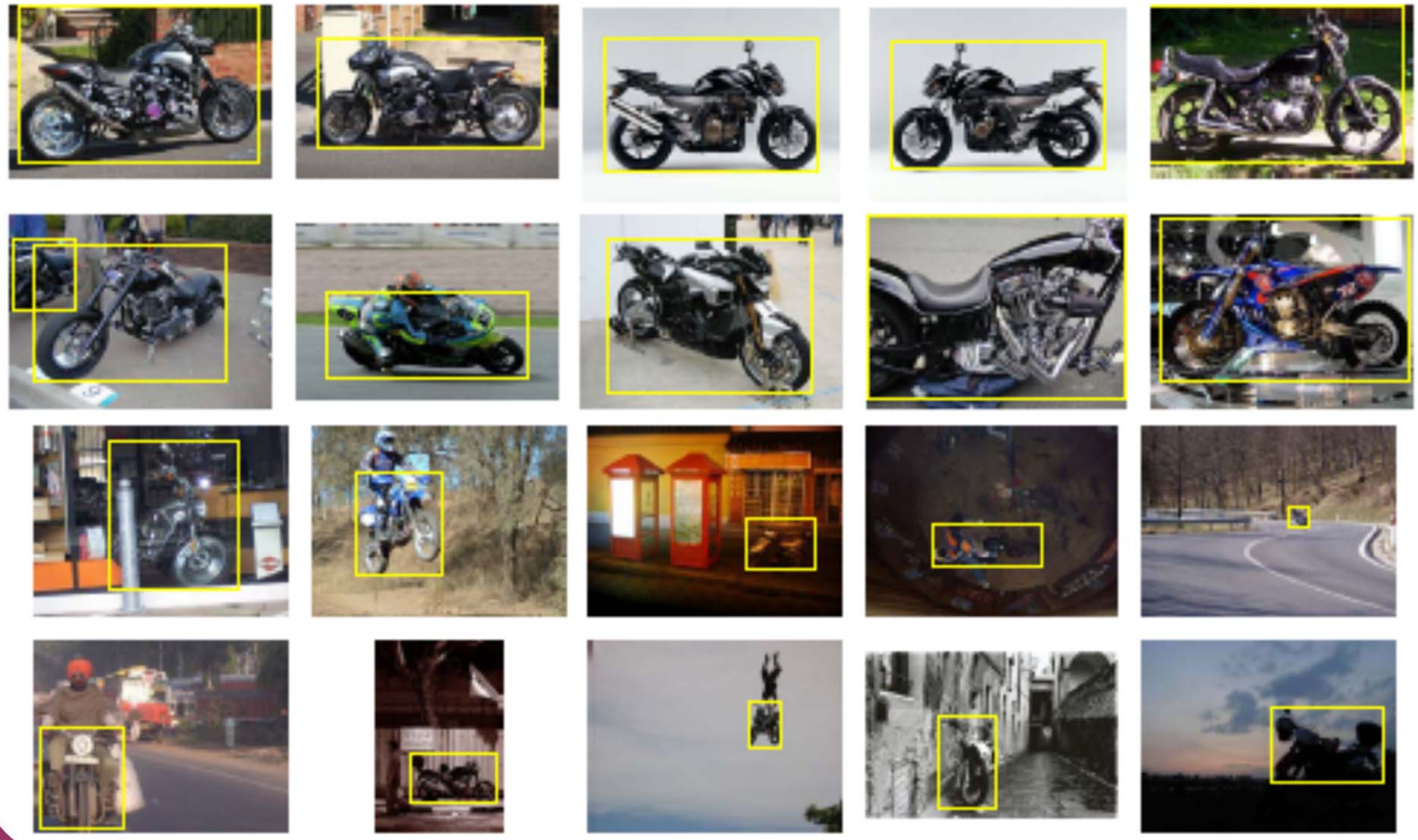


Examples: Bus

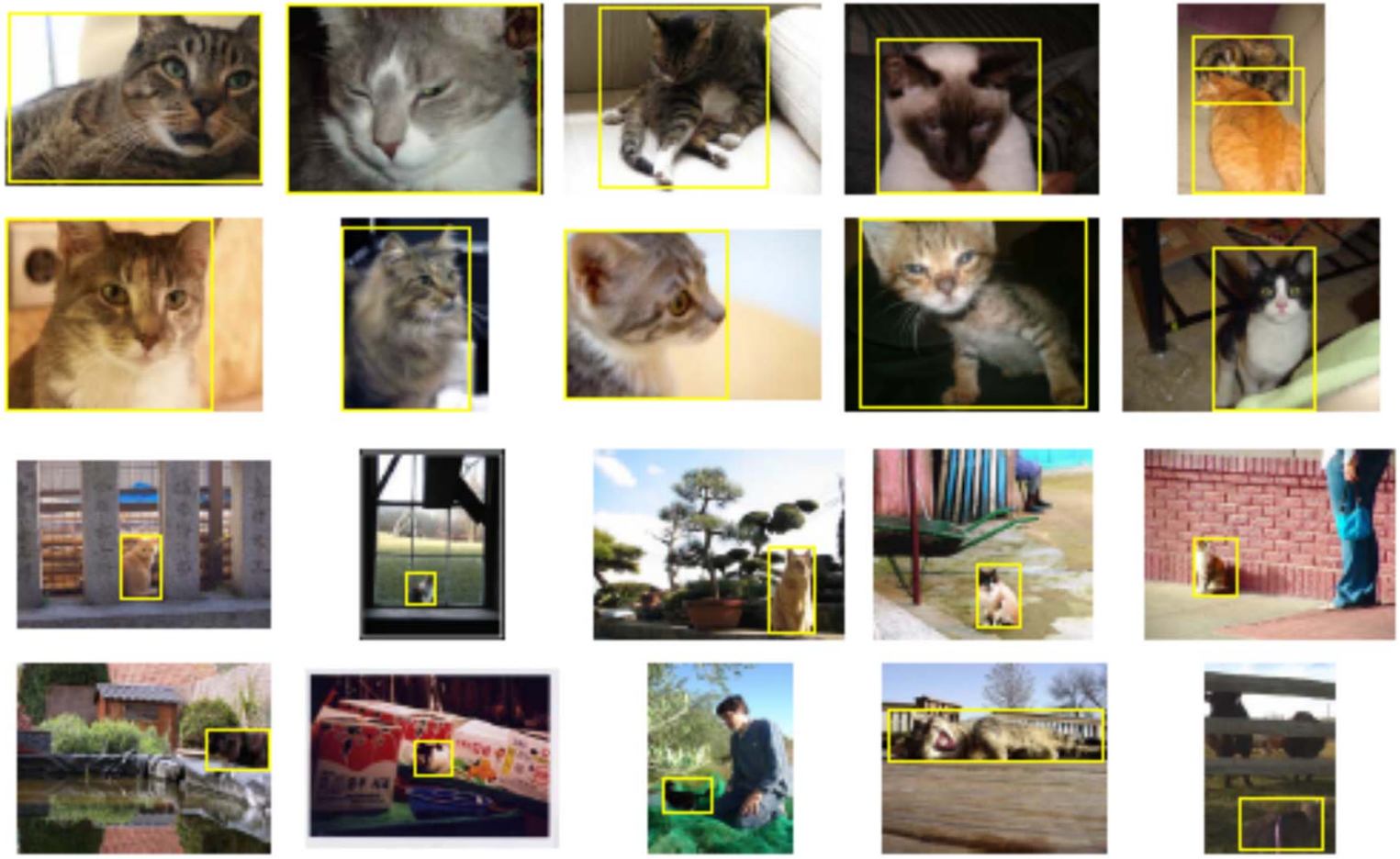
Examples: Car



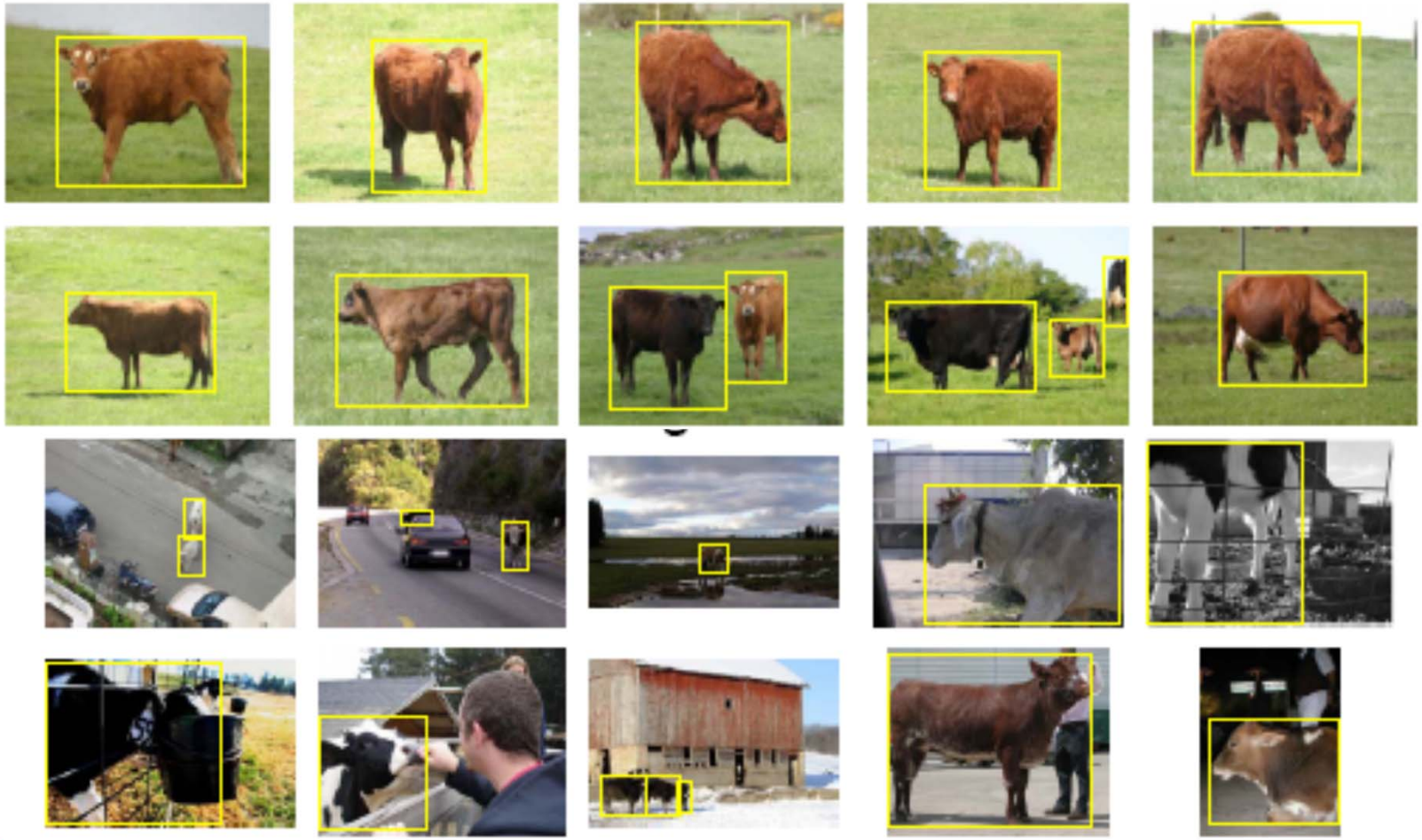
Examples: Motorbike



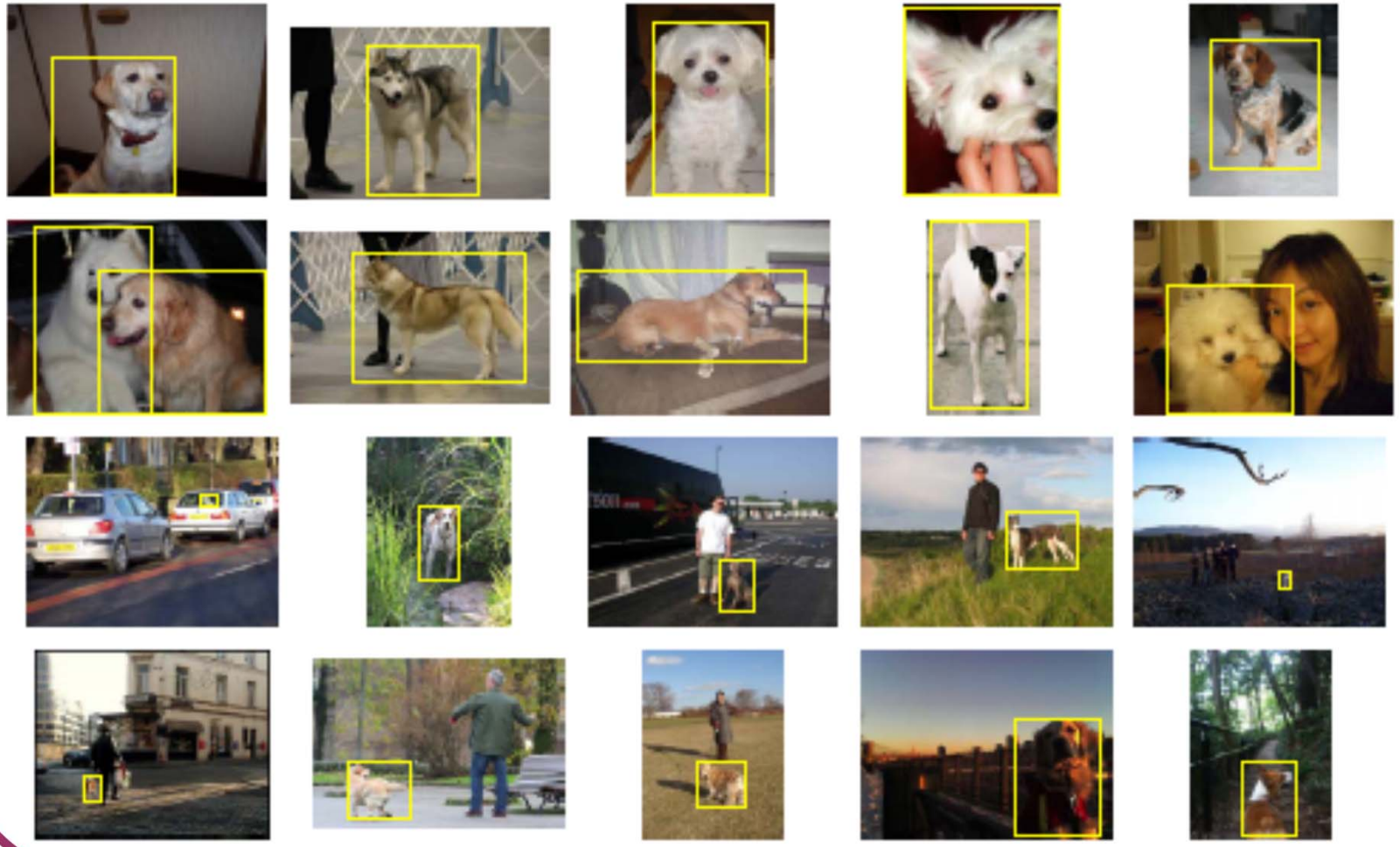
Examples: Cat



Examples: Cow

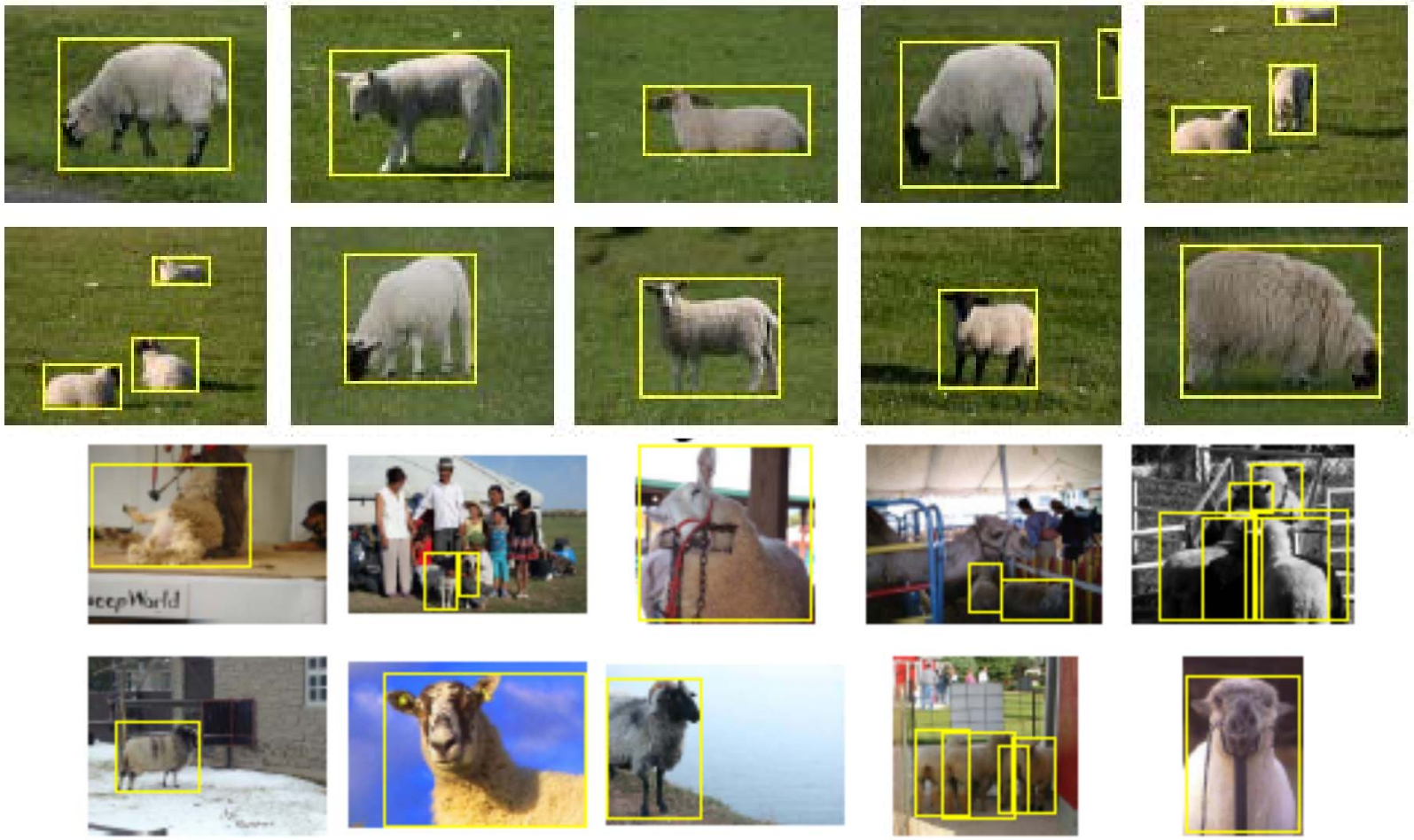


Examples: Dog

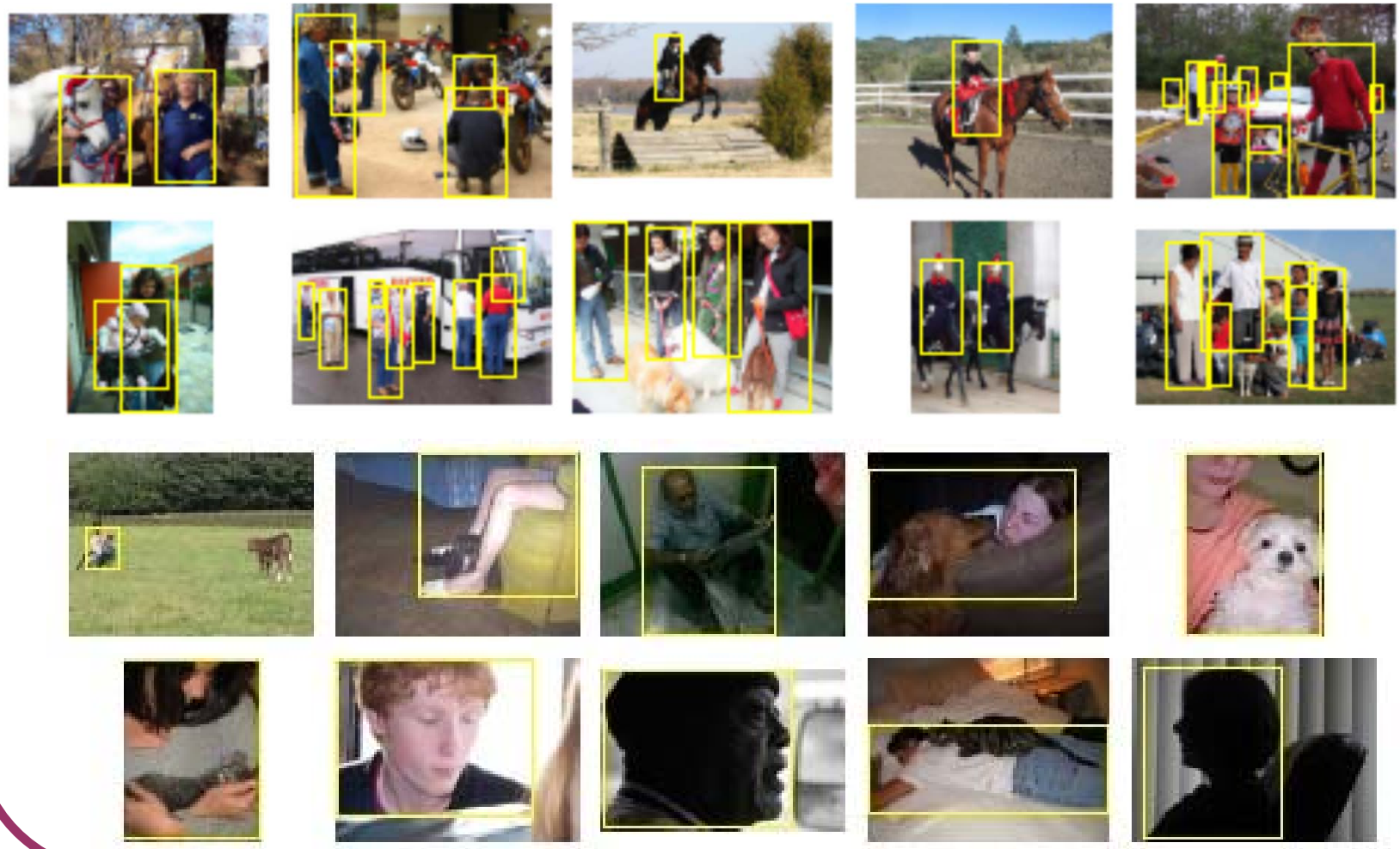


Examples: Horse

Examples: Sheep



Examples: Person



PASCAL Project: Guidelines

- **PRTools4** toolbox or **weka** toolbox
  - Matlab toolboxes for Pattern Recognition
- Sift library (Matlab) (**Vlfeat** for dense sift)
  - To extract sift descriptors from an image
- 2006 **Pascal Development Kit** (Matlab)
  - Follow the ***example_classifier.m***
  - It simplifies the access to the image files (training, validation and test sets)
  - Automatic results generation (ROC, Az value)

PASCAL Project: Guidelines

- Colour, Texture, SIFT, etc
- 1 classifier per object class (binary decision)
- Training / Testing steps
  - NN, K-NN, SVM, Adaboost …
- Dense vs Sparse strategies
  - Features extracted from a grid of patches / Sliding window for classification
  - Features extracted from interest points / Standard image classification

PASCAL Project Presentation

Good luck!!!

Hope you will enjoy this project!