

1 Introduction

- Our aim is to perform automatic fruit classification.
- *AFC* is vital for a number of surveillance applications such as *temporal decomposition* and automatic *fruit collision* detection.
- As the number of fruit increases we must design our system with scalability.

2 Modelling Bananas and Plums

- We model bananas and plums using a density estimation of the colour space.
- We fit a Gaussian Mixture Model using Expectation Maximization. We select the number of clusters using an MDL criteria.
- Typical image examples of bananas and plums look like this:



Bananas



Plums

3 Classification

- We perform classification of a novel image by estimating MAP using each fruit model.
- Each point is projected into *fruit space* the novel fruit is classified as that with the highest probability:

$$p(x) = \sum_{k=1}^K p(x|k)P(k)$$

4 Results

- We classified 1,000,000 novel fruit images.
- We obtained a classification accuracy of 99%.
- Examples of classification results are shown below:



5 Conclusions

- We proposed a novel *fruit classification* system.
- It was demonstrated to successfully identify fruit to a very high percentage.
- Automatic Fruit classification is a vital component of visual surveillance and video indexing systems.
- We aim to build on this work by incorporating a textured apple model.

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