Applying computer vision methods to applications

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- **Fish recognition in massive databases**: Fish4Knowledge

- **TrimBot2020**: shape fusion and geometry change

- **Video analysis:** Analysing human behaviour

- **Time series video:** DTI/Bayes construction site

Fish4Knowledge Project

Cameras	10
Format	320x240
Frame rate	5
Frames	1.5×10^9
Video	1×10^{14} bytes
Length	90K hours
Detected Fish	1.4×10^9
Result size	4×10^{11} bytes
Processing	400 core-years

VIDEO

Observations per day?

What are the numbers of fish observed per video per day?

Median number of fish per video vs day (1 Oct 2010 – 26 June 2013)
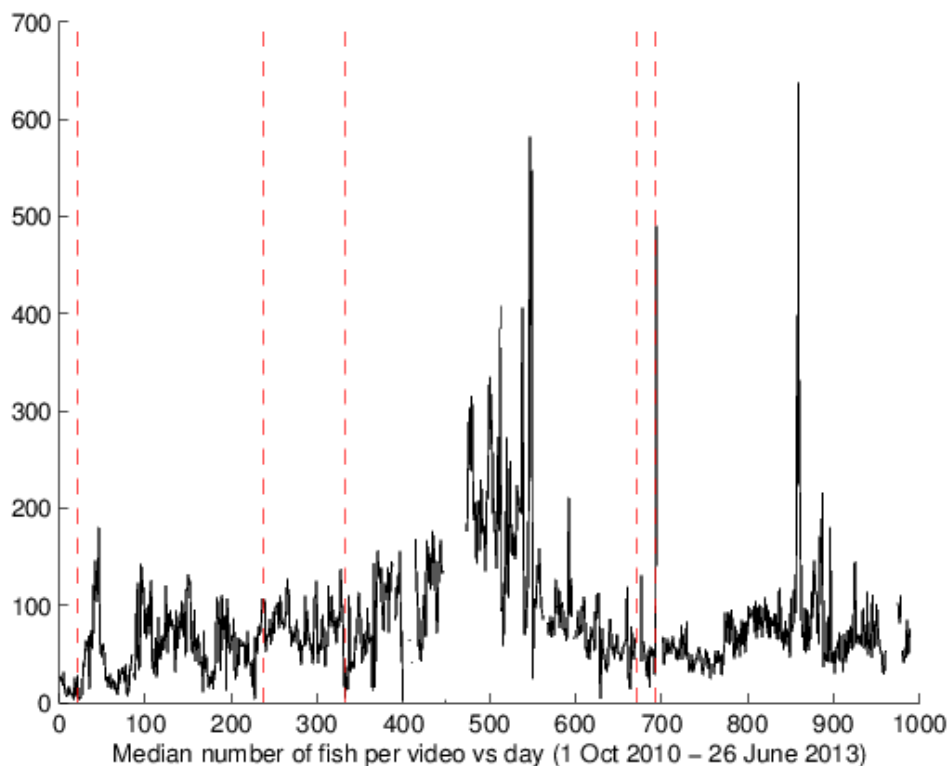
Red lines are typhoons: fish population quickly recovers

Fish Speeds *vs* Water Temperature

Box plots for each temperature bin using ~4 million fish trajectory
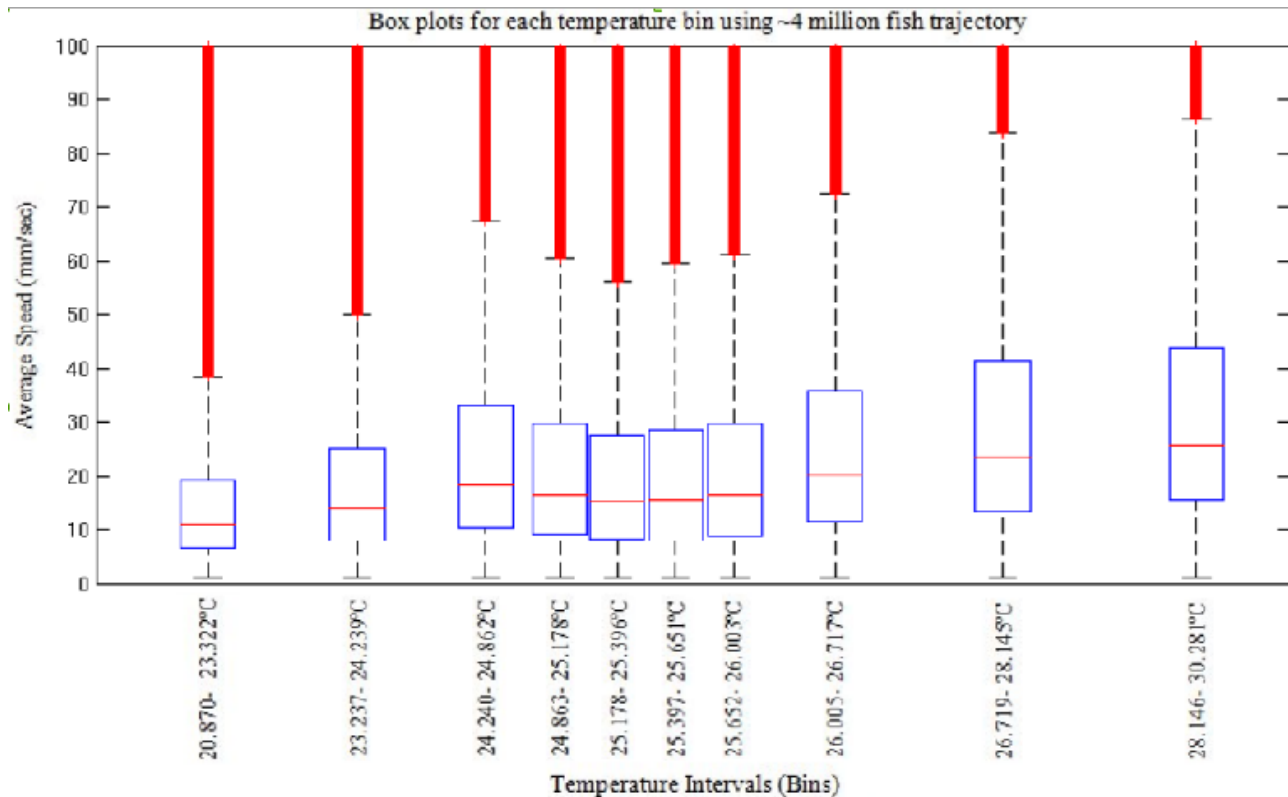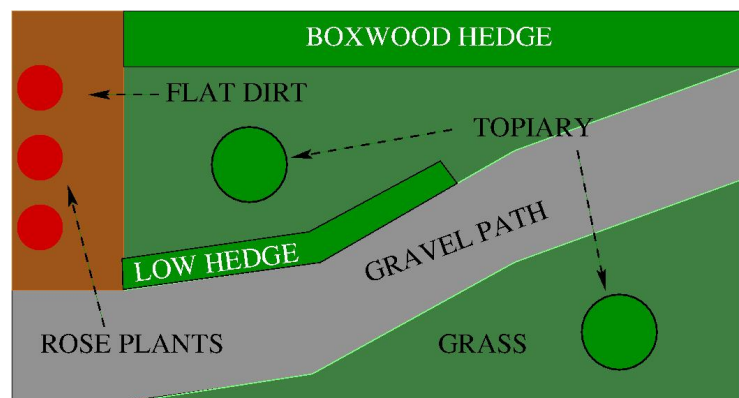
4 million tracked *Dascyllus reticulatus*

Contradicts previous laboratory studies

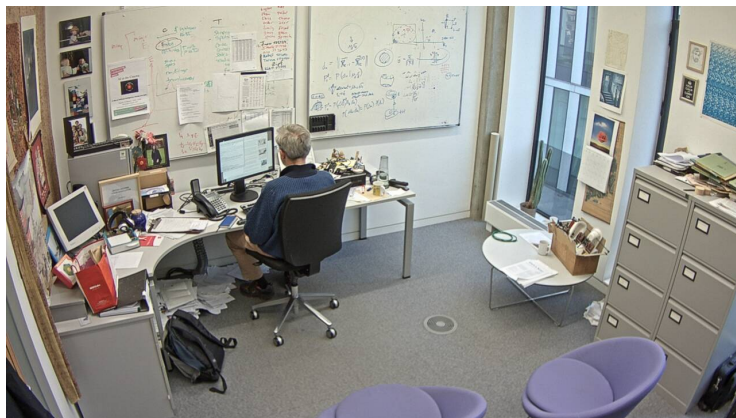# TrimBot2020: Robot Hedge Trimmer

UoE: Fusion of stereo, scene flow, structure from motion noisy 3D point clouds
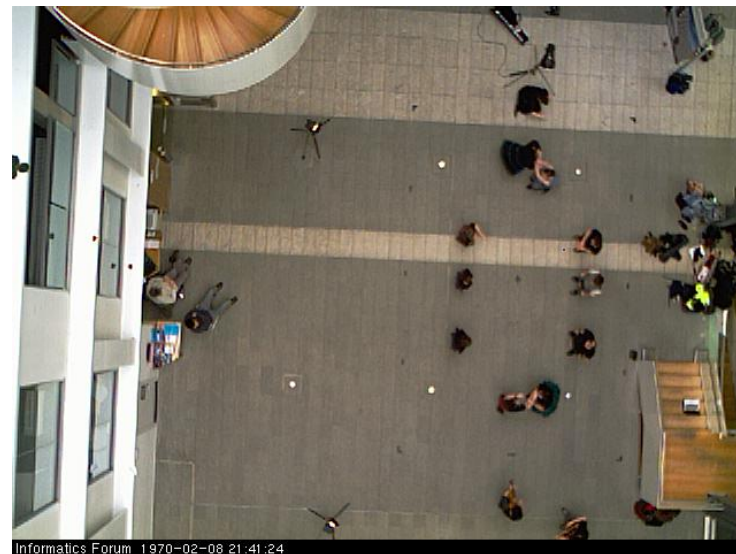
TrimBot2020: Robot Hedge Trimmer

UoE: deformable matching and registration of sketch map to real 3D point data

Understanding Human Behaviour
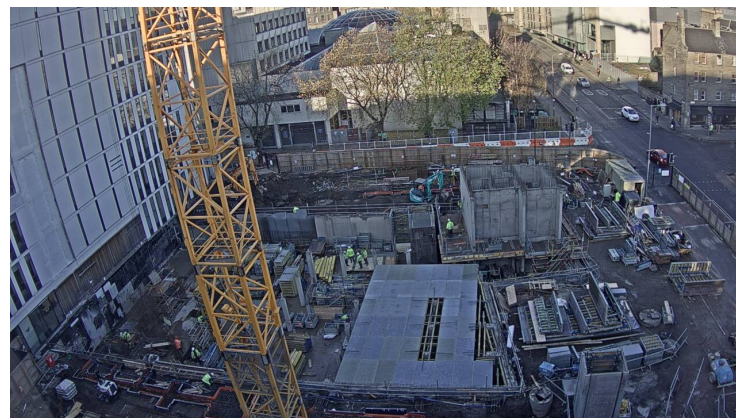

Long term routine activity

400K frames

highly structured activity

4K frames

DTI/Bayes Construction Time Lapse Video

How to construct video: 10 min per image, shadows, lighting, camera motion, scene activity