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Trimble

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10:00 ς 10.15	(JE215)

10:15 ς 10:45 **Nathan Robinson**,

White

: Photogrammetry, structure from motion, visual odometry, SLAM and other computer vision technologies rely on the ability interpret the physical geometry of a scene around the camera. Camera lenses have a projection that may be known but is generally known imprecisely. To make the most of the camera, the system is typically calibrated to establish a more robust estimation of the projection function from the r32(ca853)-5(8)-77

Herewini

This research is part of a larger project, "MaaraTech", which aims to reduce variability in vineyard pruning that results from human decisions. The automation of any process relies on accuracy and reliability. In the case of pruning in vineyards, the robot must accurately align itself with a trunk and operate a robot arm to prune vines. Using computer vision, we can identify trunks and posts along a vineyard, creating accurate anchor-points for the robot.

This research addresses the methods of locating these anchor points. Two primary methods will be evaluated and compared, one that uses a 2D CNN, and another using a 3D CNN. The 2D CNN uses a segmentation model to identify the posts and trunks from images, producing a 2D mask. This mask can then be overlaid onto the corresponding 3D point-cloud to isolate the points representing posts and trunks. Applying a 3D clustering algorithm to these points will return the post and trunk regions, which can then be used to output geographical locations. The architectur

Ellerm

Rough

Bloodstain Pattern Analysis (BPA) is a discipline of forensic science which is often used at scenes of bloodshed to assist with the reconstruction of events. Seen as a pattern recognition discipline, BPA has received criticism of its subjective nature and lack of quantitative techniques. As a result, quantitative classification methods are being explored in this research project.
Deep learning using CNNs has become a popular method for image recognition and classification and so was chosen as a possible method for the classification of bloodstain patterns from images.
The available training dataset consists of digital images of laboratory generated patterns captured at high resolution and of various sizes and aspect ratios. Due to the relatively small size of the dataset, pretrained CNNs were explored to identify the most appropriate model for classifying bloodstain patterns. Furthermore, CNN models require training data sets that are uniform in shape and size to be optimally utilised, and the computational load of training requires a size restriction for the training images. Therefore a number of different pre-processing methods have been applied to the original images in an attempt to create a dataset of images of an appropriate size which still retain details of the patterns and removes any artefacts from the images that may otherwise have an influence on the training.

Schofield

Visual odometry is the process of estimating the motion of a camera using images that the camera is capturing. VO is often used in robotics to provide the robot with a pose estimate when GPS is unavailable or does not provide enough precision. Traditionally, VO relied on the assumption that it was operating in a static environment. Recently there has been an abundance of work aiming to improve the robustness of VO in dynamic urban scenes. However, unlike urban environments, dynamic vegetated environments remain relatively unstudied yet are essential for expanding robotics into areas such as agriculture and forestry. We propose a method for detecting (and removing) dynamic features by exploiting the differences in optical flow patterns caused by moving vegetation and camera motion. Our results show that the proposed method improves the accuracy and significantly reduces the processing time of visual odometry in dynamic vegetated environments.

McKenzie

Video games have rapidly become a massive and powerful creative industry that has far surpassed other entertainment industries such as movies and music. However, the video game development (VGD) industry is not without significant development challenges in multidisciplinary team dynamics and communication, work culture, and project management. These issues often stem from video games being a complex and confusing 'marriage' of software engineering and creative production. There is a lack of agreement in academia and even within the industry itself on 'good' or 'best' VGD practices or processes which unify these competing creative and technical aspects. So, each game studio has its own highly contextualized ad-hoc (and often closely guarded) way of working, which is often misunderstood to be 'agile'. Consequently, the absence of commonly accepted 'good' development practices and the misapplication of agile means both independent studios (especially start-ups) and even AAA studios often struggle to create successful games. Hence, through interviews, surveys, and case studies with industry studios, this research project will capture the commonly used agile software engineering and creative production practices within VGD, and, investigate the relationships between these practices and the multidisciplinary collaboration challenges studios facel om this analysis a contextualized agile VGD 'best practice' model will be proposed.

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