Research interests

I'm interested in using machine learning to extract meaning and value from data and presenting this to users in a way that promotes understanding and trust. This not only means being transparent regarding the provenance of the data, but also making the reasoning accessible and understandable to users who may be domain experts but have little or no knowledge of machine learning algorithms. Without trust there is little point to performing the inferencing as users and stakeholders will not act on the results no matter how interesting they might first appear.

My lab uses a mixture of machine learning, psychophysics, data visualisation and ethical crowd-sourcing. Current projects range from appearance rendering of ultrasound projects and examining the texture of gas turbine blades to providing strategic level summaries of large project portfolio and providing smart support for research landscaping and strategy development meetings of up to one hundred stakeholders.

Research output

Addressing shortcomings in manual alignment of laser optics via automation tools

Automated Robotic Assembly of Laser Systems

PyKronecker: A Python Library for the Efficient Manipulation of Kronecker Products and Related Structures


On-chain analytics for sentiment-driven statistical causality in cryptocurrencies

The Scottish Brain Health Service Model: Rationale and Scientific Basis for a National Care Pathway of Brain Health Services in Scotland

Package AdvEMDpy: Algorithmic Variations of Empirical Mode Decomposition in Python

The Importance of Phase to Texture Discrimination and Similarity

GLS Kernel Regression for Network-Structured Data
An Integrated Framework for Remote Planning

Perceptual Texture Similarity Estimation: An Evaluation of Computational Features

On-chain analytics for sentiment-driven statistical causality in cryptocurrencies: Supplementary appendix

A Statistical Analysis of Text: Embeddings, Properties and Time-Series Modeling

On-chain Analytics for Sentiment-driven Statistical Causality in Cryptocurrencies

Enhancing Reading Strategies by Exploring A Theme-based Approach to Literature Surveys

PlanCurves: A Visualization Interface for Multi-Agent Temporal Plans

Visualising COVID-19 Research

Survey of Procedural Methods for Two-Dimensional Texture Generation

PlanCurves: An Interface for End-Users to Visualise Multi-Agent Temporal Plans

Exploring Interaction with Remote Autonomous Systems using Conversational Agents

Challenges in Collaborative HRI for Remote Robot Teams

Issues affecting user confidence in explanation systems

Improving User Confidence in Concept Maps: Exploring Data Driven Explanations

The ORCA Hub: Explainable Offshore Robotics through Intelligent Interfaces
The Importance of Phase to Texture Similarity

An Agglomerative Layout Algorithm

Image-based Emotion Feedback: How Does the Crowd Feel? And Why?

Triangulation in UX studies: Learning from Experience. Triangulating Cognitive Styles with Open Question Survey Responses

Understanding Concept Maps: A Closer Look at How People Organise Ideas

Perceptually Motivated Image Features Using Contours

A Picture Paints a Thousand Words but Can it Paint Just One?

Human search for a target on a textured background is consistent with a stochastic model

Collocated Interaction: Supported Networking for Collaboration

Perceptual texture retrieval using spatial distributions of textons (SDoT)

Well-Connected: Promoting Collaboration by Effective Networking

The joint effect of mesoscale and microscale roughness on perceived gloss


Crowdsourced Feedback With Imagery Rather Than Text: Would Designers Use It?

What To Study In HCI? A Reflection Based On CHI and UK Research Data
Comparing two methods for diagnosis of imprecise dynamic systems

I don't think we've met: Encouraging collaboration via topic-based search

Moodsource: Enabling perceptual and emotional feedback from crowds

Is British HCI Important? A topic-based comparison with CHI

Texture similarity estimation using contours

Why do rough surfaces appear glossy?

How well do computational features perceptually rank textures? A comparative evaluation

Research strategy generation: Avoiding academic 'animal farm'

Hot topics in CHI: trend maps for visualising research

The evaluation of a Virtual-Aided Design Engineering Review (VADER) System for automated knowledge capture and reuse

Managing creative conversations between designers and consumers

Intuitive large image database browsing using perceptual similarity enriched by crowds

The importance of long-range interactions to texture similarity
Tactile perceptions of digital textiles: a design research approach

Multi-Objective Topic Modelling

Mobile digital engagement: creating an immersive online shopping experience for m-commerce

Predicting Perceptions: Proceedings Of The 3rd International Conference On Appearance

The effects of display time and eccentricity on the detection of amplitude and phase degradations in textured stimuli

Archiving and simulation of fabrics with multi-gesture interfaces

Browsing Abstract Art by Appearance

Design Suggestions Using Similarity Information

Digital Tools For The Creative Industries

Similar symmetries: the role of wallpaper groups in perceptual texture similarity

Are single images sufficient to communicate qualities of texture-rich products?

Improving Product Browsing whilst Engaging Users

Interactivity to Enhance Perception: Does Increased Interactivity in Mobile Visual Presentation Tools Facilitate More Accurate Rating of Textile Properties?

Shoogleit. com: Engaging Online with Interactive Objects

Synthesising design methodologies for the transmission of tactile qualities in digital media
The affective experience of handling digital fabrics: tactile and visual cross-modal effects

Measuring perceived differences in surface texture due to changes in higher order statistics

Feature selection for multi-purpose predictive models: A many-objective task

Gaze-motivated compression of illumination and view dependent textures

On uniform resampling and gaze analysis of bidirectional texture functions

Stochastic search on a homogeneous surface texture
Clarke, A. D. F., Green, P. R. & Chantler, M., May 2009.

Modeling visual search on a rough surface

Perceptually relevant pattern recognition applied to cork quality detection

A psychophysically validated metric for bidirectional texture data reduction

Visual search for a target against a 1/f^beta continuous textured background

Modelling visual search for a target against a 1/f^beta continuous textured background.

Perceived directionality of 1/f^beta noise surfaces

Perceived properties of 1/f^beta noise surfaces

Perceived roughness of 1/f(beta) noise surfaces
3D textural mapping and soft-computing applied to cork quality inspection

On optimal resampling of view and illumination dependent textures

Perceived roughness of textured surfaces

Measurement of perceptual roughness in fractal surfaces

Optimal illumination for three-image photometric stereo using sensitivity analysis

An optimal light configurations in photometric stereo

Editorial: special issue on "Texture analysis and synthesis"

Classifying surface texture while simultaneously estimating illumination direction

Can two specular pixels calibrate photometric stereo?

Capture and Synthesis of 3D Surface Texture

Classifying Surface Texture while Simultaneously Estimating Illumination Direction

Illumination-invariant texture classification using simple training images

Two-image comparison under different illumination conditions

Estimating parameters of an illumination model for the synthesis of specular surface textures
On the relations between three methods for representing 3D surface textures under arbitrary illumination directions

Real-time per-pixel rendering of textiles for virtual textile catalogues

Rotation Invariant Texture Classification of 3D Surface using Four-light Photometric Stereo and 2D Spectra

The Response of Texture Features to Illuminant Rotation

Investigation of Directional Filter on Kube-Pentland's 3D Surface Reflectance Model Using Photometric Stereo

Resolving handwriting from background printing using photometric stereo

Rough surface description using photometric stereo

Three-dimensional surface texture classification

Combining Gradient and Albedo Data for Rotation Invariant Classification of 3D Surface Texture

Combining gradient and albedo data for rotation invariant classification of 3D surface texture

Comparison of Five 3D Surface Texture Synthesis Methods

On Capturing 3D Isotropic Surface Texture using Uncalibrated Photometric Stereo

Optimal illumination for three-image photometric stereo acquisition of surface texture

Real-Time Per Pixel Rendering of Bump-mapped Textures Captured using Photometric Stereo

Real-time per-pixel rendering of textiles for virtual textile catalogues

Comparison of three rough surface classifiers
Capture and Synthesis of 3D Surface Texture  

Estimating Lighting Direction and Classifying Textures  

Illuminant Rotation Invariant Classification of 3D Surface Textures using Lissajou's Ellipses  

The Effect of Illuminant Rotation on Texture Filters : Lissajous's Ellipses  

Modelling deposition of surface texture  

Evaluating Kube and Pentland's fractal imaging model  

A Comparison of Three Rough Surface Classifiers  

Recovery of Fingerprints using Photometric Stereo  

Segmentation of Machined Surfaces  

Segmentation of Rough Surfaces using Reflectance  

The use of fault-recorder data for diagnosing timing and other related faults in electricity transmission networks  

Rough surface classification using point statistics from photometric stereo  

On the use of gradient space eigenvalues for rotation invariant texture classification  

Rotation invariant classification of 3D surface textures using photometric stereo and surface magnitude spectra  

A comparison of inter-frame feature measures for robust object classification in sector scan sonar image sequences  

Sidescan sonar: a directional filter of seabed texture?  
Choosing the right model

Interval identification - a modelling and design technique for dynamic systems

Rotation invariant classification of rough surfaces

UNION: UNderwater Intelligent Operation and Navigation

A scheduling algorithm for time-constrained model-based diagnosis

Robust tracking of multiple objects in sector-scan sonar image sequences using optical flow motion estimation

Selecting tools and techniques for model-based diagnosis

Calibration and operation of an underwater laser triangulation sensor: The varying baseline problem

Automatic interpretation of sonar image sequences using temporal feature measures

Illuminant-tilt estimation from images of isotropic texture

Detection and tracking of returns in sector-scan sonar image sequences

Compensation of illuminant tilt variation for texture classification
Modelling choices in intelligent systems
Leitch, R. R., Chantler, M., Brown, K. E., Kane, T., Shen, Q., Coghill, G., Steele, A., Aldea, A., Liddle, J.,

Spatial-temporal approach for segmentation of moving and static objects in sector scan sonar image sequences

A preliminary specification methodology for model-based diagnosis

Design and use of multiple models for time-constrained hierarchical diagnosis

Mycroft: A framework for qualitative reasoning

Probabilistic sensing for underwater robotics

Qualitative model-based diagnosis of dynamic systems

Qualitative model based diagnosis of a continuous process

Automated Subsea Inspection using Collaborating Underwater Manipulators

Distributed architectures for autonomous underwater vehicles

Integration of ultrasonic and vision sensors for 3-D underwater scene analysis

Knowledge based sensor interpretation for autonomous underwater systems

Responsive and time-constrained reasoning in autonomous vehicles

Time-constrained reasoning and consistency maintenance for real-time knowledge-based systems

Distributed problem solving architecture for sonar image interpretation
Impacts