Department of Computer Science and Software Engineering

2015 Departmental Postgraduate Conference

September 3-4, 2015
Lecture Theatre 031, Erskine Building

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Thursday 3rd September (Erskine room 031)

8:45	Coffee/Tea/Orange Juice and nibbles *upstairs in the level 2 tea room*

Session 1 – Welcome/SE Honours
Session Chair: Associate Professor Austen Rainer

9:15	**Welcome: Professor Tim Bell**
9:30	Mahmoud Abduo. Myo gesture control armband and surface electromyography for medical application
9:45	Chris Carr. A comparison of the most popular javascript frameworks
10	Andrew Curtis-Black. Assisted Resource Management in the New Zealand Rural Fire Service
10:15	Roseanna Grundy. A Web-Based Framework For Personalised Language Rehabilitation
10:30	Daniel Hope. Creating a simulation to assess performance of MAC-level opportunistic forwarding schemes in linear cluster topologies
10:45	*MORNING REFRESHMENTS upstairs in the level 2 tea room*

Session 2 – SE Honours
Session Chair: Associate Professor Austen Rainer

11:15	Marcus Stenfert Kroese. Open-sourcing CS education. Computer Science Field Guild 2.0
11:30	Zack McGrath. Sharing Educational Questions
11:45	Brett McPhail. Online Platform for Supporting Physical and Neurological Rehabilitation (Gamification to Motivate Patients)
12	Cade Picard. Towards better estimation. Improving and supporting the estimation process in Agile team environments
12:15	Johann Reiher. Social Media in Software Development
12:30	*LUNCH upstairs in the level 2 tea room*

Session 3 – SE Honours / CS Honours
Session Chair: Dr Moffat Mathews

1:30	David Sowry. Using Gamification within Computer-Aided Rehabilitation to increase motivation for people with Aphasia
1:45	Devon Steenberg. Extending Moodle to allow searching for questions based on their attributes
	### CS Honours:
2	Jonathan Avery. A Similarity Ranking for Python Programs
2:15	Matthew Ruffell: Applying Bytecode Level Automatic Exploit Generation to Embedded Systems
2:30	Matthew Stephenson. Novel Methods for Reflective Symmetry Detection in Scanned 3D Models
2:45	*AFTERNOON REFRESHMENTS upstairs in the level 2 tea room*

Session 4 – Masters
Session Chair: Dr Kourosh Neshatian

3:15	Yakir Matusovsky. Reliability-Focused Scheduling with (m,k)-firm Deadlines over Wireless Channels - A Reinforcement-Learning Approach
3:30	Geela Fabic. Investigating the Effectiveness of a Python Tutor on a Mobile Platform for Novice Programmers
3:45	Yen-Ko Huang. Enabling Proxemics Interaction for Huge Public Display by Recognizing Human Actions
4	David Hunt. Development of an autonomous, forest-following UAV

Friday 4th September (Erskine room 031)

9	Coffee/Tea/Orange Juice and nibbles *upstairs in the level 2 tea room*

Session 5 –PhD
Session Chair: Professor Tim Bell

9:30	**Keynote Speaker: Dr Stephen Fitchett** (Telogis). Challenges in Developing Geospatial Software
10:00	Huidong Bai. Free-Hand Gesture-based Interaction for Handheld Augmented Reality
10:20	Oliver Batchelor. Improving Object Instance Recognition by Metric Learning
10:40	*MORNING REFRESHMENTS upstairs in the level 2 tea room*

Session 6 – PhD
Session Chair: Dr Dong Seong Kim

11	Tieta Putri. Painterly Rendering using an Iterative Brush Stroke Extraction Algorithm
11:20	Xingliang (Enos) Chen. Adding Erroneous examples to SQL-Tutor: Can this foster learning outcomes for novices and advanced students?
11:40	Caitlin Duncan. Computer Science and Programming in Primary School
12	Mengmeng Ge. A Framework for Modeling and Assessing Security of the Internet of Things
12:20	*LUNCH upstairs in the level 2 tea room*

Session 7 – PhD
Session Chair: Professor Andy Cockburn

1	Amir Hossein Moravejosharieh. Adaptive and Collaborative Resource Allocation For IEEE 802.15.4 Wireless Body Sensor Networks
1:20	Joshua McCulloch. An integrated system for automated inspection of overhead service distribution networks using UAV based sensors
1:40	Joshua Leung. Noticeable but not Distracting -- Characterising Highlighting Techniques
2	Scott Paulin. Path planning for a robot arm in an unstructured environment with unordered tasks
2:20	*AFTERNOON REFRESHMENTS upstairs in the level 2 tea room*

Session 8 – PhD
Session Chair: Professor Tanja Mitrovic

2:40	Philip Quinn. Perceived Value and Loss Aversion in Interaction
3	Mitodru Roy. Physically Based Animation and Modelling of Fluid Particle Systems
3:20	Huyuan Shangguan. Tracking, Control, Animation Techniques for Video-based 3D Motion-capture Algorithms
3:40	Shinichi Yamada. Optimal Hyper-parameter Search in Support Vector Machines Using B́ezier Surfaces
4	**Social gathering/Awards Ceremony in the Staff Club** Location: www.staffclub.canterbury.ac.nz/contact.shtml

Abstracts

Keynote

Dr Stephen Fitchett (Telogis). Challenges in Developing Geospatial Software.
Developing geospatial software is a challenge, but developing geospatial software that works well is even harder. When things go wrong, there can be big problems. In the best case, a truck driver might not know where to go to make a delivery. In the worst case, they might crash into a bridge. This talk describes some of the challenging problems we face developing this software, as well as what can go wrong when we don't get it right.

SE Honours

Mahmoud Abduo. Myo gesture control armband and surface electromyography for medical applications.
Through studying the relationship between surface electromyography (sEMG) and hand kinematics, hand-amputees may be able to recover a significant part of their lost functionality using non-invasive methods. By investigating the accuracy of the Myo gesture control armband, more people may be able to afford devices which help them recover said functionality. By setting up an experiment using a data acquisition interface to gather sEMG signals to classify movements, the accuracy of the Myo armband can be compared to other devices that have been used in similar benchmark studies. By analysing the results obtained, the Myo armband may be a viable replacement for other, more expensive devices that can analyse sEMG. In future studies, the data acquisition interface may be extended to support other sEMG recording devices.

Chris Carr. A comparison of the most popular javascript frameworks.
Javascript is currently the wild-west of programming languages. Frameworks rise and fall practically daily, with the more popular and usable ones edging out more complicated and outdated ones. There's a wonderful site out there called todomvc which creates an identical application in as many frameworks as possible, helping to highlight the differences between each. In this study, the simple todo application has been enhanced by a complete novice, in order to compare the relative difficulty of performing the improvement. Additionally, a brand new application to assist with auditing web activity and help with navigation has been built in vanillaJS, and the current most popular framework (angular) to compare the implementations.

Andrew Curtis-Black. Assisted Resource Management in the New Zealand Rural Fire Service.
While working with the New Zealand emergency services, Tait Communications noted a need for resource management software. Many existing processes are manual and paper-based, translating to greater costs and more frequent errors. This project aims to prototype an iPad application capable of presenting information about assets such as vehicles and firefighting equipment. Location data will be displayed on a map and additional metrics will be available, along with functionality to allow searching and filtering of this data. A four person team of students from the electrical and computer engineering department (ECE) is working on a related project which aims to create a vehicle-area network and attendant services for emergency vehicles such as fire engines. This network will supply the data presented in the proposed iPad application.

Roseanna Grundy. A Web-Based Framework For Personalised Language Rehabilitation.
The ability to communicate connects us with others and the world around us. Aphasia is a little known but prevalent language impairment resulting from damage to the brain, typically from a stroke. Each day around 20 New Zealanders experience a stroke, and a third of these people will develop Aphasia. Aphasia affects all parts of language, including speaking, understanding speech, reading and writing. Currently, Speech and Language Pathologists utilise supplementary software for clinic or home use.

The software is often drill based, presenting simple exercises ranging from identifying letters and words, to simulating conversations. There is no sensitivity to the individual needs of a patient at the software level. To develop the domain ontology, task components, patient model and constraints we have used ASPIRE. We present the current and ongoing development of a framework that allows for personalised therapy on behalf of the software.

Daniel Hope. Creating a simulation to assess performance of MAC-level opportunistic forwarding schemes in linear cluster topologies.
Wireless communication provides many benefits over using wired, two being the lower infrastructure costs and easier setup in difficult locations. In wireless networks it is common to use the CSMA protocol to manage the medium. Given that the topology of the network is known it may be possible to vary the distribution used to generate the back off wait times to allow for greater throughput. This project is to create a software simulation that can be used to test this theory.

Marcus Stenfert Kroese. Open-sourcing CS education. Computer Science Field Guild 2.0.
The Computer Science Field Guide (csfieldguide.org.nz) is a substantial open source book that is heavily used in NZ high schools and beyond. Its former publishing system needed scalability, however. We have investigated the needs and quirks of open source interactive textbooks, and devised improved infrastructure for the CSFG. Additionally, a support system for teacher contributions was developed. We discuss the impacts and results of these efforts.

Brett McPhail. Online Platform for Supporting Physical and Neurological Rehabilitation (Gamification to Motivate Patients).
Physiotherapists prescribe their patients with sets of exercises to perform regularly in their own time to aid in the recovery from serious physical or neurological trauma, such as stroke. For various reasons, patients often do not adhere to their programmes. The aim of this project is to develop an online application that will mitigate this problem, specifically by motivating patients with a game that will reward them for completing their exercises. The app we are developing presents a user with videos of the exercises they are scheduled to perform each day. As they watch the videos they are rewarded with credits that they can spend to decorate a virtual house. We will present our progress so far.

Zack McGrath. Sharing Educational Questions.
Many educational institutions use online quizzes to test students performance. New questions have to be made every year for exams and test so that the questions are new to the students. If staff across educational institutions had the ability to share questions the amount of effort that they put into making new questions would be reduced. This project focuses on creating a web application that allows users to upload questions exported from Moodle, search across the uploaded questions and export questions in a form that allows importing back into Moodle.

Cade Picard. Towards better estimation. Improving and supporting the estimation process in Agile team environments.
Estimation occurs when a team of developers approximate how much of each resource (e.g. time, effort) an item (e.g. projects, stories and tasks) will take to complete to a specific standard. The success of a project depends on how accurately each item is estimated. The main deliverable of this project will be a system that supports and guides teams through each phase of the estimation process. To do this, we will research current practices, create distinctly identifiable phases in the estimation process, and design and implement a system that supports these phases. Following that we intend to conduct a small pilot study with teams from SENG302. We will analyse data collected by the system and feedback from the teams to gauge if our system improved the estimation process.

Johann Reiher. Social Media in Software Development.
Social media is becoming an important asset for software developers. Twitter, in particular, is used for communication between both developers, and end-users. This presents a large quantity of development information and user feedback. Using Drupal as a case study, we investigate the use of

sentiment analysis on bulk sets of tweets in order to extract useful emotional trends relating to the development/release cycle.

David Sowry. Using Gamification within Computer-Aided Rehabilitation to increase motivation for people with Aphasia.
Current computer-aided rehabilitation problems for people with aphasia are stale, providing little motivation outside their own intrinsic need to improve. Current software solutions are not widely adopted or used in practice. While the leading existing solutions follow a repetitive and drill-based structure of problems using stock imagery. The presentation will show a new twist on the existing style of problems and the benefits of context. It will discuss further solutions and using the idea of service to motivate users into continued use.

Devon Steenberg. Extending Moodle to allow searching for questions based on their attributes.
Moodle does not by default provide any mechanism for a teacher to search through questions. The only thing it provides is categories; each question can be put into one and only one category. The user can then select a category. This method becomes inadequate when there are over 7000 questions and over 1300 categories. We designed and implemented a plugin for Moodle which solves this problem. The plugin allows users to enter meta-data about a question such as lines of code. This data can be manually entered or automatically generated. The user can then search for questions based on their meta-data.

CS Honours

Jonathan Avery. A Similarity Ranking for Python Programs.
Detection of similar programs is a highly studied problem. Detecting similar code is an important strategy for detecting badly modularized code, finding vulnerabilities due to error prone copy-paste programming methodologies, and detecting academic dishonesty in online code assignment submissions following the copy-paste-adapt-it pattern. The latter is the impetus for this work. A novel algorithm is presented that is specifically adapted to programs that may be small, and similar by virtue of being written to solve the same problem. The algorithm is also adapted toward specific expected behaviours of plagiarists.

Matthew Ruffell: Applying Bytecode Level Automatic Exploit Generation to Embedded Systems.
Finding vulnerabilities in software is a very difficult task, typically performed by experts. Ideally, we would like normal developers to be able to search for vulnerabilities in the projects they work on before they ship. We will look at how we can find vulnerable paths in software with symbolic execution, and how we can apply techniques automatically with little knowledge about the program. I will discuss how we can use these techniques to analyse and automatically generate exploits for small firmwares written for an ARM microcontroller.

Matthew Stephenson. **Novel Methods for Reflective Symmetry Detection in Scanned 3D Models.**
The concept of detecting symmetry within 3D models has received a large and extensive amount of research within the past decade. Numerous methods and algorithms have been proposed to identify reflective symmetry within 3D meshes and to extract a quantitative measure for the model's level of symmetricity. However, most of the previous work has focused on identifying symmetry in noiseless 3D models, with most existing methods unable to work effectively on models distorted by noise - such as those commonly obtained when scanning objects in the real world. This presentation details the design and implementation of two robust and fast algorithms, which can be used on a wide variety of models to identify global reflective symmetry. These methods are also able to identify likely planes of symmetry in models that have been distorted with noise or contain minor imperfections, making them ideal for scanned models of real world objects.

Masters

Geela Fabic. Investigating the Effectiveness of a Python Tutor on a Mobile Platform for Novice Programmers.
The popularity of Python in the industry and in teaching introductory programming courses has increased compared to other programming languages like Java. This brought about the idea of developing a tutor and investigating its feasibility to help novice programmers learn Python. The tutor will be developed on a smartphone device which has also gained popularity in the recent times. The tutor is composed of *Parson's problems* – a puzzle that presents a code snippet composed of randomised lines of code which requires the learners to rearrange it in its correct order given the code output. Details of the tutor will be presented such as its user interface, types of problems loaded, and the Python topics covered. The tutor will be evaluated with the help of COSC121 students to investigate its feasibility and effectiveness in learning.

David Hunt. Development of an autonomous, forest-following UAV.
When harvesting a forest, the area of cut trees is called the "cutover". The location of the cutover edge is useful metric for forestry operators as it relates closely to contractor's remuneration. Currently the cutover is only measured once or twice a year, using expensive satellite imagery or survey aircraft, and then manual identification of the edge. Unmanned aerial vehicles (UAVs) present an opportunity to dramatically improve the accuracy of the cutover edge measurements, while allowing for the edge to be surveyed far more regularly. This Masters project with Scion (the New Zealand Forest Research Institute) aims to develop a UAV platform that can autonomously record the cutover edge using aerial sensors in a portable, embedded application.

Yen-Ko Huang. Enabling Proxemics Interaction for Huge Public Display by Recognizing Human Actions.
An effective street vendor changes their content and pitch of advertisement according to passersby reaction and attention. Similarly, instead of showing static content, a public display is more likely to attract people if it has the ability to tune displayed content based on passersby's response. In this paper, we enable proxemics interactions for huge public displays by recognizing human actions using Fourier Temporal Pyramid together with Support Vector machine and Multiple Kernel learning. We also proposed a proxemics model based on previous research and modified it to suit our development and test-bed environment.

Yakir Matusovsky. Reliability-Focused Scheduling with (m,k)-firm Deadlines over Wireless Channels - A Reinforcement-Learning Approach.
In various wireless radio applications the quality of an underlying wireless channel is important, however, we know of a few applications that can tolerate some losses. As an example, real-time applications like streaming voice or video do permit packet loss and still retain a bearable service. With respect to quality of service requirement, we embrace one concise method to distinguish between the allowed and forbidden loss patterns - the (m,k)-firm deadlines where at least m out of k consecutive packets have to be successfully delivered to their destination. We consider a point to multi-point network with a known population of nodes and with one central node which is periodically polling all the end nodes. Given limited network resource, recovery of losses in such constellation might be very challenging under high error rates and with large number of nodes. In this paper, we consider policies that improve quality of multiple periodic streams by retransmission. The base scheduler decides which streams to serve with respect to the primary goal of minimizing violation of stream's deadline. Here, we introduce an algorithm from Reinforcement Learning theory and compare its performance to a few baseline scheduling policies under static channels and channels with time-varying characteristics.

PhD

Huidong Bai. Free-Hand Gesture-based Interaction for Handheld Augmented Reality.
In this research, we investigate mid-air free-hand gesture-based interfaces for handheld Augmented Reality (AR). We prototype our gesture-based handheld AR interfaces by combing visual AR tracking and free-hand gesture detection. We describe how each method is implemented and evaluate these methods in user experiments that compare our methods with traditional device-centric methods like touch-based input. Results from our user studies show that the proposed interaction methods are natural and intuitive, and provide a more fun and engaging user experience. We discuss implications of this research and directions for further work.

Oliver Batchelor. Improving Object Instance Recognition by Metric Learning.
An increasingly popular method of extracting descriptors from images is by the use of pre-trained neural deep Convolutional Neural Networks (CNNs). The human visual system benefits from many years of "pre-training" allowing it to recognize new objects quickly, where as object instance recognition datasets are often small and contain certain bias leading to bad generalization. We first demonstrate how metric learning can be successfully applied of object instance recognition by learning image descriptors. We then discuss how we might go about using external data to improve generalization and avoid bias present using small datasets, and plans to obtain such external data.

Enos Chen. Adding Erroneous examples to SQL-Tutor: Can this foster learning outcomes for novices and advanced students? One of the main issues for design of computer-based educational systems is what kind of assistance to provide to students in order to foster learning. On one side, worked examples (WEs) provide high assistance to learners. On the other side of the spectrum, unaided Problem Solving (PS) provides no assistance at all. In between these two extremes, Intelligent Tutoring Systems (ITSs) provide Tutored Problem Solving (TPS), giving adaptive support in terms of feedback, hints or other types of help to students based on their knowledge and ability. Another approach consists of giving erroneous examples (ErrExs), which provide WEs with errors in specific steps of problem solving and require students to find and fix errors. Most research with ErrEx in computer-based educational environment has been in the domain of Mathematics. It has been found that WEs are beneficial for novices, while ErrExs are more suitable for advanced students. However, how such learning materials should be presented in order to improve learning of different categories of students within (ITSs) is still an open question. We focus on how to refine this gap between novices and advanced students in order to improve their learning when they study with examples. The preliminary step is applying erroneous example as a complement to WEs and PS in SQL-Tutor.

Caitlin Duncan. Computer Science and Programming in Primary School.
Computer Science and programming have been introduced to school curricula in many English speaking countries in an effort to prepare students for living and working in a digital world, and to increase the numbers of students choosing to enter the growing software industry. These subjects are new to primary education and, unlike traditional subjects such as Maths and Science, are not familiar to the general public. I have been investigating how to break these areas down into their key concepts, how to present these to students and teachers, and how to do this in a way which enforces Computational Thinking skills. In this talk I will discuss the current state of primary school computing curriculum in NZ and other western countries, report on a pilot study of a curriculum based on Computational Thinking and the ongoing study this is now informing, discuss the ongoing Ministry of Education review of the Digital Technologies curriculum in NZ.

Mengmeng Ge. A Framework for Modeling and Assessing Security of the Internet of Things.
Internet of Things (IoT) is enabling innovative applications in various domains. Due to its heterogeneous and wide scale structure, it introduces many new security issues. To address the security problem, we propose a framework for security modelling and assessment of the IoT. The framework helps to construct graphical security models for the IoT. Generally, the framework involves five steps to find attack scenarios, analyse the security of the IoT through well-defined

security metrics, and assess the effectiveness of defence strategies. The benefits of the framework are presented via a study of two example IoT networks. Through the analysis results, we show the capabilities of the proposed framework on mitigating impacts of potential attacks and evaluating the security of large-scale networks.

Joshua Leung. Noticeable but not Distracting -- Characterising Highlighting Techniques.
Highlighting techniques are extensively used to draw attention to salient information in a timely manner. Example uses include alerting users to missed events (e.g. a missed Skype call), pending actions (e.g. an unread message or software updates to install), or time critical actions (e.g. an incoming call). However, there is still a lack of understanding about the relative tradeoffs between noticeability and distraction, and how highlighting techniques can be controlled to manipulate these effects. This presentation will summarise our work on finding a method to measure noticeability and distraction effects. We also present a model for constructing and controlling highlighting techniques.

Joshua McCulloch. An integrated system for automated inspection of overhead service distribution networks using UAV based sensors.
In our modern society we rely heavily on the continuity of electrical power and communication services. While the infrastructure required to deliver these services continues to increase in size and capability, it is often built on top of existing ageing hardware in environments which may impose some risk to the equipment and make continuous monitoring difficult. In our research we are constructing a system to apply automation to the task of monitoring and maintaining the state of overhead electrical and communications infrastructure. In this presentation we give a high level overview of the goals and current progress of our research, along with an in depth look at our LIDAR based data capture system and classification pipeline. We look at our early attempts to classify our scans using generic learning algorithms, and our current attempts to build an effective classification system using chains of classifiers built on top of simple rules based on prior knowledge.

Amir Hossein Moravejosharieh. Adaptive and Collaborative Resource Allocation For IEEE 802.15.4 Wireless Body Sensor Networks.
IEEE 802.15.4 Wireless Body Sensor Network (WBSN) is expected to play a pivotal role in health-related and well-being applications. Arguably, the most popular frequency band in this standard is the 2.4 GHz band. In this frequency band, WBSNs are exposed to two types of interference: internal interference which is the mutual interference of WBSNs over each other and external interference which is the interference caused by other technologies e.g. WiFi or Bluetooth. In this research we investigate the impact of internal interference on the WBSN's performance gain in terms of reliability and timeliness. We addressed the situations where many people wearing body sensor networks are gathered at the same place, for example at a sport event. Clearly, in such scenarios, WBSNs must compete with each other to gain access to the frequency spectrum and as a result, it is highly likely that many of them will experience noticeable performance degradation. A range of schemes is proposed to improve the performance gain of the IEEE 802.15.4 standard in the presence of internal interference.

Tieta Putri. Painterly Rendering using an Iterative Brush Stroke Extraction Algorithm.
Computational creativity is one of the most explored branch in artificial intelligence that is associated with the production of creative output through the help of machine. Painterly non-photorealistic rendering (NPR) is one of the sub-branch of computational creativity which aims to capture the existing artistic styles and create new images that resemble those styles. In this presentation, we propose a method for extracting brush strokes iteratively from images with existing artistic style. The extraction method will aid the stroke-based painterly NPR process as a tool for depicting a particular artistic style properly by looking through the characteristics of its brush strokes.

Scott Paulin. Path planning for a robot arm in an unstructured environment with unordered tasks.
A robot is being developed to autonomously prune grape vines at the University of Canterbury. We use computer vision to reconstruct grape vines, AI to find cuts, and planners to find collision free paths for the robot arm to follow. My research focusses on how to find short paths for the robot arm so that it can quickly prune vines. I will cover the collision detection, path planning, and how we decide which order to make cuts.

Philip Quinn. Perceived Value and Loss Aversion in Interaction.
Loss aversion is a well-established psychological effect wherein negative outcomes engender stronger negative sensations than the positive sensations resulting from positive outcomes. We build a model of reference-dependent preferences to interaction that seeks to predict and explain certain inconsistencies user preferences for interface conditions. In two experiments we find that (1) small components of negative progress can overwhelm the assessment of overall utility—substantial performance gains are required to overcome small elements of negative progress; and (2) this effect can be reversed by manipulating the system's response to appear more helpful, even though it still contains performance disadvantages.

Mitodru Roy. Physically Based Animation and Modelling of Fluid Particle Systems.
The primary goal of this project is to develop efficient methods for modelling and rendering particle-system based fluid behaviour in three-dimensional scenes. The framework involves physically based models such as Navier-Stokes equations for particle dynamics, and subdivision algorithms for modelling rigid objects. It also involves level-set methods.
A detailed evaluation of performance is going to be carried out and the focus will be on scene realism as well as the accuracy of the physical models. For example scenarios will be created wherein fire and water are made to interact with each other in open and closed containers respectively.
For another example a rigid body like a human body would be created and it would be seen if it can endure a sudden gush of water that is directed towards it. Depending on the speed and volume of the water and the size of the human body, the results will vary. For yet another example, the physical deterioration of objects that are set on fire would be modelled.

Huyuan Shangguan. Tracking, Control, Animation Techniques for Video-based 3D Motion-capture Algorithms.
Human motion capture data has been widely applied to generated realistic human body motion for decades. Although many works have been done in this area, capturing motion sequences from existing videos remains a challenge. Changing of perspective, complexity of background, and multiple degrees of freedom (DOF) of the human body make tracking person's full body movements by current techniques unrealistic. In this study, we propose a new framework to capture single person's motion sequence with minimal user interaction from existing videos, such as sports games or movies. In this study, marker-less tracking algorithms, machine-learning techniques and human dynamics are incorporated to track human motion sequence from exiting videos and then the motion data is applied to a virtual character. This novel framework will facilitate motion tracking easier, faster and more accessible to small animation producers.

Shinichi Yamada. Optimal Hyper-parameter Search in Support Vector Machines Using B́ezier Surfaces.
We consider the problem of finding the optimal specification of hyper-parameters in Support Vector Machines (SVMs). We apply B́ezier curves to the approximation of the performance surface in the hyper-parameter space. This geometrical approach helps us grasp some useful information which has not been noticed before. The results suggest that it would be possible to construct efficient search tools for several dimensional hyper- parameter spaces.

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Jade systems sit at the core of banks and building societies, at the logistical centre of shipping ports all around the world, and at 2.1 million electricity and gas connection points in New Zealand.

Today we have three lines of business: Jade Logistics for ports and freight; Jade Technologies for developers and technology partners, and for clients in other industries a multi-skilled team of digital business transformation experts.

Our global headquarters are in Christchurch, where we started out. There are also Jade offices in Auckland, Dunedin, Australia, USA, UK, Netherlands, Indonesia and the United Arab Emirates.

www.jadeworld.com

Assurity is New Zealand's leading software testing and Agile | Lean consultancy. We give the nation's biggest enterprises confidence in the quality of their software and the confidence to change the way they deliver software. Better testing. Better delivery. Better outcomes. To talk more contact us on 03-3799146.

Dynamic Controls is the world's leading manufacturer of electronic controls for power wheelchairs and scooters. Focusing on innovation and growth in the bio medical engineering sector, Dynamic Controls works to go above and beyond expectations to ensure end users receive the best product possible in order to enhance their quality of life. Dynamic Controls is unique in that we specialize in the medical mobility market. Products range from cost effective integral controllers to a world leading modular control system that can be customised to suit a wide range of user needs. In addition we have a range of scooter controllers suitable for small, lightweight mini shoppers to rugged outdoor scooters. All our products are renowned for reliability. Dynamic Controls is a global organization which employs 333 people, with corporate headquarters in New Zealand and regional offices in the United Kingdom, North America and Asia.
http://www.dynamiccontrols.com/

Orion Health's 350 (and expanding) employees supply technology and services to over 1100 clients worldwide. Orion Health is a leading provider of clinical workflow and integration technology for the healthcare sector. Orion Health's clinical information software meets the information needs of clinical staff and healthcare managers, delivering secure, universal access to healthcare information and helping healthcare providers proactively manage and coordinate patient care across the community. Orion Health's integration and messaging products streamline the exchange of healthcare data within organisations and between business partners. Integrating healthcare systems throughout the world since 1993, Orion Health contributes to integration and clinical workflow projects across the globe for clients including Abbott Laboratories, New York State Department of Health, Capital Health, New South Wales Health, and the New Zealand Ministry of Health. Orion Health has offices in the United States, Canada, United Kingdom, Spain, Dubai, Singapore, Bangkok, France, Australia and New Zealand, and our growing network of partners includes leaders in technology and services such as Oracle Corporation, LogicaCMG, Sierra Systems, Sun Microsystems, Philips Medical Systems, Hewlett-Packard and IBM. Further information including a video featuring staff in our Auckland office can be found at www.orionhealth.com.

Tait Communications: Our clients protect communities, power cities, move citizens, harness resources and save lives all over the world. We work with them to create, support and unify the critical communication solutions they depend on to do their jobs.

Digital mobile radio communication forms the central nervous system of everything we do. Around this resilient, robust core we design, develop, manufacture, test, deploy, support and manage innovative communication environments for organizations that have to put their total trust in the systems and people they work with.

Our global Service Management Centres are staffed with trained and experienced professionals using industry-leading management applications to monitor and manage our client's critical communications networks, allowing them to focus on their core objectives.

We've worked hard to develop genuine insight into our clients' worlds, and have pursued engineering, operational and services excellence for more than 40 years. This understanding, and our belief in championing open-standards technology, means we can give our clients the best possible choice and value to achieve the human outcomes they're driven by.

We're not simply aligned with our clients, we're devoted to their cause.

SLI Systems makes site search and merchandising easy. We install, customize, integrate, host and maintain everything for site visitors find the products and information they want. Most search technologies use complex algorithms to determine which results should be returned for a query. Our patented Learning Search technology takes relevance a step further by learning from site visitors' behaviour over time to deliver more relevant results. We are a global business with over 50 staff in Christchurch, with additional offices in California, London and Melbourne. The Christchurch office is the anchor tenant for the new Enterprise Precinct and Innovation Campus Project (EPIC). http://www.sli-systems.com/