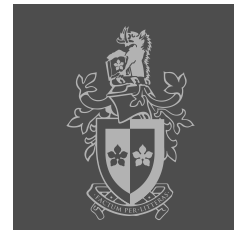


## Research Interests of Philip Branch

Philip Branch



### Outline



- Using machine learning to identify Skype traffic
- Characterisation and synthesis of first-person shooter game traffic
- Handover strategies in next generation cellular networks
- Using time series methods to model software evolution



## Identifying Skype Traffic

- Part of a larger project with the goal of identifying the class of a traffic flow based on external attributes
  - Packet length, packet interarrival times and higher order statistics derived from them
- Motivation is in QoS management, Lawful Interception and Intrusion Prevention
  - Cisco's IPS identifies Skype traffic based on characteristic packet lengths
  - Works well for specific releases but fails with new releases
- Goal is to find a quick, robust, reliable method
  - Particularly interested in attributes that do not change from one release to the next



## Identifying Skype Traffic

- Some success with attributes based on autocorrelation and coefficient of variation
- Classifier trained and tested on different versions of Skype
- Current work is to find best attributes that can be computed rapidly

Trained on Skype v3, tested on Skype v2		
Skype	Other	Classified as
0.84	0.16	Skype
0.03	0.97	Other

Trained on Skype v3, tested on Skype v4		
Skype	Other	Classified as
0.81	0.19	Skype
0.09	0.91	Other



## First Person Shooter Game Traffic

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- Goal is to understand FPS game traffic in order to synthesise it
  - Wish to be able to simulate new games as they are developed
- Some interesting linear behaviour in FPS game traffic
  - Knowing probability density function (PDF) of a two and three player game enables prediction of PDF of games with larger numbers of behaviour
- Current research
  - Capturing the autocorrelated nature of games using Box-Jenkins models
  - Efficient methods of generating traffic streams with large numbers of players

## Handover in 4G Cellular Networks

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- Goal is to identify new techniques for heterogeneous handover that reduces the likelihood of a handover failure but at modest increase cost
- Have developed a scheme Conservative Soft Handover (CSHO)
- Instead of using both radio interfaces during the handoff period, mobile station (MS) activates and deactivates its radio interfaces and transfers between which ever is able to provide the best signal



# Modelling Software Evolution

- Collaboration with our software engineering colleagues
- Use time series modelling to predict how software changes over time
  - Each class has attributes that evolve with time
  - Examples are number of methods, fan-in and fan-out counts, etc
- We can model these changes with discrete time Markov Chains
  - Examine probability of a class changing in the initial release (release 0)
  - Use that to construct a Markov Chain to predict number of changes in successive releases

CDF of number of classes changed by release 4 (ANT)

