

# **New Horizons in Digital Media**

# **NHDM - 2012**



## **Abstract Proceedings**

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# New Horizons in Digital Media (NHDM 2012)

## An Interdisciplinary Research Workshop

November 10, 2012

University of Bedfordshire, Luton, UK



Digital Media (DM) and related technologies, services and products are no longer an option alongside more traditional media. They have been embedded into almost every aspect of modern life. The rapid growth of DM and their role in our world can be attributed to major distinguishing features including programmability, interactivity, mass storage, multi-dimensionality, and distributed structure (networking and mobility). Efficient use of these features is the key to successful utilization of DM-based systems. On the other hand, DM have intertwined with all facets of life to the level that studying them is no longer limited to one discipline. DM bring together three basic components of technology, people, and content. Proper academic study of DM should be a fundamental priority for universities and need to consist of these three components. The University of Bedfordshire, Institute for Research in Applicable Computing, invites all researchers, professionals, and students to participate in a one-day discussion on the new horizons in digital media research. Participants may submit a research presentation or poster on the workshop topics including but not limited to:

- Advances in hardware and software
- Graphics and Animation
- Computer Games and Virtual Worlds
- Artificial Intelligence (AI)
- Human-Computer Interaction (HCI)
- Image Processing & Computer Vision
- Web Applications
- Mobile Applications
- Communications and Networking
- Information Technology Adoption and Usage
- Educational Technologies
- Multimedia Design
- Digital and Interactive Art

The workshop program will include invited keynote talks from academia and industry, research presentations, and poster sessions. A separate track is scheduled for PhD research and student project presentations.

### Keynote Speakers:

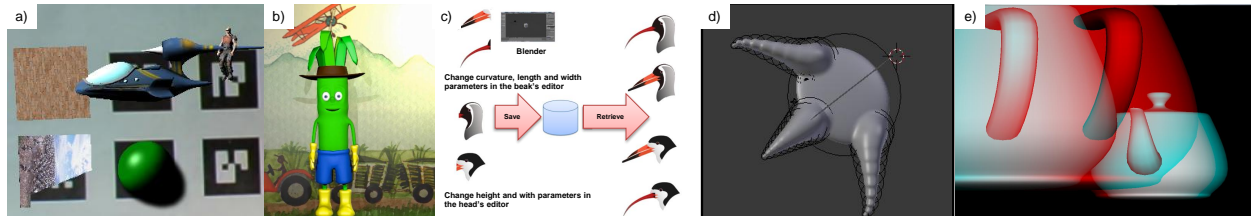
- Opening Talk: Dr. Ali Arya, Carleton University, Canada
- Invited Speech: Dr. Abdenmour El Rhalibi, Liverpool John Moores University, UK
- Invited Speech: Dr. Andres Adolfo Navarro Newball, Universidad Javeriana in Cali, Colombia
- Invited Speech: Gorm Lai, Kotori Studios and Global Game Jam, UK/Denmark

### Technical Program Committee:

- Dr. Baihua Li, Manchester Metropolitan University, UK
- Dr. Ali Arya, Carleton University, Canada
- Dr. Edmond Prakash, University of Bedfordshire, UK

# Graphics and Interaction for Museum Environments

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**Figure 1:** Towards an interactive model for museums. a) Augmented reality book page displaying several multimedia types. b) Augmented reality demo at the sugar cane museum. c) 3D modelling process. d) Creating a bird's leg. e) Basic virtual reality experiments.

## 1 Introduction

Technology elevates interest and allows creating experiences that transform the visitors [Ciolfi et al. 2008]. However, technological developments at museums are usually rigid [Styliaras 2007]. Our Interactive Model for Museums (MOMU) aims to support complex cultural contents using tools that favour learning and user's interest. It integrates technological innovation following an interdisciplinary approach to aid designing educational environments for museums.

## 2 Our approach

**Affordable Interaction Technologies.** We use AR Books [Billinghurst et al. 2001] and tangible surfaces [Patten et al. 2001]. AR books can provide 3D views of complex situations, increasing understanding and are an evolution of traditional books, the main medium of teaching and learning [Do and Lee 2009]. Our AR book overcomes limitations in the output data type and provides tangible interaction using the Kinect (Figures 1a and 1b). Besides projecting 3D objects and animations with synchronized rotation and translation on pages, it allows to create pages and to introduce markers with related elements such as: virtual models, animations, videos, sounds, images and gestures. Additionally, we will provide integration to basic virtual reality scenarios (Figure 1e).

**Modelling tools.** Virtual worlds required in interactive environments use 3D models. Our development is motivated by the need of creating 3D animals for virtual environments at museums and inspired by the modelling by parts approach [Katz and Tal 2003]. It is also similar to [Jain et al. 2012] but considers parameterisable components of organic live beings and a generic classification model for animals which contemplates 3D edition tools. Our model categorises a 3D component according to its morphology. It takes into account its parameters and allows it to be classified. Parameters consider topological, spatial, kinematics and rendering features. Then, stored 3D parts can be edited to create new components using a Blender edition plug-in or to build a complete animal. For example (Figure 1c), using one plug-in, we alter a bird's peak in terms of its curvature, length and width. Using another plug-in, we alter a bird's head in terms of its height and width. The new sub components can be stored in a graphic's databank (or retrieved from the databank to create a new one). Once we have the components, we retrieve a set of them to create a complete animal model that is stored in the databank. We have advanced in the leg-arm editor (Figure 1d) and have created a GUI to overcome some of the complexities of 3D design tools. The graphic's databank stores any animal model and sub-model with its parameters. We still need to

explore computer vision and mesh partitioning methods in order to take advantage of existing visual information.

**Content management.** Narrative databases support interactive storytelling allowing to maintain and to use a repository of narratives [Ciarlini et al. 2010]. Our narrative system will help to achieve flexibility. In order to build it, we are using a narrative database and evaluating an interface based on a timeline. The main challenges are the smooth technological integration and finding out how the timeline aids museum interaction and supports complex cultural content in an "invisible" and flexible way.

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# Digital Media on Mobile Devices

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**Overview:** There has been considerable development in mobile hardware architectures, media software architectures as well as in new ways of interaction. This presentation will look at core developments in graphics technology on mobile devices. First we will look at the architectural foundations on which the mobiles and handheld consoles are built to deliver media performance. Millions of hand-held and portable devices are sold and their performance has grown rapidly. Middleware software or media engines, help developers build media content with rich features and also simultaneously harness the power of the hand held devices for user satisfaction. The third part will highlight the way users interact with the mobile devices. The mobile devices are an instant success because of the more intuitive interfaces. Finally, we will also look at novel research developments that go beyond current interaction devices.

**GPUs:** The Graphical Processing Unit (GPU) has revolutionized a wide spectrum of computing activities from game consoles to the modern supercomputing systems. We explore the various advances in media technology because of the underlying GPUs. For developing high performance media applications, developers rely on the performance of GPUs that have become integral in the mobile devices.

First we look at the various mobile devices and how the GPU helps in achieving the performance. Figure 1 shows the organization of the execution units (ALUs) in a CPU compared with the GPU. The GPU has tiny computing elements, but has several of them and facilitates single instruction that operates on multiple data in parallel. The GPU also is designed for high computation per memory access. The CPU on the other hand is flexible and can perform logical operations, branch-intensive operations and also random access, memory intensive operations.

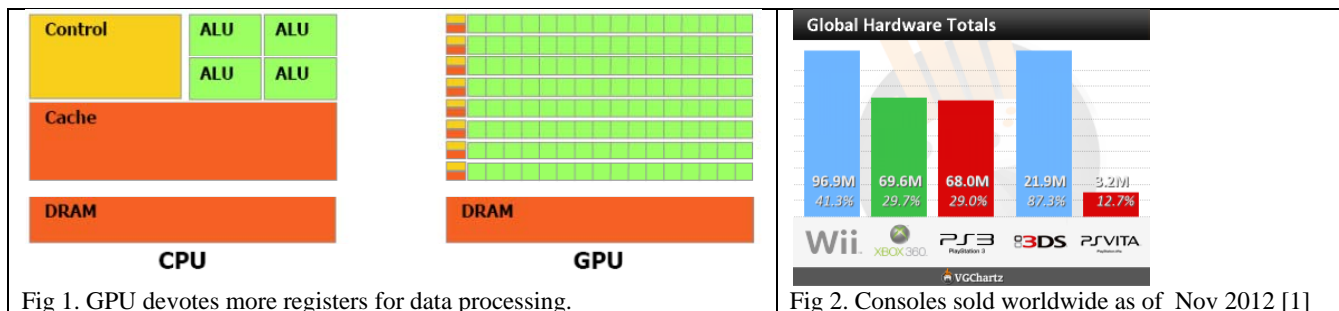


Fig 1. GPU devotes more registers for data processing.

Fig 2. Consoles sold worldwide as of Nov 2012 [1]

**Consoles:** There has been an exponential growth in the demand for handheld games consoles. The development of consumer electronics has accelerated the adoption rate of games consoles. Figure 2 shows the total number of the current generation of consoles that have been sold until Nov 2012. The sheer number of consoles sold exceeds 50 million for every vendor has been the driving force for the success of the console and its underlying hardware. The unified processor can deliver better performance for the same number of transistors. The XBOX 360 and more recently the iPad and iPhone systems attempt to unify CPU cores with the GPU in a single processor [2]. Another benefit of the unified processor architecture is reduced power consumption. Media hardware development in the form of consoles and mobiles has been successful.

**Summary:** In summary this presentation will look at the development of media technology which is taking place at a rapid pace. Areas of development have been in the hardware and software for media content development and deployment.

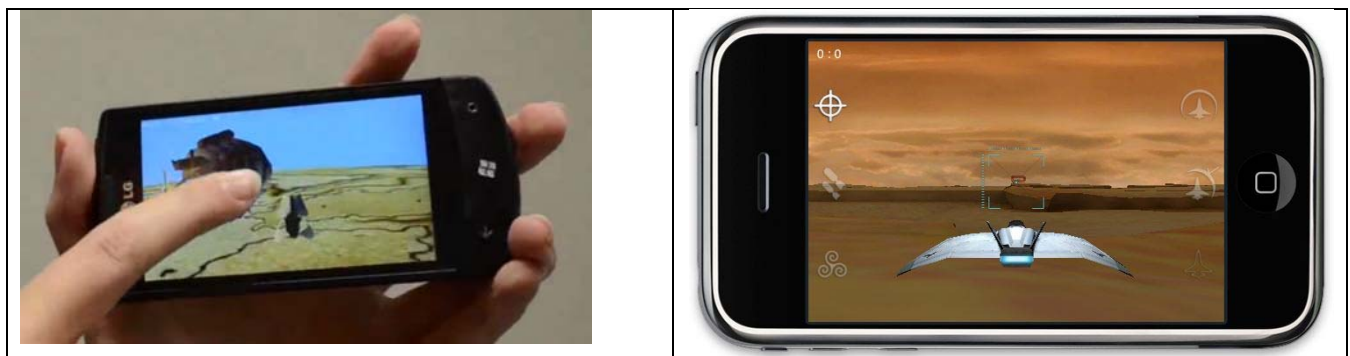


Fig 3: Snapshots of media display on mobiles. Courtesy of <http://www.youtube.com/exploreIMD>

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[1] Game Console Hardware total sales, Source: <http://www.vgchartz.com/>

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# Virtual Environments for Teaching and Assessment of Risk within Project Management

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## Abstract

Project Management is an inherently inter-disciplinary activity and defined by the Project Management Institute as “the application of knowledge, skill, tools, and techniques to project activities to meet project requirements (PMI, 2008). In order to teach Project Management an approach based on practical, hands-on experience seems most appropriate. This follows the ‘situated learning’ approach by Herrington and Oliver (2000) which encompasses parameters such as authentic context, multiple roles as well as perspective and collaborative construction of knowledge. Whilst some knowledge areas of Project Management are straightforward to deliver – for instance time management is enforced by the inherent context of a university assignment that is linked to ‘natural’ deadlines – other areas are less obvious to be incorporated. One of these areas is Risk Management.

Indeed health and safety considerations as well as common sense suggests that student should not be exposed to a source of “real” project risks such as damage to health, bankruptcy or other material loss. The use of Virtual Worlds – as these provide a controlled environment – is therefore a useful way to implement risk within a project management course. Virtual Worlds have been used within teaching of Project Management at University of Bedfordshire since 2008. The more experimental experience within Second Life (Figure 1) as a provider is documented in (Conrad, Pike, Sant & Nwafor, 2009). A systematic exposition of the Second Life is then detailed within (Conrad, 2011).

In 2011, a different provider, Reaction Grid, has been used (Figure 2). While the underpinning technology is similar there have been notable differences between these two environments (Kanamgotov et al, 2012). We discuss how these may have impacted the teaching of Project Management.



Figure 1: Second Life, 2008

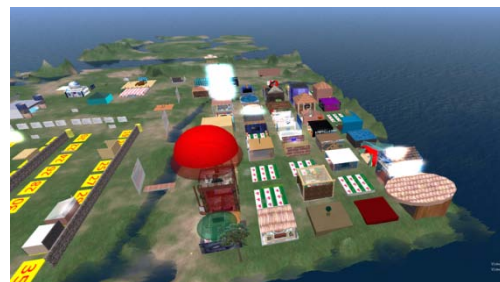


Figure 2: Reaction Grid, 2012

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# Adaptive User-Driven Compression of Multi-View Video with Rate and View Scalability

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We derive an optimization framework for joint view and rate scalable coding of multi-view video content represented in the texture-plus-depth format. The optimization enables the sender to select the subset of coded views and their encoding rates such that the aggregate distortion over a continuum of synthesized

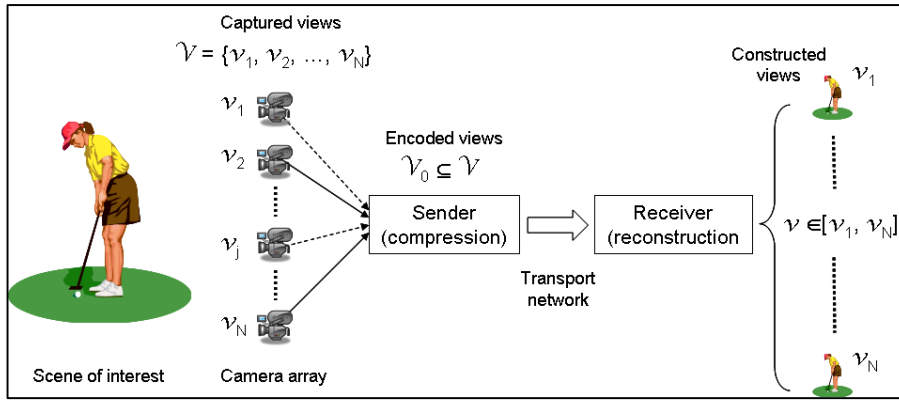


Fig. 1. Overview of a multiview imaging system.

views is minimized. We construct the view/rate scalable bitstream such that it delivers optimal performance simultaneously over a discrete set of transmission rates. In conjunction, we develop a user interaction model that characterizes the view selection actions of the client as a Markov chain over a discrete state-space. We exploit the model within the context of our optimization in order to compute user-action-

driven coding strategies that aim at enhancing the client's performance in terms of latency and video quality. Our optimization outperforms the state-of-the-art H.264 Scalable Video Codec (SVC) as well as a multi-view wavelet-based coder equipped with a uniform rate allocation strategy, across all scenarios studied in our experiments. Equally important, we can achieve an arbitrarily fine granularity of encoding bit rates, while providing the additional novel functionality of view embedded encoding, unlike the other encoding methods that we examined. Finally, we observed that the interactivity-aware coding delivers superior performance over conventional allocation techniques that do not anticipate the client's view selection actions in their operation.

**Keywords:** Multiview imaging, depth-image-based rendering, bit allocation, view and rate scalable encoding, user-action-driven coding, view selection Markov model

# TAXONOMY OF DECENTRALISED ARCHITECTURES IN ONLINE SOCIAL NETWORKS

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## ABSTRACT

Social networking has become increasingly popular in the last few years among all age groups and professions; but this has raised number of issues surrounding user's privacy and security. Existing social networking services are centralised and they hold the complete authority to control all the users' data. This has prompted the users to distrust the existing social networking service providers and think of decentralised approach. This paper will examine the attempts that have been made to create such architectures and will explore their feasibility, identify the gaps between them and will provide possible solutions. We have also proposed a model that will answer the issues surrounding access control policies and user's data replication over multiple nodes.

## Categories and Subject Descriptors

Distributed Systems, Decentralised Architecture.

## General Terms

Social Networking, Facebook, Diaspora, Mr. Privacy, Peerson Prpl, Hello World.

## Keywords

Taxonomy, Online Social networks, Decentralised social networking, Decentralised architectures, Web 2.0.

## INTRODUCTION

Online Social Networks has now become a part of our everyday life; we keep contacts with our friends and families and even work colleagues. Jaakkola believes that we are moving from information society to a network society. It also has a great influence on businesses to advertise their products or services online and reach their potential customers. The success of online social networks has completely changed the way people interact with each other. Among the most dominant social networks are the Facebook and Twitter that have completely changed the way people interact with each other that hold data of millions of users. Where the online social networks have brought advantages to the community and businesses it also has put the users privacy and security at risk. There are number of issues associated with the existing designs of social network service providers. Some of the key problems are: i) Users don't have hold of their data[2][1][3]; ii) Users have to agree to the terms and conditions of the service providers that can be changed anytime without any prior notice [4][2]; iii) There aren't any set of fine grained policies for access control [4]; iv) Privacy leakages. Some of the service providers were also being caught selling users data to third parties [4]; v) The users data provided to businesses might be very good for them to target their customers by personalizing ads but it could be very dangerous on the other hand as the service providers knows their relationship with the customers

This has raised serious privacy concerns among the users and in the research community.

For that reason alternative solution have been propose and many attempts have been made to create a fully decentralised model of online social networks where the users will control their data and should have find grained access control policies. Several proposals in the literature have been made that aim to provide better user privacy without changing the existing architecture. Examples of semi/fully decentralised online social networks are Peerson, Diaspora, Mr. Privacy and PrPl. Diaspora is the only large scale online active social network that provides features similar to existing social networks with over 216,000 users as of November16, 2011 [1].

## PROPOSAL

In this work we present a Decentralised model of online social networks and will look at the existing models proposed by the other researchers in the community. The paper is organized as follows. In the presentation we explore the tremendous success and need of online social networks (OSN's) over the last few years. Next we will discuss the differences between centralized and decentralised models in OSN's. Then we explain the related work done in creating a decentralised model that may ensures better user's privacy and security. We will give a brief overview on the existing social networking service providers. We will also compare the attempts that have been made to create distributed model of OSN's, their limitations and possible will propose solutions. Finally we will include our proposed model for data replication of user profile by ensuring better user privacy and access policy; in this section we will also discuss trust issues related to it. We will also discuss the strengths and weaknesses of the proposed model.

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# Quantifying the Immersion in Mobile Virtual Reality (MVR)

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## Abstract

3D Virtual Realities can greatly enhance learning experience by bringing new technologies and approaches in online based education, providing with richer environment, more resembling the real classroom and allowing for deeper involvement of students. Currently many universities utilize the tablet PC in formal taught courses, [1] allowing students to revise material at their convenience. Does this new technology enhance the learning process or, in contrast, it limits the learner's ability to comprehend material? Will 3D environment, being accessed from tablet PC, provide with the same level of immersion, (deep mental involvement (Oxford Dictionary) or the sense of "being there"? [2]). By this work we will try to fulfil the gap in quantifying immersion in MVR- subject which is not covered properly yet as we believe.

In 2007 the University of Bedfordshire began to utilize Second Life for classes in the Linden Scripting Language and Project Management. In our previous experiment, which was the continuation of Conrad's research [3] the attempt was done to quantify immersion in VR environment where goals are not identified at all, namely, in 3D online world. Students were required to build an educational showcase within Virtual Environment and to develop an artefact of their own choice (unrelated to virtual worlds). Results indicated that not much immersion happened during the experiment. The reason for the lack of immersion experience we see in a lack of communication due to general underpopulation of virtual world, used for experiment. The paper summarising the findings was accepted for publication in September 2012 by IEEE Cyberworlds conference in Darmstadt (Germany). [4]

In this research we propose to measure immersion in the MVR, used for educational purposes. We argue that immersion, which plays a vital role in material comprehension, will not be lost due to technical constraints of tablet PC (e.g. smaller screen size, lower CPU power). Having the tablet as the only meaning of communication while being out of class or home, as we believe, brings more sense of concentration and immersion into material. Previous experiments [5] have been undertaken within non-mobile VR environments and the user's goal was clearly identified- to find a hidden objects or to play predefined games. In games or, for instance, training simulators the most immersed users, as indicated by the experiments' results, demonstrated better performance. [6]. However, there is also the "less is more" approach. Gaps and omissions stimulate engagement since the reader fills the gaps of what happens between each panel of the illustrated story [7]. But how much immersion would be enough and how that affects the comprehension of the material? [8]

This work will seek to investigate the influence of mobility on immersion experience while using Tablet PC for learning course material within MVR. The aim of this project is to create a novel methodology or framework to quantify immersion. Participants will be doing a "task" in MVR. By "task" we mean the presence in MVR without clearly identified set of goals, e.g. having a group meeting, in contrast to strictly goal oriented game environment. During the experiment participants must be isolated from each other, physically being in different places to prevent "Real life" communication. All the communication must be held exclusively through avatars in MVR. It is expected that results will demonstrate that mobile immersion will not significantly drop in comparison to stationary environment. The reason for this conclusion lies in the results of our previous research which indicated that immersion mostly depends on successful communication among users rather than technical aspects.

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# Novel Techniques for Moving Target Search in Dynamic Environments

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**Abstract:** This research is solving path-planning problem of multiple competing players within dynamically changing environments. The circumstances of the environment and capabilities of players occupy key roles with this problem, which is the problem of path-finding for competing multiple agents subject to multiple moving obstacles towards static or moving targets. It is expected that multiple moving objects will create dynamic temporal obstacles in the considered environment. Machine learning techniques and heuristic search algorithms are promising AI approaches to tackle this type of dynamic problems. The path planning problem for multiple competing agents subject to multiple temporal obstacles, which has significant complexity, has not been tackled to the best of our knowledge.

The main aim of this study is to investigate how to model and solve the path-planning problem of multiple competing players towards static and/or moving targets subject to dynamic and temporal obstacles using cutting-edge machine learning and heuristic search algorithms and then visualise the complete system. A multi agent modelling approach will be implemented so that multiple players and multiple moving targets will be considered within the same problem setting [1]. The ultimate aim will be to maximise the achievement of each player in hitting all corresponding moving targets by solving the problem and visualising the product.

The study reported in [2] is on chasing and capturing a moving target with Multiple Agents Moving Target Search algorithm, where the agent is a policemen chasing after a moving villain to catch it. Multiple participating policemen can communicate among themselves; can see what is in front of them. Information about the target and coordination among the agents gives maximum coverage and speeds up the process, where agents are initially coordinated and then use real-time heuristic search for each agent. A similar study is presented in [3], multiple agents coordinate and share information to achieve their goals with Cover with Risk and Abstraction algorithm.

In order to achieve the project, a more realistic test environment will be designed, where multi agents need to cross the river with moving obstacles. Once they cross the river, they have got targets to pursue and capture. The river has got wooden boards that flow within the stream. The agents with a capable jumping radius need to jump in to the one available board and jump out to other side of the river in most suitable place. These are moving obstacles that need to be solved before they can surround and capture the moving target. This scenario is inspired of the study reported in [4], where a cylinder moves towards the static target, avoiding static or moving obstacles by performing forward movements or jumps.

A multi-agent approach will be developed to setup such a simulation environment with visualisation functionalities, where all players and the obstacles are agents. The agents will be trained made learning how to act optimally in real-time with reinforcement learning algorithms and heuristic-based learning approaches. A game engine will be used to demonstrate and visualise the whole scenario and achievements.

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# The WotBot: When Things are Abused

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## Abstract

The Web of Things (WoT) describes “a collaborative computing environment” [1] using the established and (possibly future) protocols and standards of the traditional Web [2]; this environment is formed by the interconnection of objects. The WoT is essentially the technology behind accessing *Things* (where the “Things” set includes, but is in no way limited to, medical equipment, medications and traffic controllers) that are accessible via web browsers, mobile and/or desktop apps and any future communication, access, control/monitoring methods that may be developed and applicable to this purpose.

The underlying network of the WoT is referred to as the *Internet of Things* (IoT). Currently the major enablers of the IoT are Radio Frequency Identification (RFID) tags, wireless sensors (and actuators). These technologies introduce a plethora of realised and envisaged benefits to society ranging from innovative applications in health e.g. [3], all the way to social applications such as Pachube [4].

Research into identifying security issues in the IoT and WoT has already been and continues to be carried out as is evidenced by the work of [5], and [6] among others. Various threats to the WoT are already being identified. Here we concentrate on one particular possible threat to the WoT.

*Botnets* describe the networks of computing resources (hosts) that are commandeered with the aim of using them to perform specific tasks including, e.g., Distributed Denial of Service (DDoS) attacks [7] on unsuspecting specified targets by applying the collective resource of the hi-jacked devices. Each of these sometimes unwitting **bots** (derived from the word *robots*) are typically infected with malware that serves as a “control contact point” for the “Botnet Master” via which instructions or commands can be sent to the bots to execute. It is not illogical to envisage a similar situation arising in the IoT and WoT.



**Figure 1:** An attacker takes control of a sensor network and disrupts normal traffic flow.

Figure 1 above illustrates how a system of hi-jacked sensors, which in this case are a collection of traffic detection sensors, can cause the traffic lights to erroneously reflect the wrong traffic situation leading to a traffic jam.

We highlight the threat of the development of **robots** in the **Web of Things**, or *WotBots*, an acronym for a possible development of a scheme to hi-jack a collection of sensors (see *Figure 1*) and other WoT-enabling devices and apply them to various hitherto unintended uses. We also highlight the need to develop (i) a framework - a set of guidelines - and (ii) relevant forensic tools for investigating possible crimes that might be carried out against or by arrant WoT elements.

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# Intelligent Facial Agent: A Survey of Behavioural Affective Expression

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**Aim:** The aim of this research is to develop original algorithms capable of detecting and synthesising human's facial expressions of emotions.

**Applications of Facial Animation:** Simulating human's behaviour and more specifically facial actions has drawn the attention of image and computer vision scholars. Face performance involves expression of emotions that can facilitate social communications. An efficient and realistic emotion-driven virtual face provides a vehicle for improving human-computer interaction, online communication in virtual environment and affecting people who suffer from psychological and behavioural disorders. The aspects explored are examining and evaluating the existing systems and techniques in capturing face data and creating 3D prototypical model.

**Related Work:** There are a considerable number of efforts in producing animated computer-based characters that can represent facial behaviour (see Fig. 1) and expressions synthesis (for example shown in Fig 2 from Zhang et al. (2004)). The research shows that Facial Action Coding System (FACS) developed by very early work of Ekman underpins much of the work in producing virtual expressive avatars. They encoded muscle movements involved in six universal expressions: fear, anger, sadness, joy, disgust, and surprise. Other researchers have extended to 3-dimensional model including Pleasure-Arousal-Dominance (PAD) that measures the emotional states and can help the creation of more complex expressions. The MPEG-4 animation system defined Facial Definition Parameters (FDPs) as a set of facial feature points that can be customized using Facial Animation Parameters (FAPs) pre-defined actions associated to each group of FDP (Deng & Noh, 2007). Zhang et al. (2007) adopted FAPs as low-level parameters and PADs as high-level parameters in conveying specific emotions in the faces. They proposed Partial Expression Parameters (PEP) in order to use local regions of the face to create emotional states. The work of Arya et al. (2009) is geared toward the perceptual validity of generated expressions. Their proposed Expression Units is Action Units correlated to certain values of emotion dimensions: Pleasure-Arousal-Agency. They demonstrated blended emotions that are more acceptable in user's vision system. Martinez & Du (2012) argue that perception of emotions does not only rely on the movements of facial features but also the location of facial components. Therefore, their proposed emotional model comprised of both facial actions and configuration features.

**Open Issues:** Some of the open issues in addition to face modelling, rendering and animation includes considering culture and gender in simulating emotions. This would be one area of focus for my research.

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# Social Networking Websites: Usage of Fake Identity on Facebook

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## Abstract

This paper explores the current existence of fake identities on social networking websites such as Facebook. Facebook is a fast growing social networking website with 1.01 billion users [1]. The main aim of this paper is to discuss the usage of fake accounts used to trap genuine users and also to determine appropriate solutions to stay away from cyber predators. Facebook attracts many cyber predators due to its lenient policies about identity usage. Facebook's root motivation is communication and maintaining relationships [2], hence increasing the chances for the users to be a victim of identity related crimes. An identity is considered to be "fake" if an individual is not using their own identity. This is a common activity on social networking websites such as Facebook. [3] A survey conducted by consumer reports investigation team has found that 1 in 4 users on Facebook lie on their profiles. Even though certain users lie to conceal certain information about them, it can be seen as deceiving to some users as they are using different personalities.

False name, age, gender etc are some of the attributes of fake identity. An example of these attributes used on Facebook is the case study of Gemma Barker [4]. Gemma Barker, a girl who used three identities, to date girls (friends from school) who were using Facebook. She disguised herself as a boy and altered her character to trap the other girls. Her invention of three alter egos shows the existence of fake identities on Facebook. Such situations could have been avoided if appropriate procedures were in place to eradicate the usage of fake identities on Facebook or any other social networking websites. Predators create Facebook profiles using fake identities to target genuine users of any age or gender for many purposes. It has been found that Facebook has provided users with options to conceal certain personal information to the public but Facebook has not put in a system to identify fake user accounts. Even casual browsing Facebook it can be seen that the usage of Fake identities do still exist on Facebook even though Facebook has confirmed that it does not allow the usage of fake identities [5], especially fake names. Having a system in place to determine one's identity through the usage of identity credentials is beneficial for a largely populated social networking website like Facebook.

An experiment will be conducted to confirm the usage of fake accounts and also to understand if users are able to identify fake and real accounts. Participants will be provided with 50 Facebook user profiles consisting of both fake and real accounts. Participants will be asked to place the names into two different categories, fake and real. This will show if fake accounts can be differentiated from real accounts. This should also prove the existence of fake accounts on Facebook.

The results will clarify the usage of fake identities on Facebook, hence showing that there are no identity credentials in place to audit the user's identity. The results will help to create a framework or guidelines to stop the usage of fake identities on Facebook. This system should be able to audit and confirm a person's identity to stop any identity related crimes on Facebook as well as other social networking websites. An important outcome of this experiment is to raise awareness of cyber predators to the genuine users of social networking websites as they are largely affected by this.

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# ICT Services: An Automated Service Management System

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## Abstract

Information and Communication Technologies (ICT) have made the human life easier. ICT use in an University environment is prevalent in every activity, whether it is the students, staff or admin and support staff. The systems used in an university environment are also under constant evolution. This poses a heavy burden on the service staff, as the number of staff does not increase exponentially as the support services and software. An intelligent way of providing service will bring satisfaction to the users and will also enable resolution of all ICT related issues within budget to provide a timely solution.

Incident Management is the process of restoring normal service as soon as possible from unexpected problems or incidents as well as to cater to new service requests. This incident management process is managed by service desks [1]. Banking services have been automated by ATMs. Similar automation and self-service experience is required at the Service Desk. By automating the service desks, the technicians can use valuable time in resolving issues than to interact with irate customers. Another challenge is the assignment of tasks to appropriate IT departments that has the expertise to resolve the issues. This work aims to provide a web based self-service tool and automatically provide support for the service request / incident with the aim of improving the customer satisfaction. This tool has three objectives:

1. The self service tool is a web based tool to help request/report incidents within an University environment.
2. The system should automatically assign the request/incident to the right group and set an incident priority. It should also automatically notify if there is any update in the status.
3. The system should provide features to track: (a) by generating reports of all calls logged, resolved, in progress and on hold; (b) the workflow on all calls and reduce paper work.

Universities have many campuses, various departments, faculties, staff and students and many services available to these stakeholders. An effective solution would be to have an integrated single point of contact, one stop solution where all stakeholders can record their incident/request at any time.

The functional requirements of the system are: log incident/request, assignment of ticket, update/save request, generate reports, maintain workflows, resolve a ticket, accept a ticket, place a ticket on-hold, maintain registers, configuration setting, checking status and change workgroup [2].

The proposed system incident management is processed as follows:

**Detection:** Customer logs a call via online web tool system automatically generate the ticket with incident number and the ticket contains information 'customer perception' of description. The short and detailed description is known as incident description.

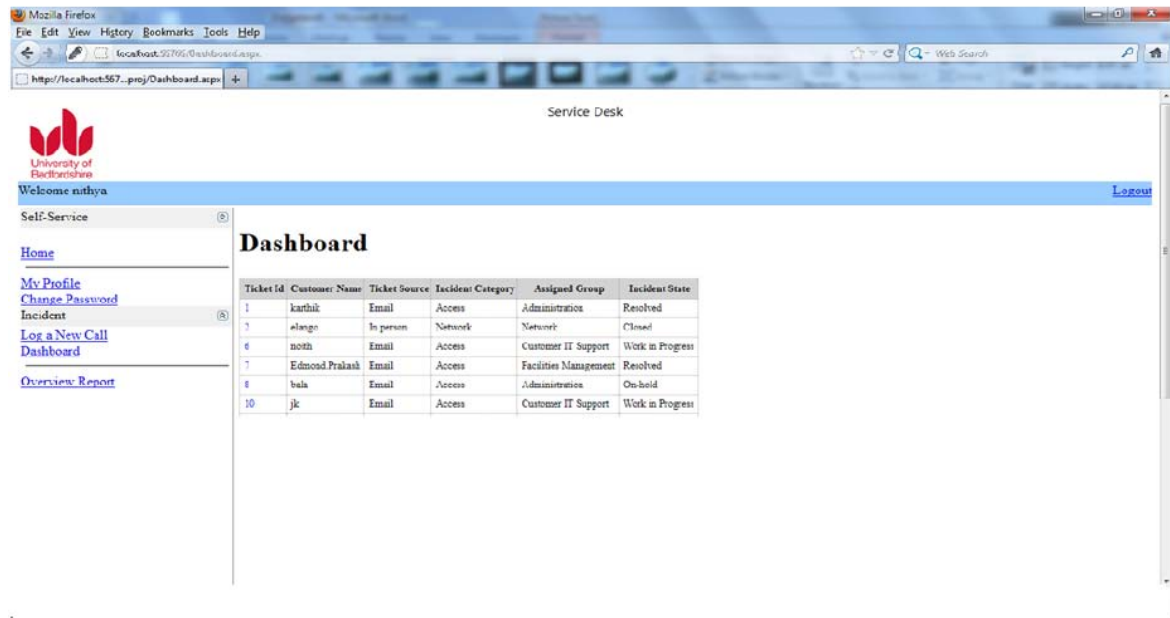
**Classification:** Based on the incident classification (incident or request) will provide the initial resolution and support to escalate the incident to workgroup.

**Routing:** With the help of description, classification on the ticket used to extract the keyword from token dictionary the incident will be automatically routed to appropriate work group.

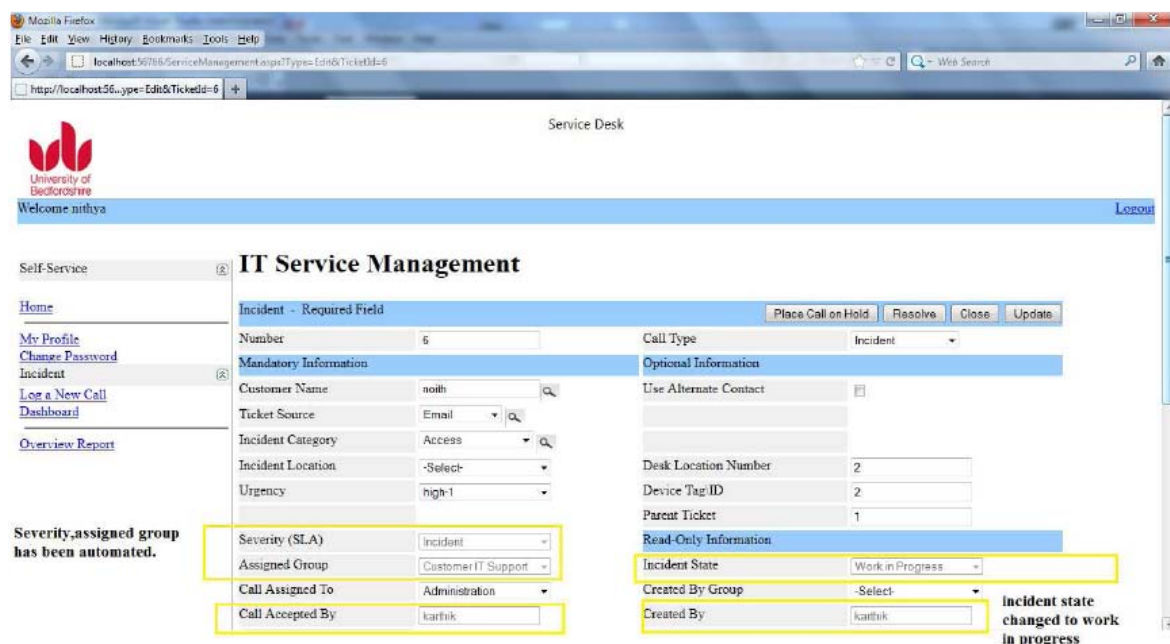
**Resolution:** The assigned group follows resolution procedure or else the ticket will be escalated to higher group. The process will be continued until the incident is resolved.

Example: A ticket with incident description: "unable to access email". Based on incident classification this is an incident (fault) not the request. Token – email, mail. Keyword-classes - Email. The Tokens and Keyword classes traces found the ticket will be assigned to respective group (e.g.: Customer IT support work group) to resolve the incident [3].





(a) After successful login directs to dashboard (click on the ticket id to view the status of the incident/request).



(b) Once the incident/request is accepted by the technician the incident state automatically changes to work in progress.

Figure 1.Snapshot of the working IT Service Management System

The system has been developed by Microsoft ASP.net, SQL server management studio and C# programming language. The web forms were simple and easy to comprehend. Though, there were many challenges to run the interface without any error with database. But debugging tools like SQL profiler and Microsoft visual studio 2010 IDE made the testing easier. In future, the plan is to extend the work to implement the knowledge base portal. Based on the similarity evaluation of incident description, similar incidents can be resolved. This knowledgebase management will help the users to deal the incidents by their own. Combining the incident management and knowledgebase management helps to reduce the number of calls to service desk [3].

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# Optimization Techniques and Numerical Simulations for a Better Design of Endovascular Medical Devices

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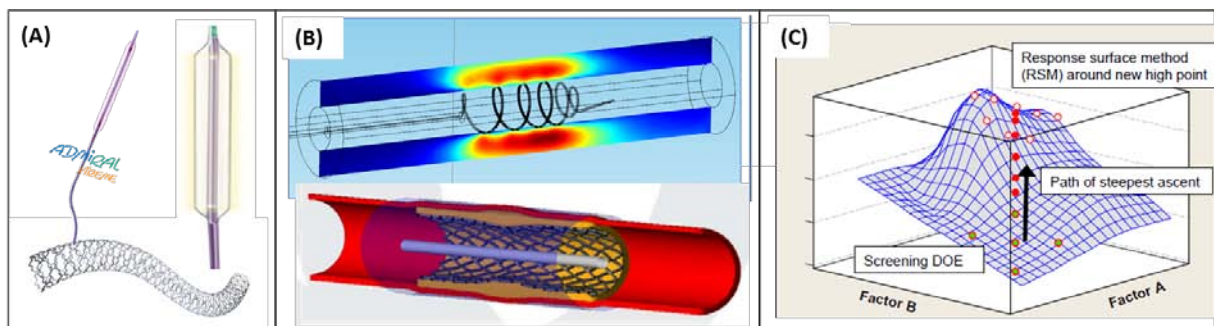
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## Abstract

Peripheral Arterial Disease (PAD) is a pathological condition of the human vasculature, in which narrowed blood vessels cause reduction in supply of nutrients and oxygen to specific anatomical districts. PAD commonly causes ischemia and gangrene of tissues within the patient's limbs or brain; PAD occurrence can be as high as  $30 \div 40\%$  among people aged 60 and over [1]. Nowadays, endovascular techniques are gaining momentum as alternative treatment options with respect to surgery, due to a lower invasiveness and a reduction of the risk of adverse events. The typical treatment of PAD in the lower limbs is delivered via catheters which are advanced through the patient's vasculature to the lesion site. The catheters restore the physiological blood flow [2].

Sometimes, metallic tubes (stents) are implanted inside the artery to scaffold the vessel wall and restore the mechanical stiffness of the native vasculature. Inflatable balloons and stents are two of the most commonly used endovascular devices utilized by physicians to treat arterial occlusions and plaques. Endovascular devices are extremely complex in their design. Peripheral endovascular devices are required to perform in an extremely adverse environment. Inflatable balloons and stents catheters must typically show superior mechanical properties in terms of resistance to kinking and torsion, as well as low frictional resistance, excellent biocompatibility and low dimensional profiles [3, 4]. The design of endovascular devices is a process of the highest complexity. It requires expertise and know-how from the most diverse areas (mechanical engineering, biology, materials science, software development and medicine, etc.). Endovascular devices must fulfil a broad set of design requirements. Given the high complexity of the matter, advanced PC-based computing techniques such as numerical simulations have been traditionally exploited for the design of endovascular devices, as they have been across all the medical industry [5]. Numerical simulations offer relevant savings of resources during the iterative designing process. Still, PC-based simulations are valued in many cases as "stand alone" tools, with respect to the whole design process of the final product. The next frontier of medical devices design relies in the ability to fully embed computing visualization and simulation techniques within the traditional, experimental-based prototyping process of industrial medical products.

In order to do so, optimization techniques such as Monte Carlo simulations or response surface methods have been introduced [6, 7]. These advanced computing tools allow dealing with a large number of control variables (input parameters), during the designing process. The student will analyze the application of optimization techniques to the design of endovascular devices. Numerical simulations results will be compared to *in-vitro* and *in-vivo* testing conditions, when available. The results obtained will be used to run extensive iterations of optimization applications, such as design for six-sigma statistical methods, response surfaces and Monte Carlo simulations, so to develop a more structured and efficient device designing process.



**Fig.1** (a) Endovascular devices; (b) Examples of numerical simulations results; (c) Response surface methods

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# BEDS NEWS: A SHORT FILM HIGHLIGHTING NOVEL COMPOSITING & VISUAL EFFECTS

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## Abstract

*The aim of this project was to analyse a scene in which visual and special effects and digital compositing would be used. Various techniques were studied and then applied in a short film that took the format of a live news channel broadcast, with added visual effects.*

**Keywords:** Visual Effects Production, Digital Compositing

## 1 Introduction

Creating visual effects on a real captured footage or image is a challenging task. Adding more layers of different schemes of images and effects to create a perfect composition of single image is a tricky job to do. While we have to consider the colour contracting, matting, environment and theme to create picture perfect. Some of the basic problems faced during this research project were creating samples from various sources to get a clear picture for the storyboard, creating image/video sample, updating new tools and software to make the work flow streamlined (see Figure 1). One of the most difficult issues was lighting and colour correction in the green screen studio as well as in the use of the features in the software tool.

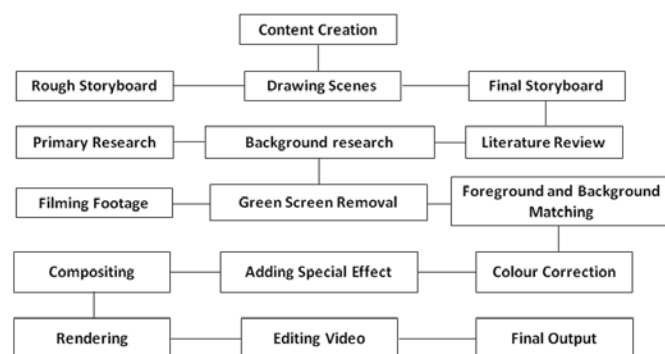


Figure 1: Block diagram of the content creation process

Since the film was shot in the bright daylight, the green background screen reflected the light on the actor and the face was getting keyed. Editing the reflected light was hard when exported to the software. The second day of filming was done in dim light but resulted in the same issue as day one.

## 2 Research

A comprehensive literature was carried out in areas related to this work. This helped me to identify the established

techniques and also new techniques used in this field [1][2][3]. Conducting surveys and updating techniques helped to easily improvise the project compared to the footage from the first two trials. This project also helped to develop new tools and software, for example, to reduce pixel noise in the film footage by using neat-video plug-in to reduce the noise in the footage.

## 3 Implementation

A step by step process as indicated in Figure 2 was followed. Special attention was paid to identify reflections in the characters due to lighting, ensure lighting of characters were consistent with night/actual video shooting, seamless integration of the visual effects, and blending the video footage/characters within a 3D synthetic newsroom environment.



Figure 2: Process of blending visual effects

## 4 Results

The video created shows a combination of the process of image compositing, animation creation and special effects. The final compositing and VFX research project was accomplished in accordance with the conceived storyboard and the outcome is comparable with other professional work/show reel. The video clip (results and the making of the clip) can be accessed at [http://naveenraj.com/?page\\_id=416](http://naveenraj.com/?page_id=416)

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# **Higher Education in Virtual Worlds: The Use of Second Life & OpenSim for Educational Purposes**

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**Abstract** — This study explored the features of Second Life and OpenSim that affect the choice of academics who are planning to use a virtual world in order to meet the learning needs of their students. For the conduct of this study, what was taken into account is a pre-existing framework which proposes the evaluation of virtual worlds against four dimensions: their contexts, the immersion encountered within each, their cost, and their persistence. The research aimed to validate, enhance or alter the framework on which it is based, and also highlight the similarities and differences between Second Life and OpenSim worlds, either internally or externally hosted ones, against these four dimensions. For the fulfillment of these objectives, academics were interviewed and students were asked to fill in some questionnaires. However, the findings suggested that none of these options is “the best”. On the contrary, the answer to the question “which is the ideal virtual world for the conduct of educational projects?” is “it depends on each educator’s needs”. Nevertheless, this thesis provides clear guidance to academics who face the decision to use virtual worlds for educational purposes.

# **Policy Refinement for Dynamic Multi-Objective Scheduling Using Evolutionary Algorithms**

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**Abstract** - Scheduling has been one of the most popular research areas in optimisation especially for solving problems arising in various industries such as manufacturing systems. The importance of effective schedules is clear from its definition; the allocation of a number of tasks to a number of resources. Hence a better schedule leads to production efficiency in manufacturing systems when a number of objectives such as completion time, maximum tardiness, maximum flow time are considered. Evolutionary approach has been a well known and widely used method in solving scheduling problems besides other soft computing techniques. A policy refinement approach is used in this research that evolves the set of dispatching rules with use of Evolutionary Algorithms (EAs) in order to solve dynamic multi-objective job shop scheduling problems. The use of dispatching rules relaxes decision making process where EAs improves the fitness of these decision making policies for optimal solution.