Introduction to the Web Engineering

Introduction

Within a decade, the World Wide Web has become every where, and it continues to grow unabated at exponential rate.

- Web-based systems and applications now deliver a complex array of varied content and functionality to a large number of heterogeneous users.
- The interaction between a Web system and its backend information systems has also become more tight and complex.
- As we now increasingly depend on Web-based systems and applications, their performance ,reliability and quality have become paramount importance, and the expectations of and demands have increased significantly difficult to manage.

Introduction

- As a result, the design, development, deployment and maintenance of Web-based systems have become more complex and Web developers failed to address users' needs and issues such as content management, maintenance, performance, security, and scalability of Web applications.
- They also often overlook important non-technical considerations such as copyright and privacy.
- Many Web developers seem to think that Web application development is just simple Web page creation using HTML or Web development software such as *Front Page or Dreamweaver and embodying few images and hyper linking documents and Web pages.*

Introduction

- Web applications are complex and are required to meet an array of challenging requirements which change and evolve.
- It involves planning, Web architecture and system design, testing, quality assurance and performance evaluation, and continual update and maintenance of the systems as the requirements and usage grow and develop.

Evolution of the Web

- Web has grown very rapidly in its scope and extent of use, supported by constant advances in Internet and Web technologies and standards.
- In 10 years, the number of Web sites dramatically has grown from 100 to over 45 million.
- Enterprises, travel and hospitality industries, banks, educational and training institutions, entertainment businesses and governments use large-scale Web-based systems.
- E-commerce has become global and widespread. Traditional legacy information and database systems are being progressively migrated to the Web.

Evolution of the Web

The evolution of the Web has brought together some disparate disciplines such as media ,information science, and information and communication technology, facilitating easy creation, maintenance, sharing, and use of different types of information from any where ,any time, and using a variety of devices such as desktop and notebook computers, pocket .PCs, personal digital assistants (PDAs), and mobile phones. Contributions of each of these disciplines to the evolution and growth of the Web are:

Media: integration of different types of media such as data, text, graphics, images, audio and video, and their presentation (animation, 3D visualization); different types of interaction and channels of communications (one-to-one, one-to-many ,many-to-one, and many-to-many).

Information science: information organisation, présentation, indexing, retrieval,aggregation, and management; and collaborative and distributed content creation.

Information and communication technology and networking: efficient and cost effective storage, retrieval, processing, and presentation of information; infrastructures that facilitate transfer and sharing of data and information; wired and wireless Internet communication; and personalized and context-aware Web applications.

Functionality/Category	Examples
Informational	Online newspapers, product catalogues, newsletters, manuals, reports, online classifieds, online books
Interactive	Registration forms, customized information presentation, online games
Transactional	Online shopping (ordering goods and services), online banking, online airline reservation, online payment of bills
Workflow oriented	Online planning and scheduling, inventory management, status monitoring, supply chain management
Collaborative work environments	Distributed authoring systems, collaborative design tools
Online communities,	Discussion groups, recommender systems,

Categories of Web Applications

The scope and complexity of Web applications vary widely: from small scale, short-lived(a few weeks) applications to large-scale enterprise applications distributed across the Internet, as well as via corporate intranets and extranets.

- Web applications now offer vastly varied functionality and have different characteristics and requirements.
- Web applications can be categorized in many ways there is no unique or widely accepted way Categorizations of Web applications based on functionality is useful in understanding their requirements and for developing and deploying Web-based systems and applications..

Web Development Practices

- Several attributes of quality Web-based systems such as usability, navigation, accessibility, scalability, maintainability, compatibility and interoperability, and security and reliability often are not given the due consideration they deserve during development.
- Many Web applications also fail to address cultural or regional considerations, and privacy, moral and legal obligations and requirements.
- Most Web systems also lack proper testing, evaluation, and documentation.
- Developers and their individual development practices rather than standard practices.

Web Development is Different

- Web application development has certain characteristics that make it different from traditional software, information system, or computer application development.

Web applications have the following characteristics:

- Web applications constantly evolve. In many cases, it is not possible to fully specify what a Web site should or will contain at the start of the development process, because its structure and functionality evolve over time, especially after the system is put into use.
- Further, the information contained within and presented by a Web site will also change.

Web Development is Different

- Unlike conventional software that goes through a planned and discrete revision at specific times in its lifecycle, Web applications continuously evolve in terms of their requirements and functionality (instability of requirements).
- Managing the change and evolution of a Web application is a major technical, organizational and management challenge much more demanding than traditional software development.
- Web applications are inherently different from software. The content, which may include text, graphics, images, audio, and/or video, is integrated with procedural processing.

Web Development is Different

- Varying requirements, expectations, and skill sets. the user interface and usability features have to meet the needs of a diverse, anonymous user community to whom we cannot offer training sessions.
- Most Web-based systems are content-driven (database-driven). Web based systems development includes creation and management of the content.
- Most Web-based systems demand a good "look and feel," favoring visual creativity and incorporation of multimedia in presentation and interface.
- Web applications have a compressed development schedule, and time pressure is heavy.

Web Development is Different

- Dissatisfaction of users of Web-based applications can be much worse than conventional IT systems.
- Web applications are developed by a small team of people with diverse backgrounds, skills, and knowledge compared to a team of software developers. Their perception of the Web and the quality of Web-based systems also differ considerably, often causing confusion and resulting in misguided priorities.
- There are rapid technological changes constant advances in Web technologies and standards bring their own challenges new languages, standards, and tools to cope with.

Web Development is Different

- Web development uses cutting-edge, diverse technologies and standards.HTML files, databases,

  images, and other multimedia components such as video and audio.
- Web applications need to cope with a variety of display devices and formats, and supporting hardware, software, and networks with vastly varying access speeds.
- Security and privacy needs of Web-based systems are more demanding than that of traditional software.