

# 电子商务系统的协同智能化模型探讨

## Exploring Intelligent and Collaborative Model for E-Business System

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- 一 引言 Introduction
- 二 相关领域的研究背景 Related Research
- 三 电子商务的协同智能化模型

Intelligent and collaborative model for  
E-Business system

- 四、资源与性能的双向协调控制

Collaborative control of resource and  
performance subsystem

# 一引言

## Introduction

- **1.1 电子商务系统协同智能化的意义**  
**Meaning of intelligent and collaborative control for E-Business system**
- **1.2 电子商务协同自适应系统**  
**Adaptive collaborative system of E-Business**
- **1.3 协同自适应网站的功能**  
**Main functions of adaptive collaborative web system**

# 1.1 电子商务系统协同智能化的意义

## Meaning of intelligent and collaborative control for E-Business system(1)

- 1 知识与服务科学的发展

**Development of Knowledge Economy and Service Scientific**

- 2 网络复杂性不断提高

**Complexity of computer network**

- 3 电子服务的人性化

**Personalization of E-Service**



# 1.1 电子商务系统协同智能化的意义

## Meaning of intelligent and collaborative control for E-Business system(2)

- **4协同系统性能的最优化Performance optimization of collaborative system**
- **5企业电子商务应用纵深发展Deeply development of E-Business application in enterprise**

## 1.2 电子商务协同自适应系统

**Adaptive collaborative system of E-Business**

- **数据采集与预处理系统 Data collection and pretreatment subsystem**
- **数据仓库与数据挖掘子系统 Data warehouse and mining subsystem**
- **控制子系统 Control subsystem**
- **评价子系统 Evaluation subsystem**

## 1.3 协同自适应网站的功能

### Main functions of adaptive collaborative web system

- 1 通过自学习得到用户访问模式  
self-learning of users' accessing patterns
- 2 提出页面或商品推荐和性能优化建议  
recommendation of personalization webpage, goods and optimization advice
- 3 控制与调整 control and modification
- 4 根据评价结果不断完善  
improvement according to evaluation result

## 二相关领域的研究背景

### Related Research

- **2.1 基于Web挖掘技术的自适应网站研究**  
**Research on adaptive website based on Web Mining**
- **2.2 Web挖掘研究** **Research on Web Mining**
- **2.3 电子商务系统性能优化研究** **Research on performance optimization of web system**
- **2.4 Web QoS控制研究** **Research on Web QoS control**

## 2.1 基于Web挖掘技术的自适应网站研究

### Research of adaptive website based on Web Mining

- 1使电子商务网站达到更高的客户满意度  
**Higher customer satisfaction**
- 2大大提高企业网络经营的效率  
**Higher efficiency during online operation**
- 3提高市场竞争力  
**Competition power**

## 2.2 Web挖掘研究

### Research of Web Mining

- **KDD (Knowledge Discovery in Database)**
- **KDW (Knowledge Discovery in Web)**

## 2.3 电子商务系统性能优化研究

Research of performance optimization of web system

- 电子商务性能模型

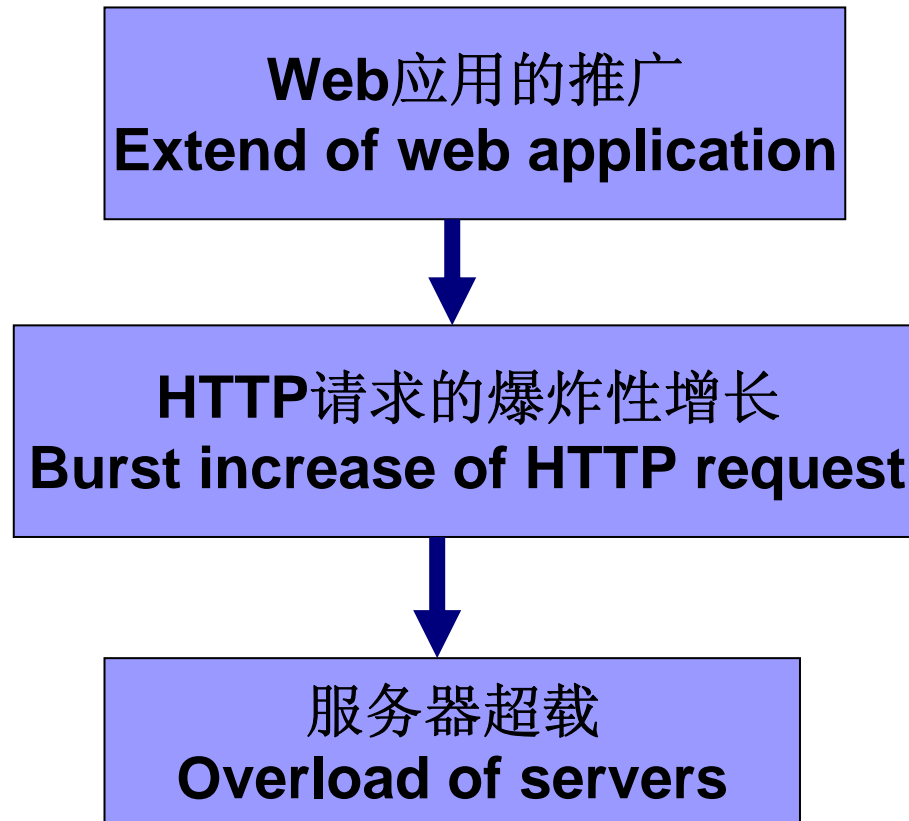
**Performance Model of e-Business system**

**1 系统级模型 System model**

**2 组件级模型 Component model**

# 2.4 Web QoS控制研究

## Research of Web QoS control



# 三电子商务的协同智能化模型

## Intelligent and collaborative model for E-Business system

- **3.1 协同智能化模型的学术思想 Theory Basic of Intelligent and collaborative model**
- **3.2 协同智能化模型的主要内容 Models of Intelligent and collaborative control**

## 3.1 协同智能化模型的学术思想(1)

### Theory Basic of Intelligent and collaborative model

- 依据复杂大系统控制理论 **According to control theory of complex large-scale system**
- 运用智能计算方法 **Applying the methods of intelligent computing**
- 结合计算机网络技术 **Combining with the technology of computer network**



## 3.1 协同智能化模型的学术思想(2)

### Theory Basic of Intelligent and collaborative model

- 系统地探讨一类协同型智能化商务网站的大系统管理控制算途径 **The control approach of a type of Intelligent collaborative E-business system is discussed**
- 从而建立一系列相应的集成化协调模型与实施操作方法 **A set of integrated model is proposed**

## 3.2 协同智能化模型的主要内容

### Models of Intelligent and collaborative control

- 1 协同电子商务系统的自适应预测模型

#### Adaptive predict model

- 2 协同系统的调度机制和优化控制模型

#### Request schedule and performance optimize model

- 协同系统的自适应度评价体系和模型

#### Evaluation system and model of adaptiveness

- 通用性自适应代理软件的结构模型

#### Architecture of general adaptive agent

## 四、资源与性能的双向协调控制

### collaborative control of resource and performance

- **4.1资源与性能子系统的双向制约**The resource and performance subsystems are restricted by each other.
- **4.2电子商务系统多级双向控制模型**Multilevel hierarchical control model of electronic business system
- **4.3资源子系统变量分析**Variable analysis of resource subsystem
- **4.4性能子系统变量分析**Variable analysis of performance subsystem
- **4.5资源与性能的自适应协调控制**adaptive collaborative control of resource and performance

## 4.1 资源与性能子系统的双向制约

The resource and performance subsystems are restricted by each other

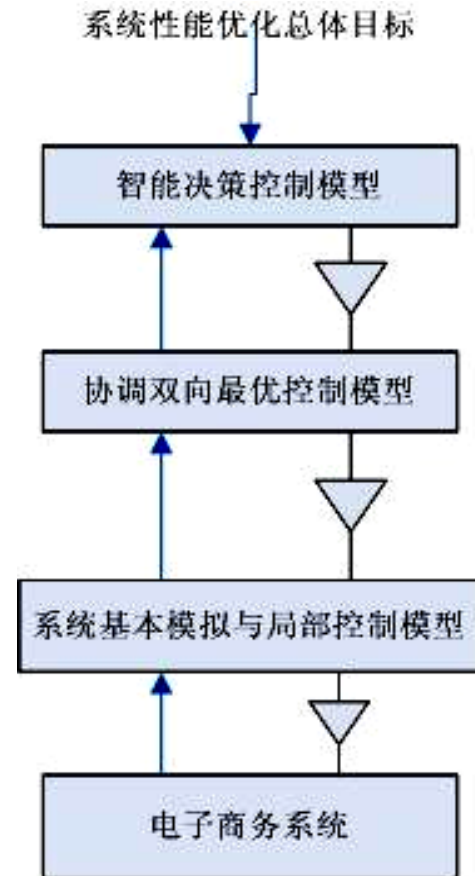
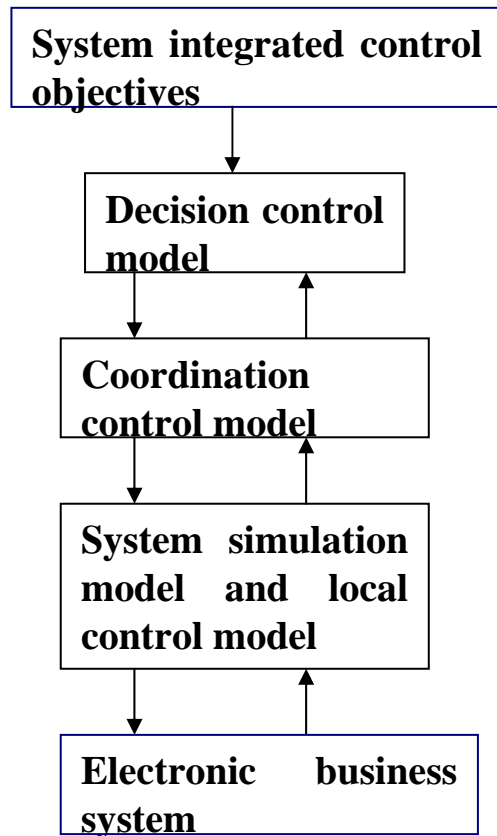
- 一方面，电子商务系统的性能提高需要占用大量系统资源 **On one hand, the system should provide enough resources for processing burst requests to gain higher performance.**
- 另一方面，系统资源不节制消耗将导致系统整体性能下降 **On the other hand, the limited resource of web system would result in lower performance if it were used without planning.**

## 4.2 电子商务系统多级双向控制模型

### Multilevel hierarchical control model of electronic business system

- 把电子商务系统的多个子系统视为整体  
**Regarding the multiply-tiered E-business website as a whole system**
- 采用大系统理论的多级递阶控制策略，建立多级双向控制模型体系以达到系统资源与性能协调发展  
**A multi-level hierarchical control model of E-business system is proposed based on the theory of large-scale system**

# 多级双向控制模型体系 A framework of multilevel hierarchical control model of electronic business system



## 4.3 资源子系统变量分析

### Variable analysis of resource subsystem

- 状态变量 **state variable**

- 1 可用内存大小 **usable memory**

- 2 CPU 空闲率 **probable vavancy of CPU**

- 3 实际带宽 **usable bandwidth**

# 影响系统可利用资源的因素

**Factors influence the usable resource**

1 用户会话平均长度

**average length of session**

2 请求类型 **types of HTTP requests**

3 用户访问模式 **accessing patterns**

4 用户访问强度 **accessing intensity**

5 应用程序

**processing application programs**

# 输出变量 **output variable**

- 1 内存占用率 **utilization rate of memory**
- 2 CPU使用率 **utilization rate of CPU and bandwidth**
- 3 带宽利用率 **utilization rate of bandwidth**

## 4.4性能子系统变量分析

### Variable analysis of performance subsystem

- 电子商务系统的性能参数 **Performance parameters of E-business system**

1 可靠性或可利用性 **Reliability or Usability**

2 处理能力或效率 **Capacity or Efficiency**

(1) 吞吐率 **throughout**

(2) 平均响应时间 **average response time**

(3) 平均事务时间 **average transaction time**

(4) 丢失率 **probability of drop**

# 电子商务系统性能影响因素

## Factors influence performance

- 通讯协议 **communication protocols**
- 数据库并发处理能力 **concurrent processing capability**
- 应用程序 **processing application programs**
- 缓存和内存大小 **capacity of cache and memory**
- 每科长最大请求数 **maximal request number per second**
- 最大并发连接用户数 **maximal user number of simultaneously access per second**

# 输出变量 **output variables**

- 每秒事务量 **transactions per second**
- 每秒失效请求数 **failure requests per second**
- 事务时间 **transaction time**
- 响应时间 **response time**
- 吞吐量 **throughout**

# 系统控制的目标函数

## Objective Functions

- 每秒事务量和吞吐量最大  
**transactions per second (TPS) and  
 throughput should be at the maximum**
- 每秒失效请求数和平均响应时间最小  
**failure requests per second and  
 average response time should be at the  
 minimum.**

## 4.5 资源与性能的自适应协调控制

### adaptive collaborative control of resource and performance

#### ■ 基本原理

#### mechanism of adaptive collaborative control

采用动态大系统的辨识与协调控制方法实现电子商务系统资源与性能的自适应协调控制。

**According to the system identification theory of dynamic large-scale system to realize the adaptive collaborative control.**

# 协调控制 collaborative control

- 通过由信号采集与处理模块、知识库、推理机、协调控制器、局部控制器等组成的电子商务协调控制系统来完成。
- **Collaborative control can be implemented through the control system that is composed of information process module, knowledge base, reasoning engine, coordination controller and local controller.**

谢谢各位

*Thanks*

欢迎合作

*Welcome to cooperate*

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