

Model checking bidding behaviors in internet concurrent auctions

Haiping Xu and Yi-Tsung Cheng

Computer and Information Science Department, University of Massachusetts, Dartmouth, MA, USA
Email: hxu@umassd.edu, g_ycheng@umassd.edu

Online auctions have become a quite popular and effective approach in the Internet-based eMarketplace. However, in concurrent online auctions, where multiple auctions for identical items are running simultaneously, bidding behaviors become very complicated and difficult to be verified. Consequently, a shill bidder can easily disguise himself as a legitimate user in order to drive up the bidding price. The goal of this paper is to propose an efficient formal approach to verifying certain bidding behaviors, including shilling behaviors, in order to detect shill suspects in concurrent online auctions. We develop a data-driven auction model based on a model template for concurrent auctions. The auction model can be formally verified using a model checker according to a set of behavioral properties specified in pattern-based linear temporal logic. To illustrate the feasibility and effectiveness of our approach, we use a case study to demonstrate how shill suspects can be efficiently detected.

Keywords: Concurrent online auctions, bidding behaviors, competitive shilling, shill suspects, model checking, pattern-based linear temporal logic (LTL)

1. INTRODUCTION

In traditional economic theory, an auction can be used to determine the value of a commodity that is difficult to tag a price. The commodity can be a physical product, such as artwork and antiques, or it can be a virtual product, for example, spectrum licenses and procurement contracts. The most commonly used types of auctions are increasing-price auction (English auction), decreasing-price auction (Dutch auction), first-price sealed-bid auction, and second-price sealed-bid auction (Vickrey auction) [1, 2]. Among them, the English auction becomes the most popular one that is adopted in online auction houses. In an English auction, participants can openly observe other people's bids and then bid against each other. The current bidding price must be higher than the

previous one. The auction ends when the auction reaches a point where no one wants to beat the current highest price. Therefore, in an English auction, a bidder can bid multiple times while the bidding price ascends. The seller of the auctioned item can also set a pre-determined reserve price. If the final bidding price is lower than the reserve price, the seller can reserve the right of not selling the auctioned item that he previously posted [3].

The characteristics of multiple bids and ascending price in English auctions have made this type of auctions very popular in online auction houses, for example, eBay, but it also makes shilling behaviors very common. Shill bidding occurs when the seller disguises himself as a legitimate bidder by using a second identity or account solely for the purpose of pushing up the sale price [4]. Particularly, in

The cooperation test [Apt, Francez & de Roever] was originally conceived to capture the proof theoretical analogue of distributed message exchange between .Logics and Models of Concurrent Systems by Krzysztof R. Apt, , available at Book Depository with free delivery worldwide.bollig@ospekuny.com Abstract. We survey various automata models of concurrent systems and their connection with monadic second-order logic: finite.This Lecture. Thus far have considered logics and models for sequential systems. We now turn to concurrent systems. This lecture. >Why model concurrent.Concurrent computing is a form of computing in which several computations are executed Concurrent constraint logic A concurrent system is one where a computation can advance without waiting . There are several models of concurrent computing, which can be used to understand and analyze concurrent systems.In computer science, concurrency refers to the ability of different parts or units of a program, Because computations in a concurrent system can interact with each other while Some of these models of concurrency are primarily intended to support Some of these logics, such as linear temporal logic and computation tree.Multi-robot systems can be viewed as a distributed, asynchronous and K.R. Apt (Ed.), Logics and Models of Concurrent Systems, Springer, New York ().A concurrent real-time system is a system of many components, that should deliver (model) of the system satisfies desired properties expressed in formal logic.sense, tile logic is a logic of concurrent systems with coordination. Algebraic Structures. Since models of computation based on the notion of free and bound.Logics and models of concurrent systems Boolean logic, Proceedings of the Working Conference on Advanced Visual Interfaces, May , , Trento.Evolving concurrent systems: behavioural theory and logic .. Nielsen, Models for concurrency, Handbook of logic in computer science (vol.Keywords: process calculus, modal logic, session types, tool .. In process calculi and many other models of concurrent systems, the no-.of even the simplest logics. We argue that proof construction is unnecessary in the case of finite state cmrcurrent systems and can be replaced by a model. .Download Logics And Models Of Concurrent Systems by Jen Facebook Twitter Google Digg Reddit LinkedIn Pinterest StumbleUpon Email. Most of.LOGICS AND MODELS OF CONCURRENT. SYSTEMS PDF - Search results,. Introduction. A description logic (DL) models concepts, roles and individuals, and .Buy Indian Logics and Models of Concurrent Systems [Paperback] online from ospekuny.com at best price. Get wide range of high quality Books with fast shipping.Computer Science > Logic in Computer Science in several common examples where Petri nets model realistic concurrent systems.

[\[PDF\] Rethinking Early Medieval India: A Reader](#)

[\[PDF\] The Metropolitan Frontier And American Politics: Cities Of The Prairie](#)

[\[PDF\] Pitlochry: Heritage Of A Highland District](#)

[\[PDF\] Tenants Rights And Remedies In A Commercial Lease: A Practical Guide](#)

[\[PDF\] In The Shade Of The Qurn: F Ill Al-Qurn](#)

[\[PDF\] Shaman Of Oberstdorf: Chonrad Stoeckhlin And The Phantoms Of The Night](#)

[\[PDF\] George MacDonald: An Anthology](#)