Jesper Urban - DTU Orbit (25/12/2017)

Jesper Urban

Organisations

**PhD Student, Department of Naval Architecture and Offshore Engineering**
04/07/2003 → 03/09/2013 Former
ju@mek.dtu.dk
VIP

**PhD Student, Department of Mechanical Engineering**
04/07/2003 → 03/09/2013 Former
ju@mek.dtu.dk
VIP

Publications:

**Statistical learning for predictive targeting in online advertising**
The focus in this thesis is investigation of machine learning methods with applications in computational advertising. Computational advertising is the broad discipline of building systems which can reach audiences browsing the Internet with targeted advertisements. At the core of such systems, algorithms are needed for making decisions. It is in one such particular instance of computational advertising, namely in web banner advertising, that we investigate machine learning methods to assist and make decisions in order to optimize the placements of ads.

The industrial partner in this work is Adform, an international online advertising technology partner. This also means that the analyses and methods in this work are developed with particular use-cases within Adform in mind and thus need also to be applicable in Adform’s technology stack. This implies extra thought on scalability and performance.

The particular use-case which is used as a benchmark for our results, is clickthrough rate prediction. In this task one aims to predict the probability that a user will click on an advertisement, based on attributes about the user, the advertisement the context, and other signals, such as time. This has its main application in real-time bidding ad exchanges, where each advertiser is given a chance to place bids for showing their ad while the page loads, and the winning bid gets to display their banner.

The contributions of this thesis entail application of a hybrid model of explicit and latent features for learning probabilities of clicks, which is a methodological extension of the current model in production at Adform. Our findings confirm that latent features can increase predictive performance in the setup of click-through rate prediction. They also reveal a tedious process for tuning the model for optimal performance.

We also present variations of Bayesian generative models for stochastic blockmodeling for inference of structure based on browsing patterns. Applying this structural information to improve click-through rate prediction becomes a two-step procedure; 1) learn user and URL profiles from browsing patterns, 2) use the profiles as additional features in a click-through rate prediction model. The assumption we implicitly make is reasonable: Users and URLs that are grouped together based on browsing patterns will have similar responses to ads, e.g., can be used as predictors of clicks. We report successful examples of applying this approach in practice.

Finally, we introduce the multiple-networks stochastic blockmodel (MNSBM), a model for efficient overlapping community detection in complex networks which can be assumed to be an aggregation of multiple block-structured subnetworks.
Crushing and Fracture of Lightweight Structures
The overall objective of the present study has been to develop rational analytical and numerical calculation models to quantify the consequences of collision accidents. The work has primarily been focused on high speed craft (HSC) built in lightweight materials such as aluminium and sandwich. Crushing experiments conducted on full-scale aluminum plate intersections reveal that the crushing behaviour is highly affected by material fracture during the deformation. Several fracture criteria from the literature have been reviewed and three fracture models have been compared with material experiments covering a wide range of stress states. It is found that a fracture criterion by Rice and Tracey (1968) agrees well with the experiments with a high triaxiality and that a fracture criterion by Cockcroft and Latham (1968) agrees well with the experiments with a low or negative triaxiality. Based on these two fracture models a new fracture criterion, denoted RTCL fracture criterion, is proposed and the fracture criterion is implemented in the FE-program LS-DYNA as a user subroutine. The crushing behaviours of the full-scale aluminum plate intersections have been simulated with LS-DYNA and the implemented fracture criterion and the simulations agree well with the experiments. New closed form solutions for the dissipated energy during axial compression of aluminum plate intersections have been developed and the effect of fracture is included analytically based of the fracture criterion by Cockcroft and Latham (1968). Good agreement between the analytical models and the experiments is found. The crushing behaviour of two high speed ferries has been analysed with the numerical and analytical methods and the results are compared with the existing regulations for high speed craft (HSC). Several failure criteria for first-ply failure of unidirectional composites (UD), from the literature, are compared with experiments conducted on composite specimens. It is found that a failure criterion by Chang and Chang (1987) agrees well with the experiments on UD. A progressive failure procedure by Chang and Chang (1987) has been implemented in a small laminate computer program and as a user subroutine in LS-DYNA. Simulations of the progressive damage behaviour of laminated composites during deformation show that the response is reasonable well predicted by the progressive failure procedure. Crushing tests have been conducted on six full-scale sandwich intersections and the crushing responses have been simulated with LS-DYNA and the implemented progressive failure procedure. The results show that the ultimate force agrees well with the experiments while the crushing force after this is significantly under predicted.

General information
State: Published
Organisations: Maritime Engineering, Department of Mechanical Engineering, Coastal, Maritime and Structural Engineering
Authors: Urban, J. (Intern), Pedersen, P. T. (Intern), Simonsen, B. C. (Intern)
Publication date: Jul 2003

Energy Dissipation in Sandwich Structures During Axial Compression
The purpose of this paper is to investigate the energy dissipation in sandwich structures during axial crushing. Axial crushing tests on six sandwich elements are described. The sandwich elements consist of a polyurethane core and E-glass/Polyester skin. The elements compare to full-scale structural elements in fast sandwich vessels. Two of the crushing tests are simulated with the explicit finite element software LS-DYNA3D. The key results are load-end shortening relationship and the energy dissipation. Good agreement between the numerical predictions and the experiments are obtained. A simple analytical model for the energy dissipation during axial crushing is proposed. Keywords: Sandwich, Energy Dissipation, Axial Crushing, LS-DYNA, Analytical crushing models, Crashworthiness.

General information
State: Published
Organisations: Department of Mechanical Engineering
Authors: Urban, J. ( Intern)
Publication date: 2002
Damage and loss of stability for HSC in grounding or collision accidents

General information
State: Published
Organisations: Coastal, Maritime and Structural Engineering, Department of Mechanical Engineering
Authors: Ravn, E. S. (Intern), Urban, J. (Intern), Simonsen, B. C. (Intern)
Publication date: 2001

Host publication information
Title of host publication: Proceedings of HIPER 2001
Publisher: TUHH Technologie GmbH
Main Research Area: Technical/natural sciences
Conference: 2nd International Euro Conference on High-Performance Marine Vehicles, Hamburg, Germany, 02/05/2001 - 02/05/2001
Source: orbit
Source-ID: 64237
Publication: Research - peer-review › Article in proceedings – Annual report year: 2001

Collision Risk Analysis for HSC

General information
State: Published
Organisations: Department of Naval Architecture and Offshore Engineering
Authors: Urban, J. (Intern), Pedersen, P. T. (Intern), Simonsen, B. C. (Intern)
Pages: 181-194
Publication date: 1999

Host publication information
Title of host publication: FAST'99
Place of publication: Seattle, Wa.
Publisher: The Society of Naval Architectes & Marine Engineers
Main Research Area: Technical/natural sciences
Conference: 5th International Conference on Fast Sea Transportation (FAST'99), Seattle, WA, United States, 01/01/1999
Source: orbit
Source-ID: 172333
Publication: Research - peer-review › Article in proceedings – Annual report year: 1999

Projects:

Statistical learning for predictive targeting in online advertising

Department of Applied Mathematics and Computer Science
Period: 01/12/2011 → 04/03/2015
Number of participants: 6
Phd Student:
Fruegaard, Bjarne Ørum (Intern)
Supervisor:
Urban, Jesper (Intern)
Main Supervisor:
Hansen, Lars Kai (Intern)
Examiner:
Winther, Ole (Intern)
Candela, Joaquin (Ekstern)
Igel, Christian (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD
Rational Design of Light-Weight Structures against Accidental Loads

Shipbuilding has reached a stage where it is possible to design highly optimized structures that efficiently resist the loads from the sea. The use of more advanced materials has expanded dramatically over the past decade. Materials such as aluminium or composites have a significant different material behavior compared to conventional steel and new models have to be developed. Existing analytical models developed for mild steel structures do not apply on aluminium structures as the crushing response of aluminium structures is dominated by fracture and as aluminium has a different material behaviour compared to mild steel. Crushing of aluminium structures is studied with the use of LS-DYNA, a commercial, non-linear, explicit finite-element code, and exiting fracture criteria for metals are implemented in order to predict fracture during crushing. The numerical simulations are compared with experiments on X- and T-element of aluminium, performed at DTU. New simple analytical models, describing the crushing behaviour of typical structural elements of a ship-structure, are developed based on experiments and numerical simulations. Another related research area is the crushing of sandwich structures. A sandwich construction is for sure a competing building component compared to aluminium because of the flexibility, high stiffness and strength. The FE-models include the skin modelled with shell-elements and the core modelled with solid elements. The failure of each ply is controlled by a failure criterion such as Tsai-Wu, Hoffman, Tsai-Hill, Hashin-Rotem and Chang-Chang. Delamination between the skin and core is treated with a contact surface that ties the core surface nodes to the skin shell. The aim of the project is finally to be able calculate the crushing response of a sandwich-bow during a collision.

Department of Naval Architecture and Offshore Engineering
Period: 01/01/2000 → 31/12/2003
Number of participants: 1
Project Manager, organisational:
Urban, Jesper (Intern)
Project

Rational design of light-weight structures for accidental loads

Department of Mechanical Engineering
Period: 01/02/1999 → 16/07/2003
Number of participants: 6
Phd Student:
Urban, Jesper (Intern)
Supervisor:
Pedersen, Preben Terndrup (Intern)
Main Supervisor:
Cerup-Simonsen, Bo (Intern)
Examiner:
Jensen, Jørgen Juncher (Intern)
Abramowicz, Wlodek (Ekstern)
Amdahl, Jørgen (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-lønnet stipendie
Project: PhD