

Design And Analysis Of Modern Tracking Systems

Structured analysis

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In software engineering, structured analysis (SA) and structured design (SD) are methods for analyzing business requirements and developing specifications for converting practices into computer programs, hardware configurations, and related manual procedures.

Structured analysis and design techniques are fundamental tools of systems analysis. They developed from classical systems analysis of the 1960s and 1970s.

Systems engineering

systems analysis and design method System of systems engineering (SoSE) System accident Systems architecture Systems development life cycle Systems thinking

Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design, integrate, and manage complex systems over their life cycles. At its core, systems engineering utilizes systems thinking principles to organize this body of knowledge. The individual outcome of such efforts, an engineered system, can be defined as a combination of components that work in synergy to collectively perform a useful function.

Issues such as requirements engineering, reliability, logistics, coordination of different teams, testing and evaluation, maintainability, and many other disciplines, aka "ilities", necessary for successful system design, development, implementation, and ultimate decommission become more difficult when dealing with large or complex projects...

Eye tracking

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Eye tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head. An eye tracker is a device for measuring eye positions and eye movement. Eye trackers are used in research on the visual system, in psychology, in psycholinguistics, marketing, as an input device for human-computer interaction, and in product design. In addition, eye trackers are increasingly being used for assistive and rehabilitative applications such as controlling wheelchairs, robotic arms, and prostheses. Recently, eye tracking has been examined as a tool for the early detection of autism spectrum disorder. There are several methods for measuring eye movement, with the most popular variant using video images to extract eye position. Other methods use...

Electronic design automation

electronic systems such as integrated circuits and printed circuit boards. The tools work together in a design flow that chip designers use to design and analyze

Electronic design automation (EDA), also referred to as electronic computer-aided design (ECAD), is a category of software tools for designing electronic systems such as integrated circuits and printed circuit boards. The tools work together in a design flow that chip designers use to design and analyze entire semiconductor chips. Since a modern semiconductor chip can have billions of components, EDA tools are essential for their design; this article in particular describes EDA specifically with respect to integrated circuits (ICs).

Static timing analysis

"Statistical Timing Analysis: From Basic Principles to State of the Art",. IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems. 27 (4):

Static timing analysis (STA) is a simulation method of computing the expected timing of a synchronous digital circuit without requiring a simulation of the full circuit.

High-performance integrated circuits have traditionally been characterized by the clock frequency at which they operate. Measuring the ability of a circuit to operate at the specified speed requires an ability to measure, during the

design process, its delay at numerous steps. Moreover, delay calculation must be incorporated into the inner loop of timing optimizers at various phases of design, such as logic synthesis, layout (placement and routing), and in in-place optimizations performed late in the design cycle. While such timing measurements can theoretically be performed using a rigorous circuit simulation, such an approach...

Software design

tracking how requirements have been satisfied by the design model. The design should not reinvent the wheel. Systems are constructed using a set of design

Software design is the process of conceptualizing how a software system will work before it is implemented or modified.

Software design also refers to the direct result of the design process – the concepts of how the software will work which consists of both design documentation and undocumented concepts.

Software design usually is directed by goals for the resulting system and involves problem-solving and planning – including both

high-level software architecture and low-level component and algorithm design.

In terms of the waterfall development process, software design is the activity of following requirements specification and before coding.

Infrared search and track

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An Infrared Search and Track (IRST) system (sometimes known as infrared sighting and tracking) is a method for detecting and tracking objects which give off infrared radiation, such as the infrared signatures of jet aircraft and helicopters.

IRST is a generalized case of Forward Looking Infrared (FLIR), i.e. from forward-looking to all-round situation awareness.

Such systems are passive (thermographic camera), meaning they do not give out any radiation of their own, unlike radar. This gives them the advantage that they are difficult to detect.

However, because the atmosphere attenuates infrared to some extent (although not as much as visible light) and because adverse weather can attenuate it also (again, not as badly as visible systems), their range compared to a radar is limited. Within range...

Radar tracker

Tracking and Navigation: Theory Algorithms and Software. Wiley. Blackman, Samuel; Popoli, Robert (1999). Design and Analysis of Modern Tracking Systems. Norwood

A radar tracker is a component of a radar system, or an associated command and control (C2) system, that associates consecutive radar observations of the same target into tracks. It is particularly useful when the radar system is reporting data from several different targets or when it is necessary to combine the data from several different radars or other sensors for data fusion.

Automotive suspension design process

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Automotive suspension design is an aspect of automotive engineering, concerned with designing the suspension for cars and trucks. Suspension design for other vehicles is similar, though the process may not be as well established.

The process entails

Selecting appropriate vehicle level targets

Selecting a system architecture

Choosing the location of the 'hard points', or theoretical centres of each ball joint or bushing

Selecting the rates of the bushings

Analysing the loads in the suspension

Designing the spring rates

Designing shock absorber characteristics

Designing the structure of each component so that it is strong, stiff, light, and cheap

Analysing the vehicle dynamics of the resulting design

Since the 1990s the use of multibody simulation and finite element software has made this...

Material flow analysis

"Dynamic Material Flow Analysis-Based Life Cycle Optimization Framework and Application to Sustainable Design of Shale Gas Energy Systems"; ACS Sustainable

Material flow analysis (MFA), also referred to as substance flow analysis (SFA), is an analytical method to quantify flows and stocks of materials or substances in a well-defined system. MFA is an important tool to study the bio-physical aspects of human activity on different spatial and temporal scales. It is considered a core method of industrial ecology or anthropogenic, urban, social and industrial metabolism. MFA is used to study material, substance, or product flows across different industrial sectors or within ecosystems. MFA can also be applied to a single industrial installation, for example, for tracking nutrient flows through a waste water treatment plant. When combined with an assessment of the costs associated with material flows this business-oriented application of MFA is called...

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