(1)

ZLang: A Scripting Language for Digital Content Creation Applications

MohamedYousef ,Ahmed Hashem ,Hassan Saad ,Khaled Hussain

Abstract:

ABSTRACT Digital Content Creation (DCC) Applications (e.g. Blender, Autodesk 3ds Max) have long been used for the creation and editing of digital content (e.g. Images, videos). Due to current advancement in the field, the need for controlled automated work forced these applications to add support for scripting languages that gave power to artists without diving into many details. With time these languages developed into more mature languages and were used for more complex tasks (driving physics simulations, controlling particle systems, or even game engines).For long, these languages have been interpreted, embedded within the applications, lagging the UIs or incomparable with real programming languages (regarding Completeness, Expressiveness, Extensibility and Abstractions). In this paper, we present a high level scripting language (Zlang) and a DCC Engine that addresses those problems. The language can be interpreted, compiled, extended in C/C++ and has a number of constructs, and optimizations dedicated to DCC domain. The engine provides geometric primitives, mesh modifiers, key-framed animation and Physics Simulations (Rigid Body, and Cloth Simulations). The engine is designed and implemented as a library so it can be used alone or embedded.

Keywords:

Three-DimensionalGraphics and Realism, modeling Packages, Methodology and Techniques-Languages.

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(2)

Performance Evaluation of Exhaustive-Search Equivalent Pattern Matching under Chebyshev distance

Mohamed Yousef and Khaled F. Hussain

Abstract:

Abstract Pattern Matching is a fundamental problem in computer vision, and image and video processing. Exhaustive-Search equivalent algorithms yield the same results as exhaustively searching all patterns in the image but significantly faster. Though much work have been done over the L1 and L2 distances, only small amount of work has been dedicated to the Chebyshev distance though its importance in many applications. In this paper, we provide an evaluation of available state-of-art exhaustive-search equivalent algorithm that targets the Chebyshev distance; we also provide detailed analysis of the performance characteristics of evaluated algorithms.

Keywords:

:Pattern matching, template matching, fast algorithms, full search equivalent algorithm, Chebyshev distance, NOM.

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(3)

Fast Exhaustive-Search Equivalent Pattern Matching through Norm Ordering

Mohamed Yousef, Khaled F. Hussain

Abstract:

Abstract Pattern Matching is a fundamental problem in computer vision, and image and video processing. Exhaustive-Search equivalent algorithms yield the same results as exhaustively searching all patterns in the image but significantly faster. In this paper, we propose a novel exhaustive-search equivalent algorithm that is combined with a number of state-of-art algorithms to provide a significantally faster alternative in the problem of finding nearest pattern according to a predefined distance measure. Our technique also shows high resilience to both blurring and JPEG compression types of noise. This is demonstrated in the paper with results from over 15 million runs for each compared algorithm.

Keywords:

Pattern matching; Template matching; Fast algorithms; Full search equivalent algorithm; NOM

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(4)

Accurate, data-efficient, unconstrained text recognition with convolutional neural networks

Mohamed Yousef, Khaled F Hussain, Usama S Mohammed

Abstract:

Unconstrained text recognition is an important computer vision task, featuring a wide variety of different sub-tasks, each with its own set of challenges. One of the biggest promises of deep neural networks has been the convergence and automation of feature extractors from input raw signals, allowing for the highest possible performance with minimum required domain knowledge. To this end, we propose a data-efficient, end-to-end neural network model for generic, unconstrained text recognition. In our proposed architecture we strive for simplicity and efficiency without sacrificing recognition accuracy. Our proposed architecture is a fully convolutional network without any recurrent connections trained with the CTC loss function. Thus it operates on arbitrary input sizes and produces strings of arbitrary length in a very efficient and parallelizable manner. We show the generality and superiority of our proposed text recognition architecture by achieving state of the art results on seven public benchmark datasets, covering a wide spectrum of text recognition tasks, namely: Handwriting Recognition, CAPTCHA recognition, OCR, License Plate Recognition, and Scene Text Recognition. Our proposed architecture has won the ICFHR2018 Competition on Automated Text Recognition on a READ Dataset.

Keywords:

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