

TOPICAL REPORT

CITIES

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RESILIENT CITIES



How to Future-Proof Our Cities? 4 Key Initiatives to Increase Resilience

"Our cities, vulnerable by nature and design, have generated the biggest challenge that humankind has to face. With the vast majority of the population expected to settle in urban agglomerations, rapid urbanization is going to raise the issue of adaptability with future social, environmental, technological and economic transformations."

Source: Archdaily

The role of cities in a climate-resilient future

"As cities take centre stage at the 10th World Urban Forum in Abu Dhabi, we must recognize the challenges they face but also seize the opportunities, including to connect sustainable cities with global action on climate change--perhaps our biggest challenge of all."

Source: UNDP

SMART CITIES



AI can now design cities. Should we let it?

SUSTAINABLE CITIES



Physical and virtual carbon metabolism of global cities

"Activities in cities are important drivers of global carbon fluxes. Here the authors trace the carbon metabolism in 16 global cities in terms of both physical and virtual carbon inflows, stock changes and outflows in relation to the supply chains of urban production and consumption and show that the total carbon impacts of global cities are found to be highly varied in either per capita, intensity or density measures."

Source: Nature Communications

A biomimetic research on how cities can mimic forests to become sustainable and smart

"Outcomes of this paper aim to scientifically state that forests are naturally sustainable built environments which are the greatest examples for smart cities and when they unite, they are able to create the most suitable living environments for other living organisms."

Source: Declarations, Congresses and Symposiums

A Pattern of Collaborative Networking for Enhancing Sustainability of Smart Cities

"This paper represents a research response to the current vision on transformations regarding the capacity building of smart cities focused towards sustainability, by

CITIES



Demand and Disruption in Global Cities

"Our new research looks at the rapidly evolving global system of cities, the impact of the major forces of change on global urban dynamics and the implications for the real estate sector."

Source: JLL

SMART CITIES



Future of Smart Cities—Key City Profiles

"The study looks to identify the unique intelligent transport strategies adopted by major smart cities from a global perspective. It focuses on various developments in this segment, including their current and future outlook. It also presents a general overview of the disruptive technologies, data and digital strategies and various smart city initiatives."

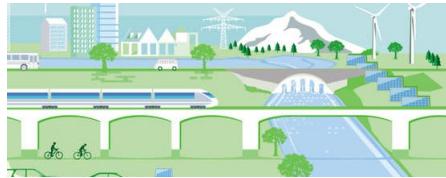
Source: Frost & Sullivan

OUTLOOK

"We used to worry about AI turning our world into gray goo. But maybe we should be more afraid of it bringing in a Starbucks and a Lululemon."

Source: Fast Company

SUSTAINABLE CITIES



Watch these four clean energy trends in U.S. cities

"At the start of this new decade, American cities, states and businesses already have come a long way on the road to cutting greenhouse gas emissions to help tackle the climate crisis"

Source: Greenbiz

In the fight against climate change, cities need not be hotbeds of environmental degradation

"Instead of being seen as pressure points for the environment, cities could be planned as innovation hubs. National governments must lead the move towards inclusive and sustainable cities, through initiatives such as carbon pricing and tax policies."

Source: South China Morning Post

addressing the knowledge based urban development and collaborative tools that support the development, dissemination, and use of knowledge."

Source: Sustainability

SMART CITIES



Exploiting Unlabeled Data in Smart Cities using Federated Learning

"The algorithm is divided into two phases where the first phase trains a global model based on the labeled data. In the second phase, we use semi-supervised learning based on the pseudo labeling technique to improve the model. We conducted several experiments using traffic signs dataset to show that FedSem can improve accuracy up to 8% by utilizing the unlabeled data in the learning process."

Source: IEEE ICC 2020

Virtual to Real adaptation of Pedestrian Detectors for Smart Cities

"in this work, we introduced ViPeD - Virtual Pedestrian Dataset, a new synthetically generated set of images collected from a realistic 3D video game where the labels can be automatically generated exploiting 2D pedestrian positions extracted from the graphics engine. We used this new synthetic dataset training a state-of-the-art computationally-efficient Convolutional Neural Network (CNN) that is ready to be installed in smart low-power devices, like smart cameras. We addressed the problem of the domain-adaptation from the virtual world to the real one by fine-tuning the CNN using the synthetic data and also exploiting a mixed-batch supervised training approach."

Source: Computer Vision and Pattern Recognition

UK smart cities present and future: An analysis of British smart cities through current and emerging technologies and practices

"This paper is premised upon an analysis of 26 cities within the UK regarding their smart city projects. Each city was analyzed through news articles, reports and policy documents to ascertain the level of each city's development as a smart city. Each was coded by separating the projects into five types, which were ranked on a scale from 0 (no



Cities Outlook 2020

"Poor air quality impacts on the health of residents and workers in cities in particular. Urgent action is needed from local and national government to clean up the air we breathe."

Source: Centre for Cities

URBAN PLANNING



The Hidden Wealth of Cities : Creating, Financing, and Managing Public Spaces

"The Hidden Wealth of Cities: Creating, Financing, and Managing Public Spaces discusses the complexities that surround the creation and management of successful public spaces and draws on the analyses and experiences from city case studies from around the globe. This book identifies—through the lens of asset management—a rich palette of creative and innovative strategies that every city can undertake to plan, finance, and manage both government-owned and privately owned public spaces."

Source: World Bank Group

Next Generation Urban Planning

"As the Voluntary Local Review (VLR) movement gains attention, this report explores the promise of the Voluntary Local Review as an urban planning tool for advancing sustainable development ... The report also proposes innovations that might be valuable for the next generation of VLRs, and raises issues for consideration in scaling the use of the VLR."

Source: The Brookings Institution

URBAN TRANSPORT



The World's Most Traffic-Choked Cities, Ranked

"TomTom pulls its data from the more than 600 million drivers who use its maps, whether on an old school aftermarket navigation device, via their car's built-in navigation system, or a smartphone app. Users don't have to see the TomTom logo to be part of its data: The company provides data for Apple Maps, and recently struck a deal to do the same for Huawei."

Source: Wired

URBAN PLANNING



Mobility Futures

How mobility will be shaped by the world's great cities



Mobility Futures

"Kantar predicts that private car journeys in the world's largest cities will decrease by 10% over the next decade. The rise of the sharing

There Is a New Model for Measuring the Success of Cities

"Cities that are most successful in addressing these areas and embracing new economic models — the innovation economy, the experience economy, the sharing economy and the circular economy — will be the most future-proof"

Source: Brink News

Scientists analyzed 1,700 cities and determined how to design safe streets

"Every day, more than 3,700 people die on the world's roads. Road traffic crashes result in more than a million deaths and tens of millions of injuries each year, and are predicted to become the fifth leading cause of death globally by 2030, according to the World Health Organization."

Source: Fast Company

WATER MANAGEMENT



How Cities are Using Architecture to Combat Flooding

"Forty percent of the human population lives within 100 kilometers of a coastline, with one in ten living under ten meters above sea level. As climate change induces more volatile flooding events and long-term sea level rises, it is estimated that coastal flooding could cause as much as \$1 trillion of damage per year by 2050. We cannot escape the reality that cities, and their populations, are more vulnerable to flooding than ever."

Source: ArchDaily

INCLUSIVE CITIES



This is how smart cities are paving the way towards an inclusive future

"By 2050, nearly 70% of people will live in a city. The World Bank's Sameh Wahba explains how its helping cities harness data and cutting-edge technology to grow sustainably."

Source: World Economic Forum

plans for use) to 5 (project type in use)."

Source: Sustainable Cities

Modeling of Smart Cities Based on ITS Architecture

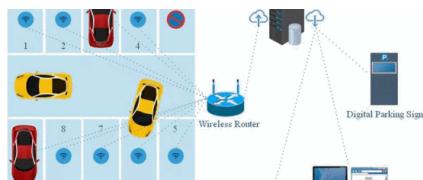
"In this paper, a new approach to initiate and develop Smart City model is provided. A unified model is one way to describe the processes within such complex and heterogeneous system as Smart City. It is based on the similarity to the well-established framework called ITS (Intelligent Transport System) architecture."

Source: IEEE Intelligent Transportation Systems Magazine

economy, multi-modality and autonomous vehicles, coupled with the ageing global population will all reduce the need for car ownership ..."

Source: Kantar

URBAN TRANSPORT



Source apportionment of particle number size distribution in urban background and traffic stations in four European cities

"Ultrafine particles (UFP) are suspected of having significant impacts on health. However, there have only been a limited number of studies on sources of UFP compared to larger particles. In this work, we identified and quantified the sources and processes contributing to particle number size distributions (PNSD) using Positive Matrix Factorization (PMF) at six monitoring stations (four urban background and two street canyon) from four European cities: Barcelona, Helsinki, London, and Zurich. These cities are characterised by different meteorological conditions and emissions."

Source: Environment International

Network-Based Analysis of Public Transportation Systems in North American Cities

"A comprehensive data analysis system is implemented for the extraction of information and comparison of North American public transport systems. The system is based on network representations of the transport systems and makes use of a span of metrics and algorithms from the established properties in graph theory to complicated domain specific measurements."

Source: Social and Information Networks

Data-Driven Analysis of Traffic Volume and Hub City Evolution of Cities in the Guangdong-Hong Kong-Macao Greater Bay Area

"Using full-sample freeway toll data of the GBA, this paper proposed a new structured evaluation methodology that combines the node degree, traffic volume, and topological and flow field-theory (e.g., agglomeration and distribution) to explore the hub city ranking and evolution in this area. The data period we selected to analyze is immediately before and after the opening of the HZMB, and we assess the counties' centrality changes in the GBA by analyzing these data."

Source: IEEE

Decentralized Optimization of Vehicle Route Planning -- A Cross-City Comparative Study

"this study compares the effects of different underlying urban structures on the overall network performance, and investigates which characteristics of the network make it possible to realize routing improvements using a decentralized optimization router. The main finding is that, with increased vehicle altruism, it is possible to balance traffic flow among the links of the network."

Source: Systems and Control

Advances in smart roads for future smart cities

"An essential part of a smart city is transport. In this paper, we will discuss the current state, developments, and some of the emerging advances in transportation technologies and how these advances in smart roads will prepare the society towards the realization of future smart cities."

Source: Proc. R. Soc. A

Deep Reinforcement Learning for Unmanned Aerial Vehicle-Assisted Vehicular Networks in Smart Cities

"In this paper, we study a UAV-assisted vehicular network where the UAV jointly adjusts its transmission power and bandwidth allocation under 3D flight to maximize the total throughput."

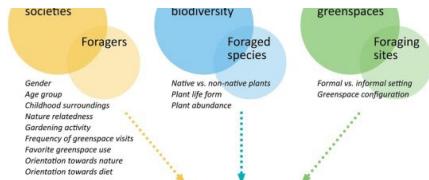
Source: Deep AI

A Review on Traffic Prediction Methods for Intelligent Transportation System in Smart Cities

"In this paper, the existing traffic prediction methods for smart cities are provided in detail and the problems and challenges of the prediction models are analyzed in depth. Based on the analysis of the existing short-term traffic flow forecasting methods, the possible development trend of short-term traffic flow predicting approaches in the future is pointed out."

Source: IEEE

URBAN DESIGN

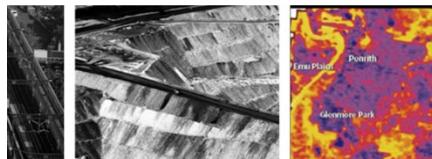


FaceLift: A transparent deep learning framework to beautify urban scenes

"we propose a deep learning framework called Facelift, that is able to both beautify existing urban scenes (Google Street views) and explain which urban elements make those transformed scenes beautiful. To quantitatively evaluate our framework, we cannot resort to any existing metric (as the research problem at hand has never been tackled before) and need to formulate new ones."

Source: Computers and Society

WATER MANAGEMENT



Changes in event-based streamflow magnitude and timing after suburban development with infiltration-based stormwater management

"Long-term monitoring of experimental suburban watersheds in Clarksburg, Maryland, USA, provided an opportunity to examine changes in event-based streamflow metrics in two treatment watersheds that transitioned from agriculture to suburban development with a high density of infiltration-focused stormwater control measures (SCMs)."

Source: Hydrological Processes

Mini-hydro power plant for the improvement of urban water-energy nexus toward sustainability - A case study

"This practical paper presents a required reflection on paradigm shift toward an aware water management in urban context for the provision of renewable energy and for the enhancement of pre-industrial heritage. It investigates the transition toward systemic and ecological approach to face the complexity of urban environment and infrastructures for energy supply."

Source: Journal of Cleaner Production

Achieve Sustainable development of rivers with

water resource management - economic model of river chief system in China

"China has established the River Chief System (RCS) to develop mechanisms to achieve success in cross-regional negotiations of the Sustainable Water Resource Management Affairs (SWRMA). This paper aims to investigate the mechanisms developed by RCS and social welfare brought by RCS in China, and thereafter put forward suggestions for the future development of RCS."

Source: Science of The Total Environment

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