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IMAGEM

IN THIS EDITION

BACK TO SCHOOL

HOW WE CAN ADOPT, MATERIALISE AND EXPORT A MODERN DUTCH GOVERNMENT'S INITIATIVE: 'COMMON GROUND' CAN BE RELEVANT ON A GLOBAL SCALE.

Wouter Brokx
CEO, IMAGEM

I remember my first day at a new school when I was full of excitement. New people, a new environment and my first cup of coffee: a life-changing experience. A school is a safe place and common ground where different ideas and thoughts come together to share knowledge. Let's have a look at one of the major technology trends in Dutch Government today in the analogy of school.

School is a place of collaboration, where we study the past, practice lessons learnt and create a strong foundation for our development towards the future. That is also the idea behind the Common Ground movement by VNG (the governing body for Dutch municipalities) – to collaborate in building an open digital ecosystem on common terrain, without the encumbrance of obsolete systems from the past. Let's have a look at the valuable lessons from the Common Ground movement in the analogy of a school environment:

The first lesson is about raw materials. Data is the raw material for the digital domain and the foundation of almost all modern information products and services. Just as every person is unique in the physical domain, data must be treated as a unique object too. Therefore, data must be stored once at the source, so that anyone who wants to use or interact with the data can access it directly from the source.

Almost all data today has a location. This is significant, as all data is seamlessly interconnected to each other and to reality. Due to this underlying relational property, the digital and physical domains are connected too. The connection exists in space, time and scale – the five dimensions of data.

The second lesson is about enrichment. It focuses on access to data through the digital channel in form of services. Standards and protocols have been defined for software to conform and to enrich data that is available for use. A rich software platform has all the tools and engines to create applications (which is the next step); and to enable connections to integrate with other systems. The platform must be open and should use APIs so that everyone can continue to build on the same foundation.

The third lesson is about the product. In the digital domain, the product can be an application where one or more processes can translate data via algorithms into useful information. At the same time the product acts as an interactive interface for users to gain knowledge and insights from the information. The user experience can be demanding, wherein three-dimensional visualisation, analysis and interactivity are increasingly considered default, and the devices that host the interface must be mobile and get smaller and smaller.

These high demands require a smart approach and software that supports the latest technological innovation such as Machine Learning and GPU processing.

Perhaps the most important lesson is not so much about the data or content, but rather the co-creation aspect. We are at school together. Common Ground movement was initially started by VNG but now extends beyond the purview of municipalities and nations. It is a usable model within which citizens, businesses and science can also participate.

Should adhering to Common Ground be a mandatory policy for government and its suppliers? I believe that it is wise for all stakeholders to apply the valuable lessons of school in their daily lives. IMAGEM and Hexagon Geospatial have adopted the Common Ground way of thinking and has aligned its technology and modular approach with the principle of “data independent from applications”.

This is the underlying concept for IMAGEM’s three themes – Data Automation, Digital Twin and Actionable Information, with 5D location data at its’ core. The associated software platforms provide technology (from lesson two) to build and integrate

solutions that securely connect and translate unique data and work processes into relevant information. We believe in creating solutions together, and facilitate co-creation and collaborate between governments, business and science.

Our VALLEY initiative was launched in late 2018 as a co-creation platform for all products and components (from lesson three). These components are available for use by all government bodies after a single-time development. For example, Machine Learning with GPU processing is already being used by Waterboard Drents Overijsselse Delta to inspect blockages in waterways from satellite images, and the knowledge and Machine Intellect is open and available to all other governments to use.

The approach to 5D data, Common Ground architecture and co-creation is deeply anchored in the foundation of our company's vision, team and technology.

At IMAGEM, we believe it is important to feel safe and at home in the digital domain. We do this by adopting the valuable lessons from school and connecting unique people with unique data. Just as in school, a co-creation approach is often the most effective in the long-term, but it requires courage from all stakeholders to participate in a collaborative environment, rather than sticking to a traditional buyer-supplier relationship between government and businesses. And for sure we know that change is present everywhere and all the time, and it's moving at an increasing pace.

Like the first day at a new school, we have taken our first step into this exciting world of co-creation. We are adapting and confident that there are similar minds who believe what we believe and want to learn and improve together. The innovation, production and export of Dutch Design has brought the Dutch and its trading partners great wealth. From school to success by co-creation: seems like a valuable lesson to remember and reapply. Shall we have a cup of coffee sometime? ■

Wouter Brokx
CEO, IMAGEM

GUEST COLUMN

THE DUTCH GEO-INDUSTRY: "SMALL BUT IMPACTFUL"

THE GEOSPATIAL SECTOR IS A SMALL BUT NICHE PLAYER WORLDWIDE. IN THE NETHERLANDS THE SECTOR IS SIZED AT €1.5 BILLION WITH 15,000 GEO-PROFESSIONALS. WHILE ITS SIZE IS SMALL, THE IMPACT IS GREAT.

This is due to the location factor. Without realising it, we frequently use geographic positions, mostly via apps that are a part of our daily lives. Technology is mainstream and everyone has access to smart devices, and we use and share geographical information, with or without knowing it.

Geo-technology plays an important role in the 'digitisation' of our society, as data and information make geo-information technology critical. Data is collected through many channels and the volume gets bigger with each update. Increased frequency of updating data creates further challenges. Our sector has deep knowledge about standards and data-operability, that contributes to collecting and unlocking data flows.

In the subsequent paragraphs, I have chalked out two examples from current trends in the Netherlands. The Environment and Planning Act allows citizens and businesses to obtain permits though a single procedure, counter and application. To support the implementation of this system, various datasets on the physical living environment are made available digitally in an interactive manner.

The Digital System for Environment Act (DSO) is being developed, with which environmental documents are created and shared based on defined standards. Therefore, geo-data or maps are integrated with all information relating to the physical living environment to support a unified system.

A similar trend is apparent in the Energy Transition initiative, where transitioning from using fossil fuels to renewable energy sources requires data and information. There is talk of 'gasless' neighbourhoods which means homes will be insulated by solar panels or wind turbines; but without a clear understanding of all the data and information needed for actualisation. This information is critical for planning investments by the government and to find support amongst target groups in the neighbourhoods.

Geo-technology is significant in collecting and measuring data such as mapping of homes and neighbourhoods or determining the optimum locations to install solar panels and wind turbines. It further helps in unlocking, analysing and providing insight into data and measuring the impact of changes.

These examples illustrate that geo-information and technology is significant at each level of these processes – from data collection to information sharing. It lays the foundation for unifying data from

The biggest growth is expected in the sectors of Energy, Construction and Infrastructure; while promising technology trends are 3D, Augmented and Virtual Reality, Artificial Intelligence, Sensors and IoT.

different sources and sensors, the 'Internet of Things' (IoT). Digitisation of these processes requires new and innovative technologies such as 3D modelling. Results are visualised on a map viewer which is essentially a digital replica of the physical reality - the 'Digital Twin'.

More recently, Deep Learning techniques have been used to further automate object recognition. This not only concerns changes and mutations of the object, but also the properties. A good example is the registration of solar panels that includes its properties such as location, quality, and more.

The latest market report by GeoBusiness Nederland (released in November 2018) highlights these trends. The report indicates that biggest growth is expected in the sectors of Energy, Construction and Infrastructure; while promising technology trends are 3D, Augmented and Virtual Reality, Artificial Intelligence, Sensors and IoT.

The Dutch geo-sector has great opportunities ahead, shaped by a unique collaboration between the government, businesses and research/science institutes. The government has made major investments in the geo-sector in the last fifteen years. Agreements have been formed on standards, with geo-information being made available to all due to the open-data policy.

The next step is to ensure data collected efficiently and shared to optimise usage. Already, the government is modernising their IT systems, starting with the municipalities under the 'common ground' programme. The core principle of the common ground is collaboration and development of future-proof IT infrastructure. ■

Camille van der Harten
Director GeoBusiness Nederland

Original text in Dutch. Translated by IMAGEM.

DATA-DRIVEN DECISION-MAKING THOUGH CITIZEN-PARTICIPATION

CROWDSOURCING FACILITATES BETTER GOVERNANCE. GO BEYOND SIMPLY RESPONDING TO CITIZEN REPORTS. LEVERAGE THE GATHERED DATA FOR DEEPER ANALYSIS. TURN CITIZEN DATA INTO VALUABLE INSIGHTS.

A common goal for the 355 Dutch municipalities and their citizens alike is to achieve and maintain liveable and safe environments. This means speeding control in neighbourhoods, litter-free pavements, functioning streetlights, clear public bins, and much more. While this sounds like a simple and achievable goal, it is in fact a gigantic undertaking for all stakeholders.

THE PROBLEM IS TWO-FOLD

Tax-paying citizens expect the government to keep their neighbourhoods in a good state. And to manage these expectations, municipalities rely on internal processes and workflows. The 'digitalisation' and 'common ground' objectives of the Dutch government further help in efficiently deploying funds and workers by zones and neighbourhoods.

However, the real challenge for municipalities is to be alerted in real-time. They must rely on being notified about public-space incidents via their field crew. This creates a time lag, often causing delay to responses. And then, there are citizens who lodge complaints to municipalities about issues in their neighbourhoods. This is quicker than the traditional methods. So why are citizen complaints not the main source of incident reporting? The answer is rather simple - citizens often do not have the right tools or channels to approach their municipalities.

Let me paint you a picture here, using a real-life example. A couple years ago, while driving down the road with a friend in broad daylight, I noticed that the street-lights were still on. My first reaction - what a waste of electricity! I tried to reach out to the municipality through their website. The contact form had too many fields to be filled out, so I decided to tweet to the municipality instead. Someone had beat me to it, and while driving back on the same road, the lights were indeed turned off.

The incident had an impact on me as it affirmed the belief that citizens care about local issues and are willing to reach out to the authorities. But there wasn't a straightforward way to accurately report incidents. While there are a wide-range of third-party mobile apps available, what happens next? Do municipalities receive the information from these third-parties on time? And what about citizen data privacy?

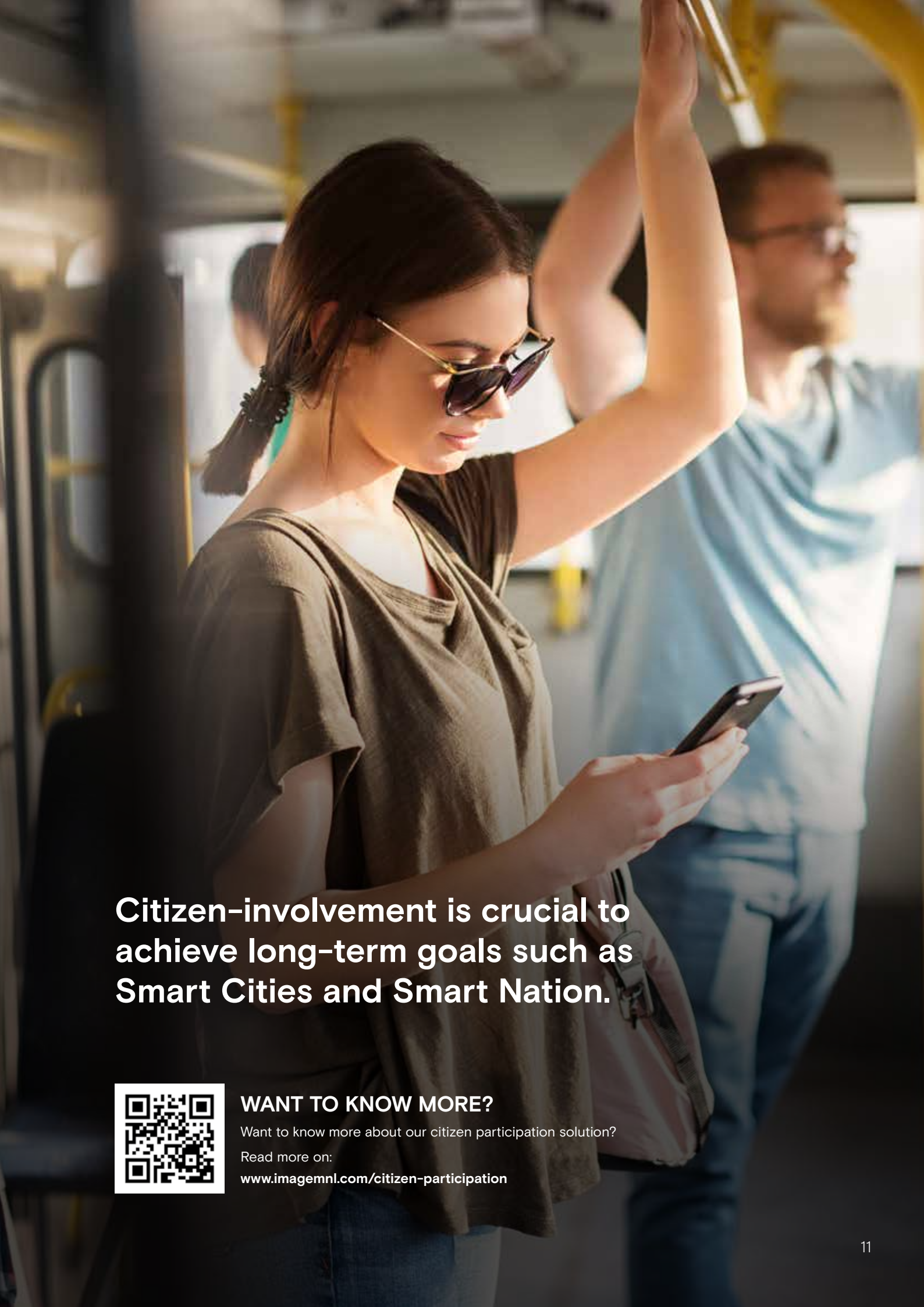
13.2

million people in the Netherlands use smartphones [1]

A TWO-WAY COMMUNICATION BETWEEN MUNICIPALITIES AND CITIZENS IS THE NEED OF THE HOUR

Increasingly, thought-leaders, policy makers, aldermen and government workers feel that sharing responsibilities with citizens to manage public spaces will have positive outcomes. Active citizen-participation and ownership will fast-

Source: [1] Statistica



Citizen-involvement is crucial to achieve long-term goals such as Smart Cities and Smart Nation.

WANT TO KNOW MORE?

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www.imagemnl.com/citizen-participation

track improvements in living standards and safety. Crowdsourcing can rapidly revitalise community collaboration and accelerate evidence-based decision making at municipalities. An exemplary case is a successful pilot conducted by the Municipality of Helmond during new year 2019 to tackle the fireworks nuisance. Citizens reported directly to the local authorities through an app promoted by their mayor on social media. The response was much higher than the municipality had expected from their citizens.

Various trials have been conducted all over the Netherlands to involve citizens in social, health and safety issues in public-spaces with varying outcomes. While some initiatives work out, the others do not.

KEEP IT SIMPLE

Why did the firework-complaint app work at Helmond? For one, it was a simple solution. Anyone with a smart phone could download the free app and in 4 clicks submit an accurate report anytime and anywhere. By aligning with local privacy laws, the AVG-compliant app enabled anonymous reporting, prompting higher response from citizens. Additionally, the app automatically tagged location to each incident, making the data highly accurate for the municipality to respond to.

14%

Dutch urban population files complaints [2]

Accessibility (no cost) and privacy (anonymity) play a large role in facilitating mass-consumption. If the government can ensure conducive reporting channels to citizens, they can be assured of higher response rates.

TURN DATA INTO INSIGHT FOR BETTER GOVERNANCE

It is important to strike the right balance between citizen-participation and data required by the government for evidence-based decision making. Hence, at the very least, incidents should be real-time, have precise location, visual support (photos), and relate to local issues.

Most citizen reporting apps available today are third-party and municipalities must purchase data from private organisations. This causes time-lags amongst other problems such as irrelevant/incomplete information and high costs.

4

complaints per minute are recorded in the country [3]

If on the other hand, municipalities can create their own platform with categorised local problems, it would significantly improve data-quality. Owning data would also enable seamless inter-departmental information sharing. Integrating multi-source data would help derive patterns for advanced analytics to gain deeper (and unexpected) insights.

KNOW YOUR MUNICIPALITY BETTER

Imagine if you could visualise all your citizen complaints on an interactive map. Now imagine, that you could have different colours for categories - dog waste, noise, fireworks, improper garbage disposal,

Source: [2] RTL News

drug-peddling and more. Add to this the possibility of sorting and viewing data by time. You could easily derive multiple patterns immediately, and identify the areas (zones, neighbourhoods and streets) that need more attention than the others.

Advanced analytics, graphs and charts integrated on a dashboard that produces custom reports would further consolidate the government's planning initiatives. Such insight would enable you to know your municipality better.

Now imagine that you could use advanced user interfaces and dashboards that seamlessly integrate location with data from your citizens and other sources. Take a moment to think about the futuristic user-interface used by Tom Cruise in movie Minority Report (2002) to prevent crimes even before they occurred. While that was fictional, in the real-world, technological advancements in artificial intelligence and Machine Learning are driving us towards developing predictive and cognitive systems.

Make an easy start in evidence-based decision making by using your citizens as sensors to collect information. Improve and optimised the liveability and safety of your municipality. We can help you realise the potential of using crowdsourced information to your advantage. Start small, but start today. ■

Yashita Arora
Marketing Director,
IMAGEM

Source: [3] RTL News

THE POWER OF THE DIGITAL TWIN

ENERGY TRANSITION, SUBSIDENCE OF OUR ROAD NETWORK, CLIMATE CHANGE AND ADAPTION - THESE ARE SOME OF THE MAJOR THEMES OF OUR TIME, IN WHICH LOCATION PLAYS A CRUCIAL ROLE.

We constantly try to get a clear picture of what's happening, analyse those developments and make informed decisions. With open standards and the ability to connect services through APIs, it becomes easier to combine data from different sources and distil a uniform view on reality.

That 'single source' of reality is ever more important. We once focused on 'keeping data at the source' and diligently described each dataset meticulously so that others would know how to appropriately utilise it.

Nowadays it is more about connecting services, wherein the data product being served has already been adjusted for use. In most cases though, it is still just a data product, and multiple data products together do not automatically transform into information.

Another recent trend is a growing focus on 3D. As a picture says more than a thousand words, so does a 3D view of our environment compared to a traditional GIS viewer with layer over layer of 2D information. A 3D view closely resembles the reality that we experience every day, both outside and inside.

Often, this does hold an undiscussed, and maybe even subconscious danger. Because we experience a 3D visualisation as 'more real', we instantly attach a higher reality value to what we see.

It is important to realise though, that reality is dynamic, constantly changing and that it is a significant challenge to maintain a 3D experience close to reality.

Hence, it takes more than simply uploading a 3D city model to the cloud just once. If nothing is done after a single upload, the portrayed digital scene will divert more and more from reality. You can imagine that certain decisions can then trigger unwanted effects.

To be true to reality and to act accordingly, connecting the model to (near) real time sensors is crucial. These sensors could be those that measure air quality, monitor congestion, track water levels and nitrogen concentrations, etc. By integrating these sensors in our 3D environment, we introduce reality, rather than 'perceived reality'.

The combination of up-to-date base systems and real-time sensors with advanced analytics allows us to come ever closer to capturing reality and to building a digital copy of the outside world, otherwise known as a 'Digital Twin'.

With the ever-changing reality, our digital copy must change in tandem to maintain its 'twin status'. If we really want to create a digital twin of an area - city, factory, airport or national park - the maintenance process also needs to be in place.

In essence this is no different from how current 2D registrations work. But a city is a complex ecosystem of intertwined processes, making maintenance of its digital twin cumbersome.

Automation of maintenance processes or 'Data Automation' is a must-have. This can be done using objective criteria and increasingly through artificial intelligence, more specifically Machine Learning.

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The Digital Twin shows the virtual effect of new developments in an existing (real) environment.

Within the geospatial domain, Machine Learning can be applied successfully to detect certain objects or to assess changes over time. IMAGEM has been working with this concept for a while now, and already around 20 Machine- and Deep-Learning algorithms have been successfully implemented in standard Hexagon Geospatial technology. By making use of GPU processing, complex algorithms can be applied effectively.

Machine Learning and Deep Learning not only provide accurate maintenance, they also show us patterns and trends that would not be detected in individual data sources.

With this pattern recognition, we have not just captured reality, we are increasingly guided by it, as the system discovers and predicts issues that we as human beings could not see by just looking at the data. While we can visually recognise significant changes, we need computers and AI to cope with an ever more complex digital world.

The Digital Twin aids in visualising new developments in an existing environment, and as such can be used for scenario planning. A real-life image can be created portraying the consequences of certain policy decisions, much before the actual implementation. You could compare this concept to putting a new Formula 1 car in a wind tunnel. Only when all the effects of the new design are analysed and show the desired results, will the car be allowed on the circuit.

IMAGEM develops solutions based on Hexagon Geospatial technology for many industries. For example, defence analysts can quickly create an accurate map of an operational theatre to analyse where specific vehicles can travel, by accounting for soil conditions, vehicle characteristics and weather predictions. In municipalities such as Almere, an up to date 3D city model has been constructed, providing valuable input to the Dutch Environmental Planning Act. Public transport authorities can plan routes based on the actual demand per neighbourhood.

These insights lead to more effective choices for deployment of means and personnel. The examples are endless.

Creating Digital Twins is a joint effort. Data from internal systems is combined with open data sources provided by the government. This includes LiDAR scans, stereo imagery, drone imagery and key registers, but also live sensors that provide current measurements. Through generic building blocks, raw data is transformed into an initial model and connected to (near) real-time data sensor data (subject to availability).

A digital copy does not have to be a full-fledged system all at once. It can start small, aimed at just one or a few aspects, as long as it provides a reliable and current picture. With the foundation present, the ‘Digital Twin’ application areas can be expanded methodically to include new themes.

It might sound futuristic, but it’s not so far away. Much of the examples above are implemented already in the Netherlands. Together with our customers and partners, IMAGEM is increasingly building Digital Twins. ■

Patrick de Groot
Sales Director,
IMAGEM

ARE SELF-REGULATING WATER SYSTEMS ACHIEVABLE THROUGH MACHINE LEARNING?

WATERBOARDS ARE PRESSED TO DO MORE WITH SHRINKING RESOURCES AND FUNDS. THEY MUST DEPLOY ‘SMART SOLUTIONS’ IN THEIR DAILY PROCESSES TO ACHIEVE HIGHER EFFICIENCY LEVELS.

Government organisations today are pressed to do more with ever shrinking resources and funds. The 22 waterboards in the Netherlands are no exception. With large areas to be managed by limited staff, waterboards simply must pick their priorities for field activities. However, this does not mean that the desired results will not be achieved. Rather it means that waterboards must use 'smart solutions' in their day-to-day processes to achieve higher efficiency levels.

The goals of waterboards are simple - manage infrastructure such as dams and dykes; keep water systems clear and flowing; and balance flooding and drought situations. Since all their assets are on the field (location), it is but natural for waterboards to rely on imagery for monitoring and decision making (intelligence). Location-intelligence hence forms the bedrock for all field operations.

We stand on the brink of the fourth industrial revolution which is fundamentally different from the previous three. The underlying basis for the fourth industrial revolution lies in rapidly evolving communication and connectivity. Breakthroughs in artificial intelligence, internet-of-things and robotics (amongst others) affect us in our daily lives, but their potential is not fully understood yet. [1]

Adapting Machine Learning in daily work processes at waterboards can incite a wide range of possibilities. Integrating the concept of Machine Learning into imagery processing technology holds the key to achieving actionable insights.

Whether it is about identifying locations and nature of obstructions, illegal excavations/constructions, or monitoring ingrowth and water storage levels, 'smart'

Source: [1] The Fourth Industrial Revolution by Klaus Schwab

satellite imagery can improve accuracy and efficiency.

Tjip van Dale

Senior Geospatial Solutions Specialist at IMAGEM

"Integration of analytical tools with smart Machine Learning algorithms offers new possibilities for detecting phenomena on the earth's surface using satellite/remote sensing data. Users do not need to specify analysis criteria themselves but simply define what they are looking for; and relate this to specific locations in the satellite data where the phenomena are present. The smart system learns to distinguish 'what to look for' (and what not to) and generates criteria itself (i.e. machine-intellect) to produce accurate results for future classifications. Simply put, Machine Learning contributes to lowering the threshold for using satellite data in spatial issues. And this is not limited to just waterboards, the application areas of harnessing machine 'intellect' are indeed limitless."

A recent example in the Netherlands of this futuristic solution is at a waterboard - Waterschap Drents Overijsselse Delta (WDO Delta).

Let's have a look: Each year in autumn, about 60 staff members from WDO Delta spend an entire week checking for obstructions in water flow. The blockages in waterways are usually formed by vegetation and/or other pollutants. Usually this task needs a couple iterations – there is the initial check, and a follow-up for complex situations. The process is painstakingly labour- and time-intensive that hampers staff availability for other activities.

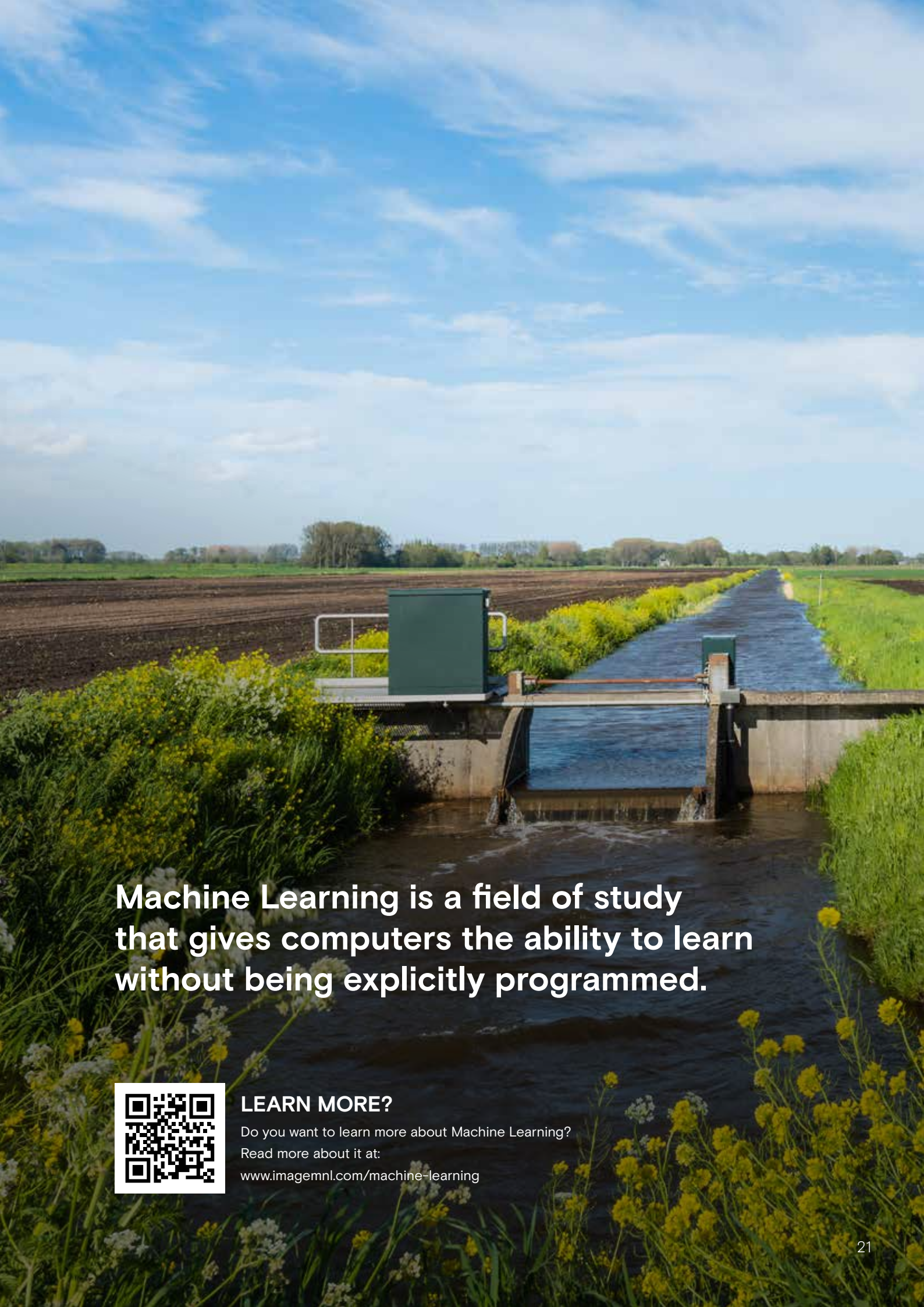
Last year (2018), the gargantuan nature of this annual activity piqued the interest of Jeroen Waanders, Innovation Advisor at WDO Delta. He wanted to drastically reduce the frequency of field visits by extracting highly accurate insights from satellite imagery. This is where the need for embedding artificial intelligence came in.

Jeroen Waanders

Information Advisor at WDO Delta

"We have been partnering with IMAGEM for many years now. They think along with us in finding solutions that generate added value for us. This project affirms that technological developments really do offer possibilities to support organisational goals in an innovative way, as well as absorb the consequences of staff turnover,"

Jeroen kick-started a living-lab to integrate Machine Learning into the existing imagery processing technology with IMAGEM; who have been working with the waterboard for creating innovative location-intelligence solutions using Hexagon Geospatial technology. In cooperation with CGI, IMAGEM developed a survey model based on Machine Learning that could be applied to satellite imagery.



Machine Learning is a field of study that gives computers the ability to learn without being explicitly programmed.

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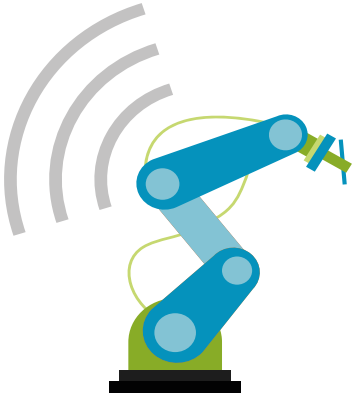

Traditional methods of imagery comparison could identify approximately 40% of blockages accurately. With the application of Machine Learning, where the model was trained to identify specific situations, ensured that a recognition rate of around 98% was achieved in just a few months. WDO Delta pioneered a breakthrough approach to regulating their water systems by simply eliminating the need for relentless site visits.

Patrick de Groot

Sales Director at IMAGEM

"Application of Machine Learning enables waterboards such as WDO Delta to create data-driven strategies and tasks for risk management. Instead of spending time to looking for the problems, they can now focus on solving the problem.

Evidence-based deployment of manpower and resources is much more effective and leads to faster response times."

Their staff will longer be required to check each waterway physically for blockages that hamper waterflow. Rather the 'smart' solution will identify areas that need to be physically checked. In a controlled test-environment, Jeroen Waanders with support from IMAGEM and CGI has attained a self-regulating water system – a first of its kind in the Netherlands.

The next challenge for WDO Delta is to move this concept from the living-lab into their live environment. If near-real time data (higher frequency of satellite imagery) is added to this equation, it would ensure continuous monitoring and evidence-based decision making. WDO Delta plans to do so in the autumn of 2019.

While the ripple effect caused by this disruptive solution is yet to be seen, this achievement is only the tip of the iceberg.

The possibilities with Machine Learning are endless, when integrated into powerful location-intelligence solutions. You are now in the fourth industrial revolution, don't work for your data, make your data work for you. ■

Yashita Arora
Marketing Director,
IMAGEM

TECHNOLOGY COLUMN

A CURRENT 3D ENVIRONMENT ON THE WEB

We hear and read more and more about 3D applications. The third dimension can be used to gain deeper insight into many problem scenarios. It has also found a place in the Smart Digital Reality vision at Hexagon Geospatial. However, in this column, I do not want to discuss Smart Digital Reality in any form – be it a 3D application or an elaboration of the Digital Twin concept. I want to focus on what is needed to create a current and real-time 3D visualisation: DATA!

There are various forms of 3D environments, some more complex than the others. Correct shapes and textures are of great importance to achieve an accurate impression of reality. In addition, you would obviously want the 3D environment to be real-time or current, needed to subsequently define links with databases, analysis or scenario applications.

IMAGEM uses stereo photos to create current environments. Through these photos we generate automated 3D city environments. With minimal manual labour you have perfect 3D building models with textures. Combined with a terrain model, a mesh, and an orthophoto-mosaic, an up-to-date 3D visualisation is created. All of this can be generated from stereo photos through point clouds. There is the possibility to add UAV data when detailed views are required for specific environments.

IMAGEM uses Tridicon, Luciad Fusion, Luciad RIA and open standards such as CityGML and OGC 3D Tiles to create a current 3D environment on the web.

The next step is sharing the current 3D visualisations through a 'viewer' on the web within the organisation or externally to public. Smart methods must be used to ensure high performance given that a current environment of an entire city would be displayed on web viewer. IMAGEM is actively investing in knowledge, methods, technology and partnerships to ensure that you have the 3D solution best suited for you – both 'on-premise' and on the cloud. ■

Wim Bozelie
Technology Director,
IMAGEM

“By fusing every type of data source into a new digital reality, we are able to bridge the divide between the static world and the dynamic world.”

Mladen Stojic, President at Hexagon Geospatial on announcing the Smart Digital Reality initiative at HxGN LIVE 2018 in Las Vegas, USA.[1]

[1] News Release: Hexagon’s Geospatial Division Introduces New “Smart Digital Reality” Vision at HxGN LIVE 2018

IMAGEM RECEIVES FD GAZELLEN AWARD 2018 FOR CONSISTENT GROWTH OVER THE LAST THREE YEARS

In 2018, the Financieele Dagblad Gazellen 2018 awarded 680 companies out of approximately 585,000 registered across the Netherlands. IMAGEM has been growing year on year by helping the governments spend tax money as effectively as possible through intelligent solutions based on cutting-edge geospatial technology.

www.imagemnl.com/fd-gazellen

WE ARE IMAGEM

We are translators and location intelligence is our domain. We translate data from the changing environment around us to enable data-driven decision making. Our platform uses hybrid software technology to turn real-time data into useful information; through which selflearning algorithms can be used to deliver ever improving predictions.

The map of the future is a smart app, that translates the complex world into dynamic information and interactive infographics. The resulting insight can be used to respond adequately to changes in the world around us. This is how IMAGEM gives meaning to the things that matter. We help you gain control over your future.

Read more: **www.imagemnl.com**

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