TECHMIND
SOLUTIONS

FROM EXPERIENCE
TO INPERIENCE

BIM & IOT solutions 2020

Virtual is closer to reality than you may think.

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WHO WE ARE

We started our business in 2013 and have been primarily developing virtual reality (VR) solutions and products. Digitizing real spaces and building up unique VR platforms from scratch have taken us on to new territories and now we use our experience to design and produce entirely new types of solutions and products.

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VIRTUALITY

In our day and age, especially with the restrictions arriving in our lives along with the new coronavirus pandemic, the significance and usefulness of virtualization are becoming more obvious than ever.

Not abadoning our 'classic' VR solutions, we have designed and developed new products and solutions that are or will be available throughout 2020.

Scan, survey, digitizing and 3D modelling of buildings

One of our new products available in 2020 offers a complex scan-survey-digitize-3D modelling solution for interiors of buildings.

In a nutshell, we scan the entire building with each and every room and premises included and we basically create point clouds, from which we then create digital data files in various formats in order to make them capable of supporting and handling a number of facility management functions. With the entire building digitized, facility management becomes more accurate, efficient up-to-date and readily accessible, and all this is integrated with BIM (Building Information Management) processes. Changes made to interiors are easy to follow up in the digitized data files and the other way around works, too: planning those changes beforehand using the digital files is just easy.

POINT CLOUD

The measurement deviation of point cloud files is under 1%, they feature solid density and are compatible with most 3D modelling programmes; we offer the most common point cloud file-types, such as .pts,.ptx, .xyz, .e57 and we are able to survey and scan both interiors and exteriors.

FLOOR PLAN

We create floor plans in various outputs and formats; from schematics and vector graphics files to highly detailed, coloured and real-world scale models we offer several options.

CAD MODEL

We create the CAD models from point clouds primarily for integration with BIM processes. CAD models can have multiple layers, each with a dedicated function; doors and windows, fixtures, structural elements, objects and furniture and the list goes on. We finalize our CAD models in Revit, ArchiFM or any other BIM-compatible format our client needs.

DOLLHOUSE VIEW

This is a low poly type of model that is the foundation for many 3D-related projects: game design, VR-platforms, 3D-printing are just a few examples, but first and foremost we use dollhouse views in the visualization of our IOT systems. We deliver dollhouse views in the most common file formats (.obj, .fbx)

Eötvös Loránd University, Budapest
Faculty of Law
30 000 sqm

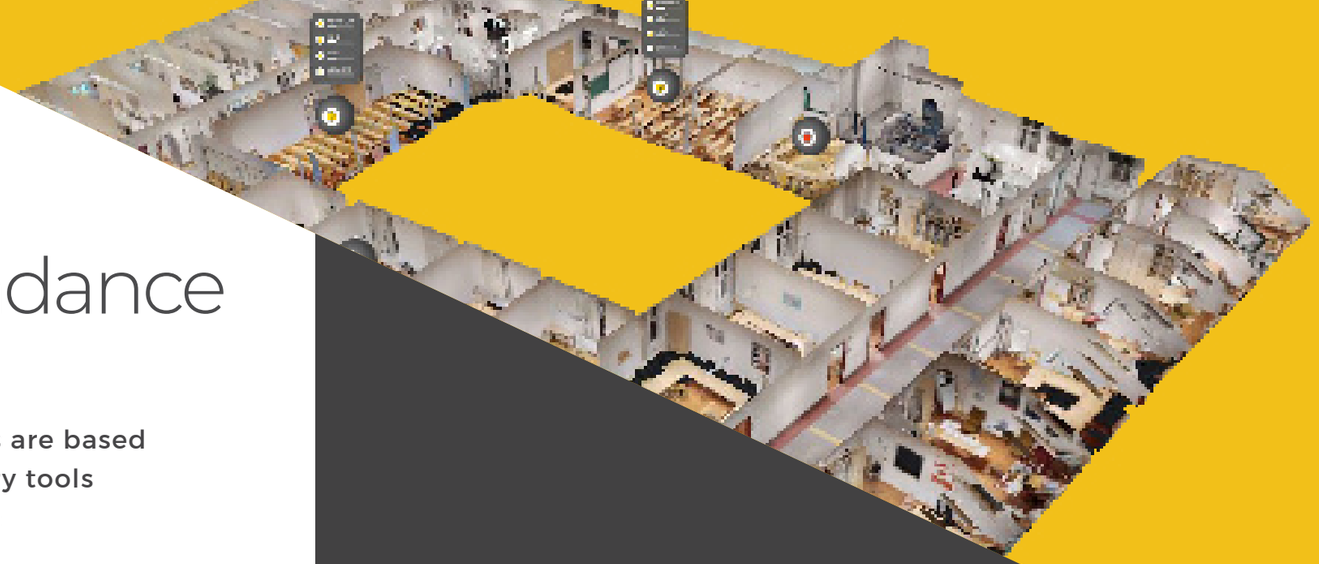
We have scanned and digitized over 100.000 square meters of building interiors.

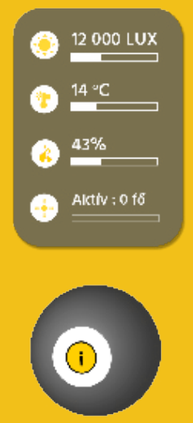
Eötvös Loránd University, Budapest
Faculty of Humanities
60 000 sqm

Eötvös Loránd University, Budapest
Faculty of Primary and Pre-school Eductation
15 000 sqm

Our methodology and tools ensure fast, efficient and high quality solutions. Thanks to our unique developments and tools, we can scan up to 3000 sqm on a daily basis without compromising the accuracy and quality of the surveys.

Interior environment monitoring and attendance checker system





3D models and 2D floor plans are the files on which the visualization of our IOT solution is based. **Our IOT solutions include the interior environment monitoring and attendance checker system, the Staff Locator mobile application and the 3D desktop user interface.**

Our IOT solutions are based on our proprietary tools and applications:

- **our environment** sensors can **monitor, in real time, the temperature, lighting conditions, humidity and movements inside interior spaces** and automatically forward data to the user interface

- our attendance checker solution is primarily based on our **checker sensor** and a Bluetooth Low Energy (BLE) tag; the sensor tracks the **BLE tag**s in **real time** and attendance data is forwarded to the user interface

- all sensing functions are integrated in to a complex sensor, thus each monitoring point requires only one sensor

- the **gateway device** is responsible for collecting sensor data and signals from the BLE tags and forward all these to the server, be it either local or remote

- **the desktop user interface is based on a 3D-engine** and processes, analyses and evaluates data, can generate stats and reports or trigger alarms in case of certain kind of occurrences

- Staff Locator is a cross-platform mobile application offering a complex search/find and navigation solution inside buildings; the app has a 2D 'map view' and lets the user search for rooms and staff members; the app shows the actual location of persons (BLE tags) inside the building, whom can be reached out to/contacted right from the app. Staff Locator will also plan the shortest route to the person the user wishes to get to; Staff locator makes indoor orientation and navigation more efficient and faster and will assist logistic processes as well.

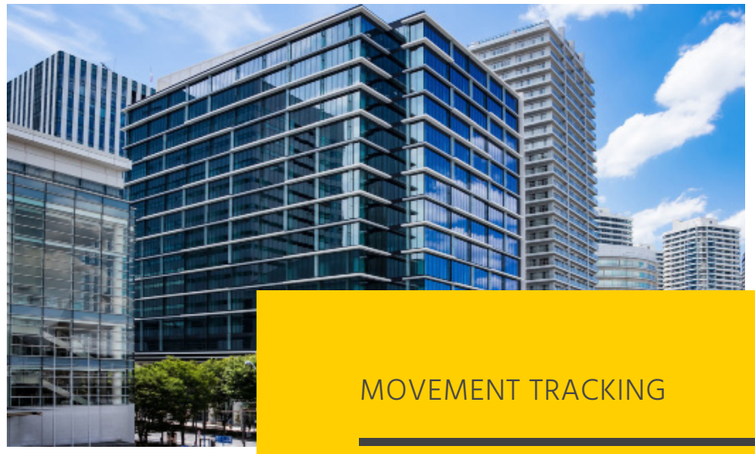
- System components (gateway to server, mobile app to server, desktop UI to server) communicate via a WiFi network that can either be already up and running or we can design and install a dedicated network.

With all the devices and applications in the same system, a complex interior environment monitoring and attendance-checker solution - augmented with the search/find and navigate functions - is created.

ADVANTAGES and ADDED VALUES

Monitoring the environment in real time provides relevant information with regard to **facility management and energy efficiency**.

Fluctuation of temperature can be the sign of windows or doors left open or the malfunction of the air conditioning or heating systems; the **level of humidity** can be critically important in some cases (server rooms, sound recording studios, etc.) or again, can prompt that a window was left open or the room was flooded after a pipe burst; **changes in lighting conditions** can prompt lights left switched on. The sensors can greatly enhance the efficiency of facility management, security and safety measures and can provide actual data of attendance.



MOVEMENT TRACKING

Movement tracking can be used in several scenarios.

- Tracking attendance in real time can be integrated with a number of other functions: **indoor movements, tracking workhorse**, passing thru security checkpoints.
- In case of emergency, especially **when evacuation is necessary**, movement tracking **can help locate** those left behind or stuck somewhere.
- In schools students can wear tags and thus their attendance and movements can be tracked for safety and security reasons.
- **Movement tracking can assist the monitoring duties of night shift receptionists.**
- Our monitoring and tracking solution offers complexity and efficiency at the same time: **the user interface makes it possible to overview and monitor** the interiors of even large buildings or networks of buildings, no matter how far apart those buildings are.

INTEGRATION

The monitoring system can be well integrated with other systems that use the mqtt or http protocols.

TECHNICAL SPECIFICATIONS

GATEWAY DEVICE

Responsible for collecting and forwarding data, requires mains power and a WiFi networks.

BLE (Bloetooth Low Energy) TAG

Has a unique ID and size of a keyring

- works with a CR2032 battery
- expected average timespan of operation with a single battery: 12 months
- signal incidence: every 5-10 secs
- signal coverage: approx. 70 sqm

COMPLEX SENSOR

Our proprietary environment sensor with a unique design.

- Works with 3 x AA batteries.
- Average lifespan of operation with a single set of batteries: 12 months.
- Temperature sensing: ±0.4 °C accuracy, -10 - +85 degrees Celsius measurement range
- Humidity: ± 3% RH accuracy, 0-80% measurement range
- Light: 0.2% accuracy, 0.01 - 83000 lux measurement range
- Movement: viewing angle 120°, sensing distance 5 m

COMMUNICATION PATHS AND PROTOCOLS

- Gateway to tag: BLE
- Sensor to gateway: 2.4 ghz radio frequency
- Gateway to server: WiFi, mqtt protocol
- Server clients: mqtt and http protocols

COMMUNICATION PATHS AND PROTOCOLS

- integration with existing, RTSP-based live video/camera systems
- instant access to video feed both on desktop and mobile platforms