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How Generative AI Is Reshaping HD Mapping

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Intro

- MSc of Geography by education
- **20+ years** in geospatial industry
- **For 15+ years** has been helping top navigation solutions providers to build their solutions with Intetics
- Teams that drove and coded **millions of kilometers**
- Teams that built **hundreds of algorithms** created to speed up production and enhance quality
- Currently in charge of AI/ML practice in the company

The Challenges of Traditional HD Map Creation

- **Labor Intensive:** Manual data collection and annotation is slow and costly.
- **Data Consistency:** Ensuring accuracy and uniformity across vast geographic areas is a major hurdle.
- **Speed:** The pace of HD map creation often lags behind the rapidly changing environment (new construction, road updates, etc.).

Imagine a world where maps update themselves in real-time, reflecting every change in our environment. Could generative AI make this a reality?

Current Examples Of Using AI In Mapmaking

Data Collection and Analysis

- Satellite and Aerial Image Processing
- Object Recognition in Street-Level Data

Current Examples Of Using AI In Mapmaking

Source: Road Traffic Analytics & Location Intelligence | HERE

Real-Time Data and Improved Routing

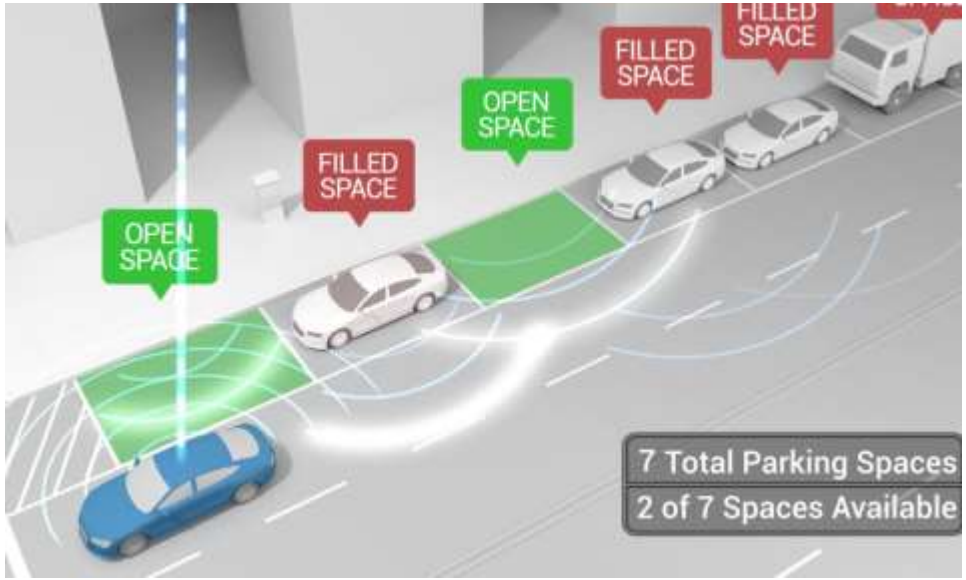
- Traffic Analysis & Prediction
- Dynamic Rerouting

Current Examples Of Using AI In Mapmaking

Enhanced Accuracy and Detail

- Identifying Road Changes
- Points of Interest (POI) Updates

Current Examples Of Using AI In Mapmaking



Source: Let Your Car Find the Parking Space: Ultrasonic Sensor Parking Tech (inrix.com)

Advanced Features and Personalization

- Hazard Detection
- Parking Availability Prediction
- Driver Preferences

Generative AI: A Game-Changer for HD Maps

- **Generative AI at its Core**
- **Key Techniques**
  - Large Language Models (LLMs)
  - Image Generation Models

- **Potential Benefits**
  - *Automation*
  - *Accuracy*
  - *Scalability*

Data capturing (photo, video, LiDAR)

Automatic feature detection, recognition and extraction

Feature is sent to central DB and integrated into existing map

The Future of HD Mapping with Generative AI

Potential for Disruption: How AI could transform mapmaking processes in the near future.

- Real-time updates
- Hyper-personalization
- Predictive mapping

The Future of HD Mapping with Generative AI

Collaboration as Key: Importance of industry collaboration to develop standards and best practices.

- Data sharing
- Best practices
- Open-source initiatives

The Future of HD Mapping with Generative AI

Considerations:

- Data privacy
- Bias
- Impact on the workforce
- Data Quality
- Computational Power
- Change Verification

Conclusions

- The existing mapmaking process is extremely labor-intensive and slow
- There are already numerous examples of using AI for mapmaking among industry leaders and startups
- Generative AI can bring dramatic changes to the automotive navigation industry through:
  - Further automation
  - Accuracy and quality increase
  - Speed up all processes and allow larger scalability

- If/when market leaders start sharing their data and algorithms, we will be very close to real-time, almost automatic map updates.
- Don’t forget about risks and considerations.

Thank you!

- **Pavlo Yalovol**
- VP of Innovation

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