



VIRGINIA TECH
**TRANSPORTATION
INSTITUTE**



An aerial photograph of a road winding through a landscape with buildings and trees. The image is in grayscale, with the text overlaid in white and yellow.

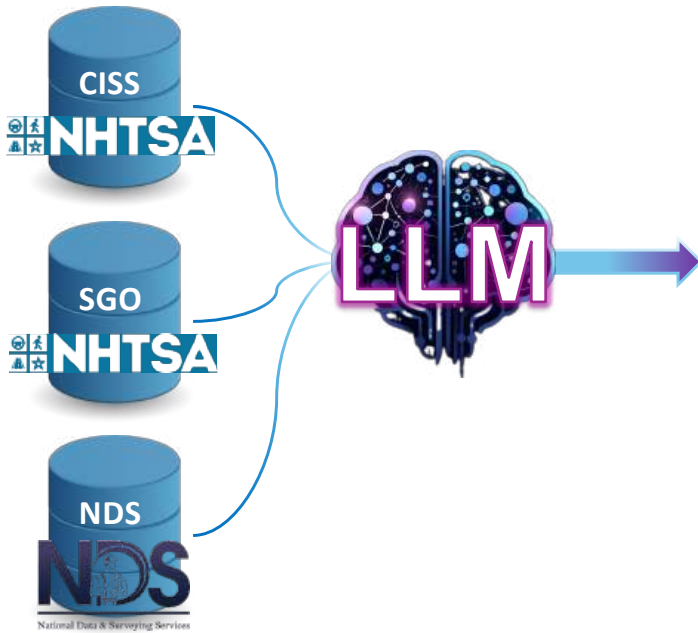
With a legacy of innovation and pioneering approaches, we are the global destination for mobility research.

- 300+** researchers dedicating their lives to saving lives
- \$1B** of infrastructure accessible to VTTI and partners
- \$150M** in infrastructure managed by VTTI
- \$50M** annual research portfolio supporting 100s of sponsors
- 70M** miles of naturalistic driving data
- >1M** hours of car naturalistic driving data
- 3,000** studies completed
- 4,000** instrumented vehicles
- 30,000** hours of data collected on Virginia Smart Roads

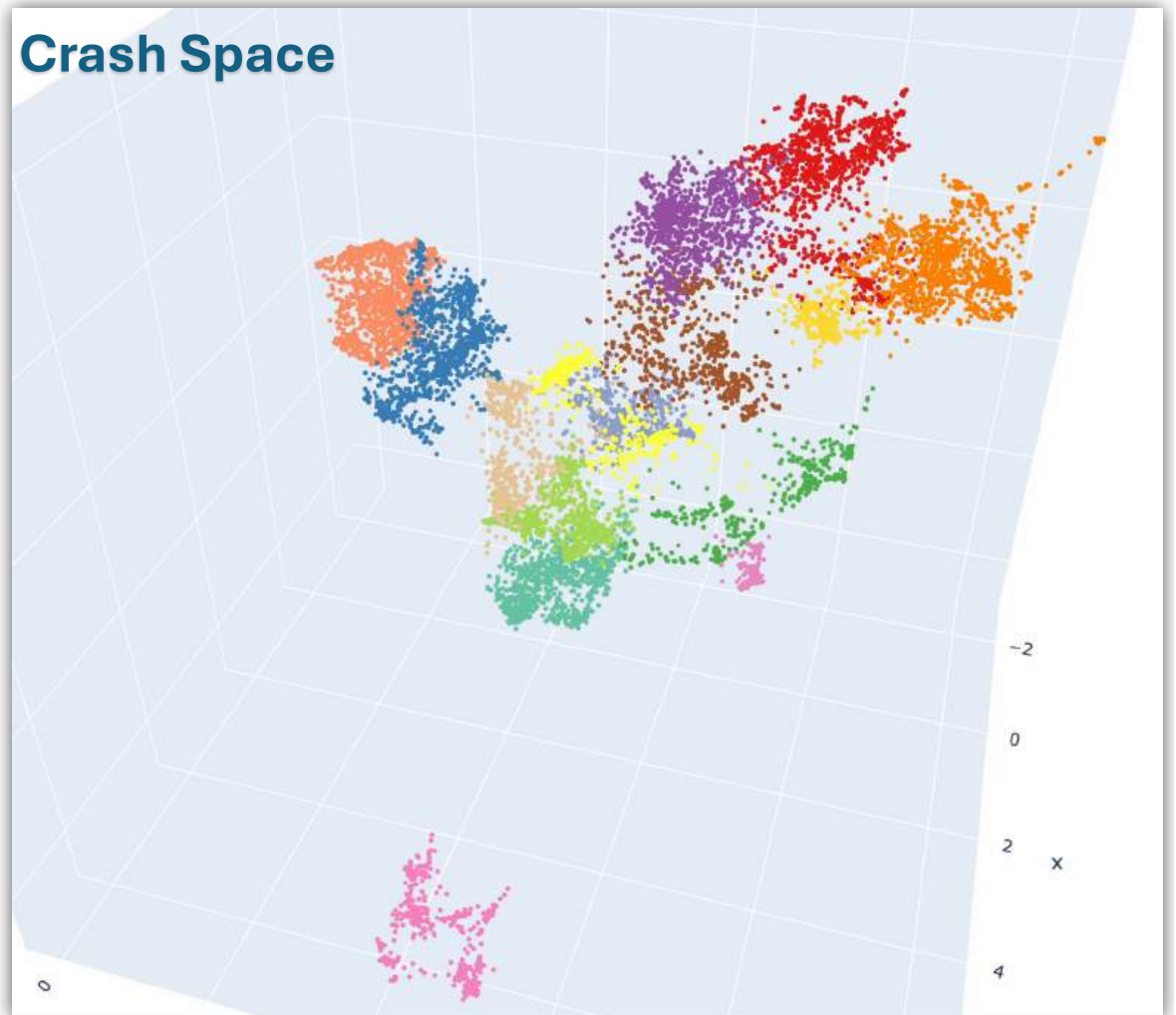
Crash Narrative

Case ID: xxxxx

Narrative: V1 was traveling south on a 2 lane, divided roadway. V2 was traveling south in the same lane ahead of V1. The front of V1 contacted the back of V2.



Crash Space



Logical Traffic Scene and Risk Understanding




Vision-Language Model

Based on the image provided, here are the points to which the driver should pay attention:

1. The **construction worker** in the orange vest holding a stop sign is directing traffic. Drivers should be aware of this person and follow their instructions regarding stopping or proceeding.
2. There is a **red stop sign** visible on the right side of the image, indicating that drivers must come to a complete stop before proceeding.
3. The **road appears to be wet**, which could indicate recent rain or other weather conditions that may affect traction and braking distance. Drivers should exercise caution due to potential slippery roads.

The current state of AI in Transportation through the lens of Topic Modeling

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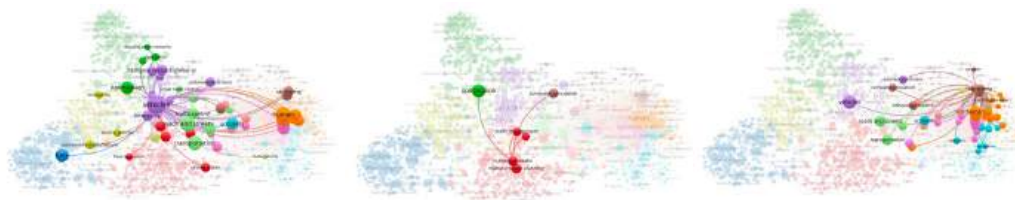
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Different papers have keywords that can be leveraged to show inter-linkage between AI and transportation

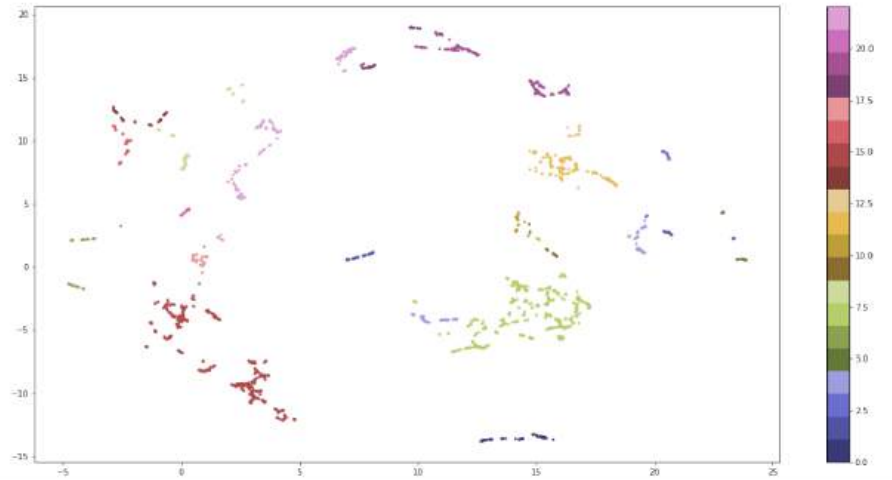
- Title:** When Vehicles See Pedestrians with Phones: A Multicue Framework for Recognizing Phone-Based Activities of Pedestrians
 - Keywords:** Articulated pose tracking; computer vision; deep learning; exemplar support vector machines (SVMs); highly autonomous vehicles; panoramic surround behavior analysis; pedestrian activity recognizer
- Title:** Driver gaze zone estimation using convolutional neural networks: A general framework and ablative analysis
 - Keywords:** Advanced driver assistance systems; Automobile drivers; Behavioral research; Classification (of information); Computer vision; Convolution; Image classification; Intelligent systems; Large dataset; Neural networks; Pattern recognition; Pattern recognition systems; Statistical tests; Driver assistance system; Driver distractions; Driver information systems; Facial feature extraction; Gaze estimation; Gaze tracking; On-road studies; Visual Attention; Eye tracking

Keywords tend to occur in clusters



X

Keywords tend to occur in clusters– We found 19 AI Topics.

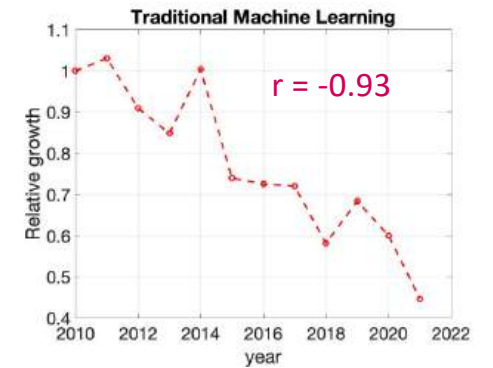
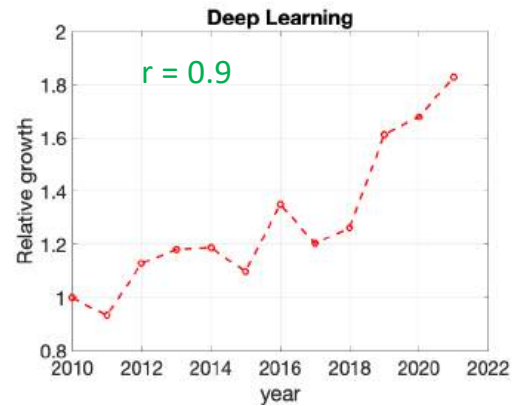
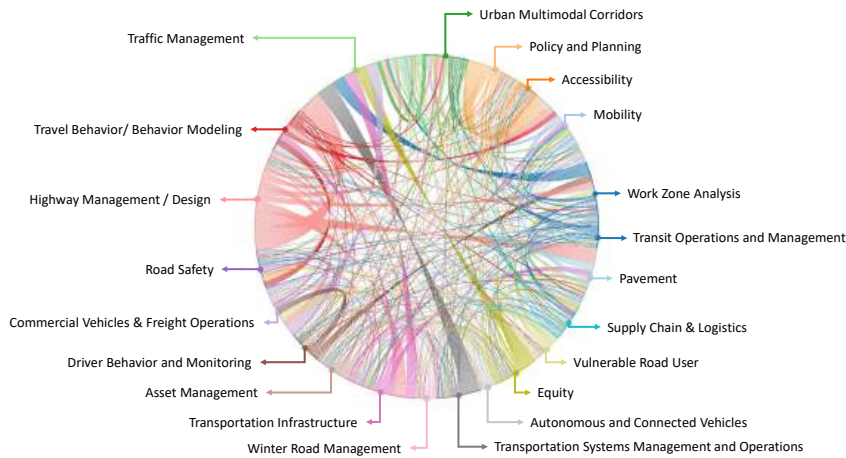


Computer Vision

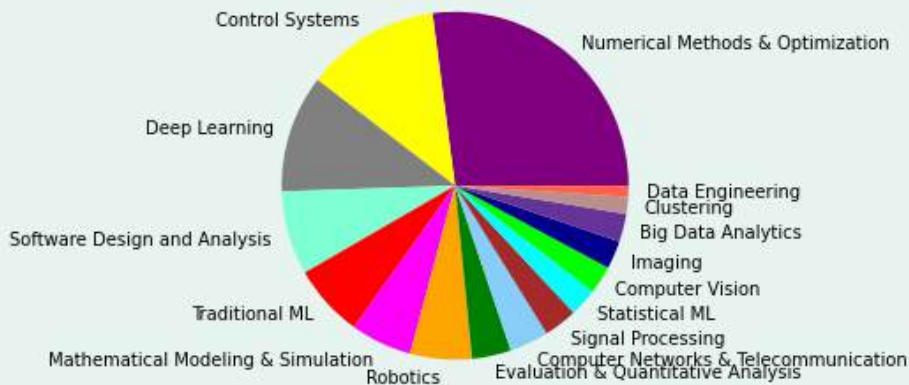
Imaging

Traffic Management

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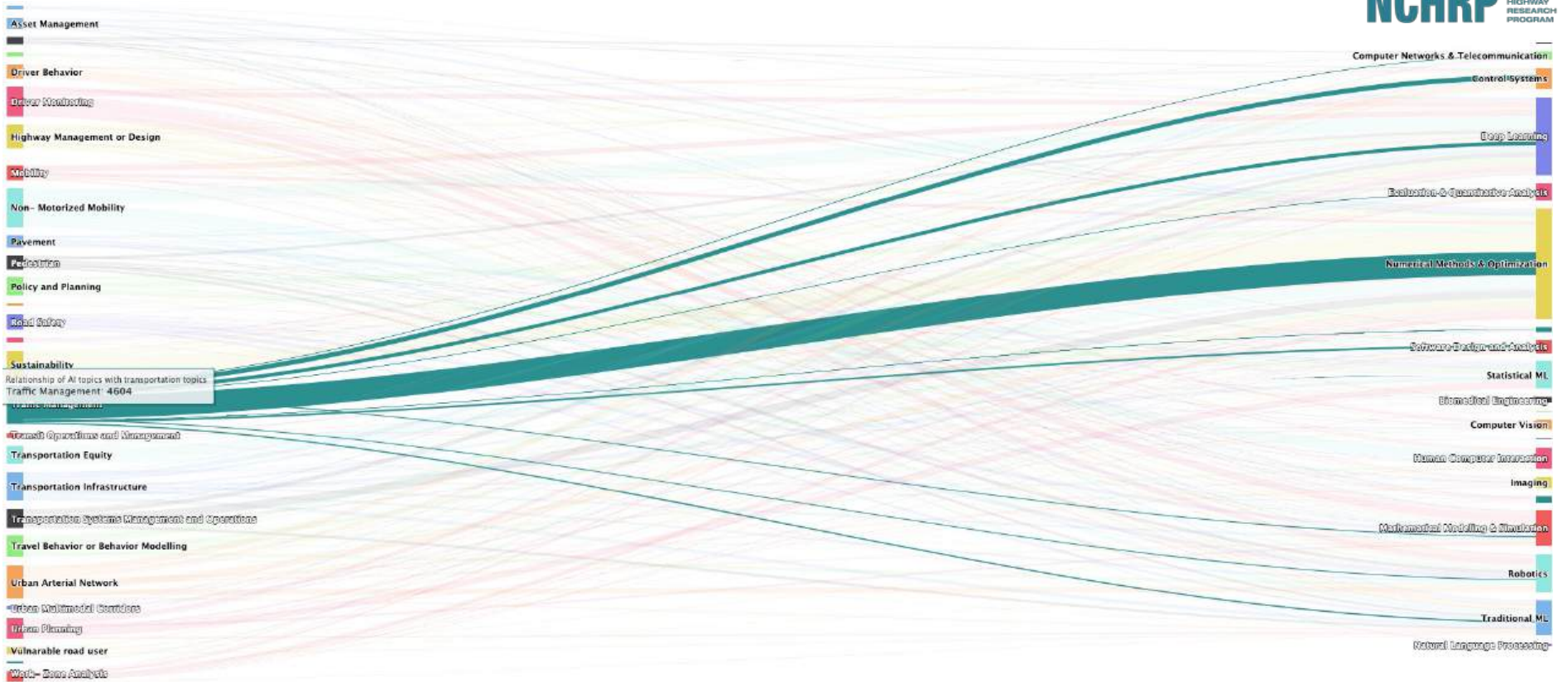


ML Topics used for Traffic Management



- Numerical Methods & Optimization
- Control Systems
- Deep Learning
- Software Design and Analysis
- Traditional ML
- Mathematical Modeling & Simulation
- Robotics
- Evaluation & Quantitative Analysis
- Computer Networks & Telecommunication
- Signal Processing
- Statistical ML
- Computer Vision
- Imaging
- Big Data Analytics
- Clustering
- Data Engineering

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Dependency of Transportation Topics with AI Topics

Title

Thank You!

