

RESEARCH PROBLEM STATEMENT

DATE: 9/5/2019	PROJECT AREA: Asset Management/System Information
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TITLE: Artificial Intelligence Based MIRE Elements Extraction

PROBLEM STATEMENT:

Highway systems can be vulnerable for any natural hazards or man-made disasters. A virtual road and traffic information system can be a very useful tool for emergency management and long term planning of the highway system and improvement of highway performances. The ARDOT's MMHIS has extensive data in its multimedia data warehouse. The agency requires more data and analysis tools for asset data integrated with a system for optimized use of the existing information. The agency already requires a number of items of road information data enlisted in the Model Inventory of Roadway Elements (MIRE), which is a recommended listing of roadway inventory and traffic elements critical to safety management. These data to be acquired for asset management plan and traffic safety analysis and improvements. These data are also required to be reported to the Federal Highway Performance Monitoring System (HPMS). advanced computer vision techniques and artificial intelligence (AI) will be used to analyze ARDOT's MMHIS' video and imagery data and extract the road element data (in a feasible geodatabase supported format) so that they can be integrated with HPMS, LTPP and SHRP 2 RID databases.

OBJECTIVES:

The main objective of this study is to extract relevant data from ARDOT's existing legacy based repository systems (e.g., MMHIS), populate the MIRE database with real-time data, and develop a decision support tool to extract important information. Also, the MMHIS tool can be further improved by adding more feature recognition tools. With the current advancement of computer vision and AI, the integration of more features into the MMHIS system and development of new decision support tools can help the decision support system more realistic. In this proof of concept study, advanced computer vision techniques and AI will be used to analyze MMHIS' video and imagery data to extract the road element data.

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

The project will help the agency to fine-tune the critical highway data collection process for highway safety analysis and improve the infrastructure maintenance system. The project will be the first milestone in the MIRE data collection and integration for Arkansas. It will help the agency in improving their roadway and traffic data inventories, conducting data-driven highway safety analysis, and in monitoring infrastructural degradation and improvements. It will also help to be compliance with the future demand of traffic information systems and approved regulations such as MAP-21, FAST Acts, FHWA initiated projects such as HPMS, and LTPP.

Estimated Project Duration: 24 Months
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Standing Subcommittee
Ranking

6/7

Advisory Council
Ranking

N/A

Statement Combined with
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