

**Paper Title:**

Multi-Scale Feature Fusion Learning Better Semantic Segmentation For Road Pothole Detection

**Paper Link:**

<https://ieeexplore.ieee.org/document/9551165>

**1 Summary****1.1 Motivation**

The paper was focused on finding multi-scale feature fusion modules (MSFFM) that will resolve the issue where feature fusion of feature maps in different scales cannot be done. This will ultimately allow us to detect potholes using semantic segmentation techniques that will have better accuracy.

**1.2 Contribution**

Introduction of a novel multi-scale feature fusion module based on attention mechanism. Using a channel attention module the feature maps in different scales are reweighted. This removes the semantic gap and improves the technique's accuracy.

**1.3 Methodology**

. After many convolution and pooling operations, we get a top level layer with rich semantic information but poor resolution and a lower level layer with high resolution but poor semantic information. Now, the MSFFM comes into play, where by utilizing matrix multiplication we find relevance of feature maps in different scales. Greater relevance means higher similarity. Then, this information passes through channel attention module (CAM) where after using global average pooling, ReLU, sigmoid we get reweighted feature maps. And thus, feature fusion becomes possible now that both layers' information has been merged without losing its meaning.

**1.4 Conclusion**

The paper compared their approach with other State-of-The-Art semantic segmentation techniques and the end results dictates that with the MSFFM and CAM working together it outperforms all.

**2 Limitations****2.1 First Limitation**

While an algorithm works well in a controlled environment, it might not be as effective in real world scenarios.

## **2.2 Second Limitation**

Advanced algorithms like semantic segmentation, takes a lot of resources to process. On top of that, here multi-scale feature fusion is also very resource intensive and hence it might not be practical for real world use.

## **3 Synthesis**

In the modern AI-driving cars, this detection feature can be added for better path finding. This can also be implemented to improve AI navigation of unmanned ground vehicles which are used in extraterrestrial findings.