

A photograph of a long bridge with a dark, multi-lane roadway and a light-colored steel truss girder system. The bridge spans across a dark body of water under a sky filled with large, white and grey clouds. The perspective is from the shore, looking out towards the horizon.

01

Orion Team

Crowdsourced
bridge inspection

02

On 14th of August
2018 at 11:36 AM

43 people died
14 people injured



03 ITALIAN BRIDGES AND OVERPASS CRITICITY

Legend :

- Collapsed
- At risk
- Closed

source: newsauto.it



04 COMPETITORS SOLUTIONS



Bucket truck



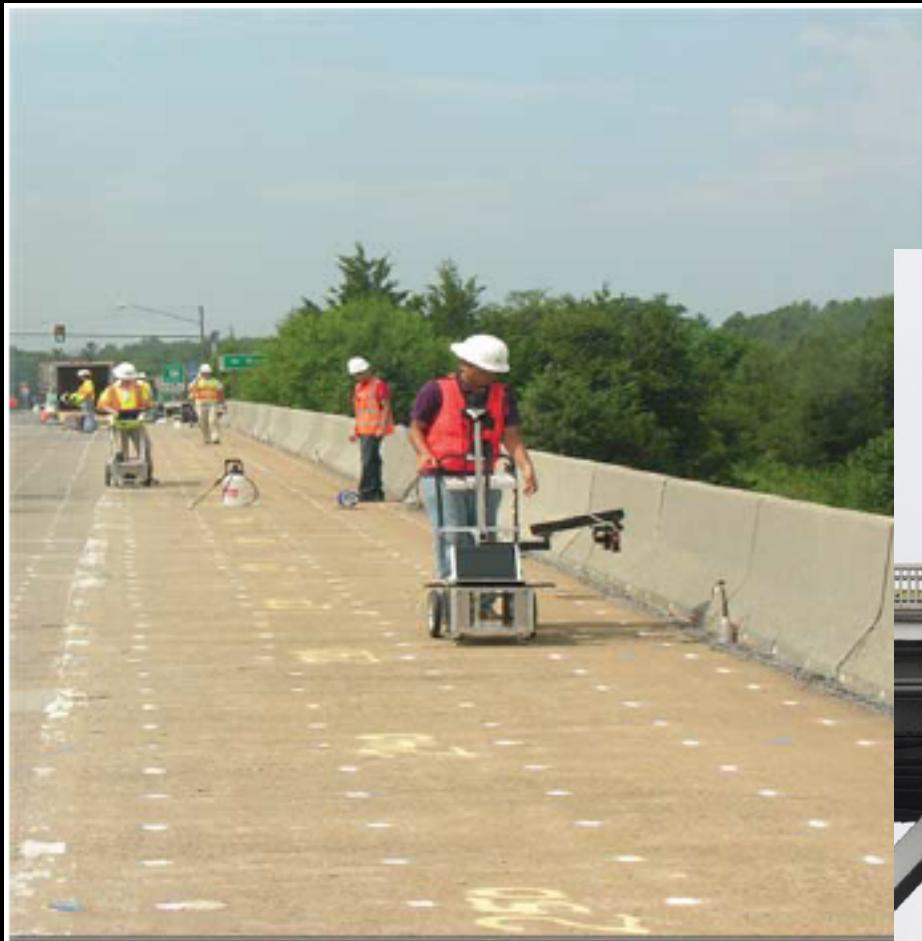
Sensors



Drone

Traditional Inspection is :

1. Expensive
2. Unfrequent
3. Bias prone

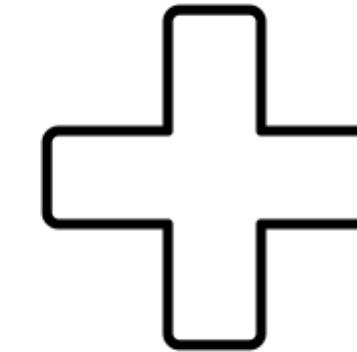


06

THE IDEA



Camera



Accelerometer

Exploit camera and accelerometers sensors, already available in the autonomous car to gather information regarding bridge's health while crossing it

07 IMAGE APPROACH



Detect cracks on the bridge deck using the camera installed already in the car.

08 IMAGE APPROACH : THE WHY

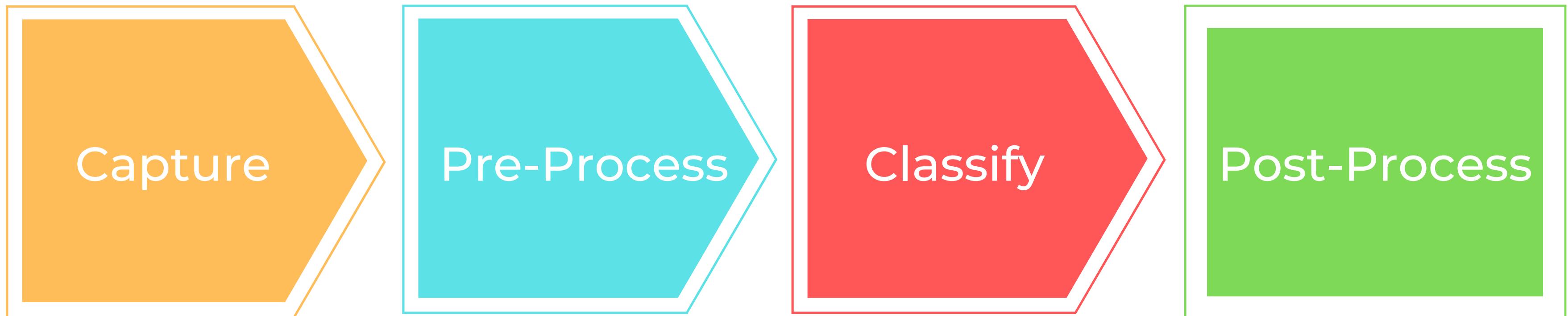
Water can enter cracks and oxidate the inner layers

"On Morandi's Bridge there were cracks and detachments that increased oxidative phenomena"

quote : *ilsole24ore.com*

09

IMAGE APPROACH : THE HOW



10

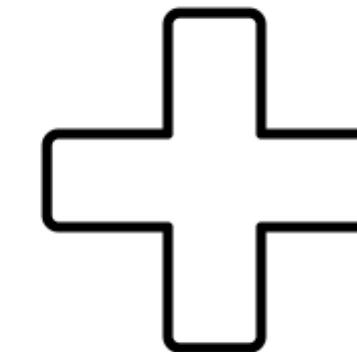
THE IDEA



Exploit camera and accelerometers sensors, already available in the autonomous car to gather information regarding bridge's health while crossing it



Camera



Accelerometer

DYNAMIC ANALYSIS

Image analysis is not sufficient to analyze the entire structure of a bridge.

80% of issues happen on the bottom layers



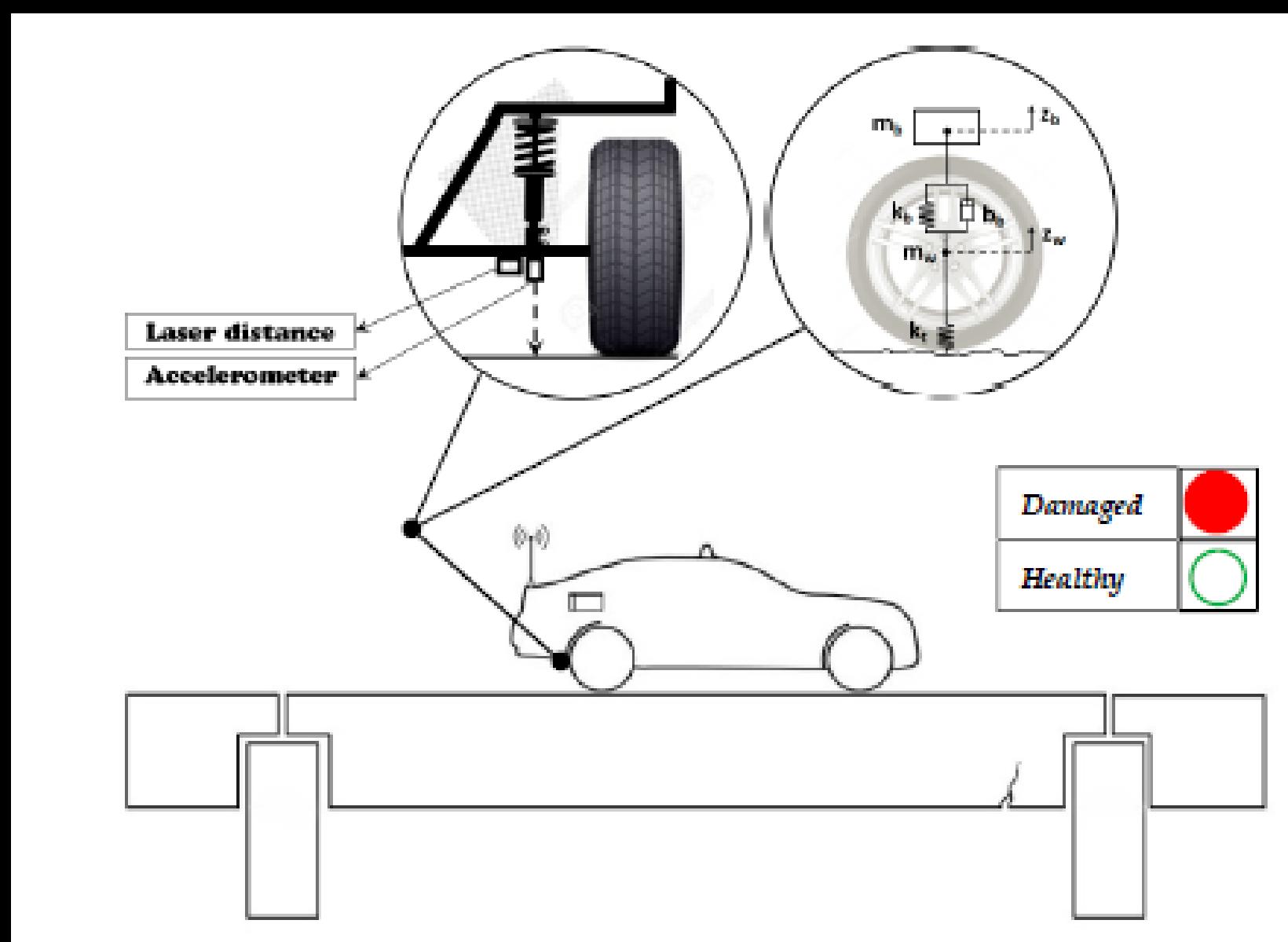
12 DYNAMIC ANALYSIS : THE WHY

Natural frequency of the bridge reflects:

- **stiffness** of the entire structure
- threshold before damage



DYNAMIC ANALYSIS : THE HOW



Use of accelerometers to detect the natural frequency of the bridge, considering:

- irregularities
- vibrations

CUSTOMER SEGMENT

Niche Market Segment

1. Public Administration
2. Bridge Inspection companies
3. Car manufacturers

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A close-up photograph of a person's hand holding a dark-colored fountain pen. The hand is positioned as if it is about to write or has just finished writing on a document. The document itself is partially visible, showing several blue and red bar charts, likely from a financial or scientific report. The background is dark and out of focus.

COST

15

- No extra sensor cost
- Human resources
- Data collection:
 - 24 km/hr -> 60 GB/km

REVENUE STREAMS

- Reduction of maintenance cost of regular inspection
- No need to update the tools for inspection

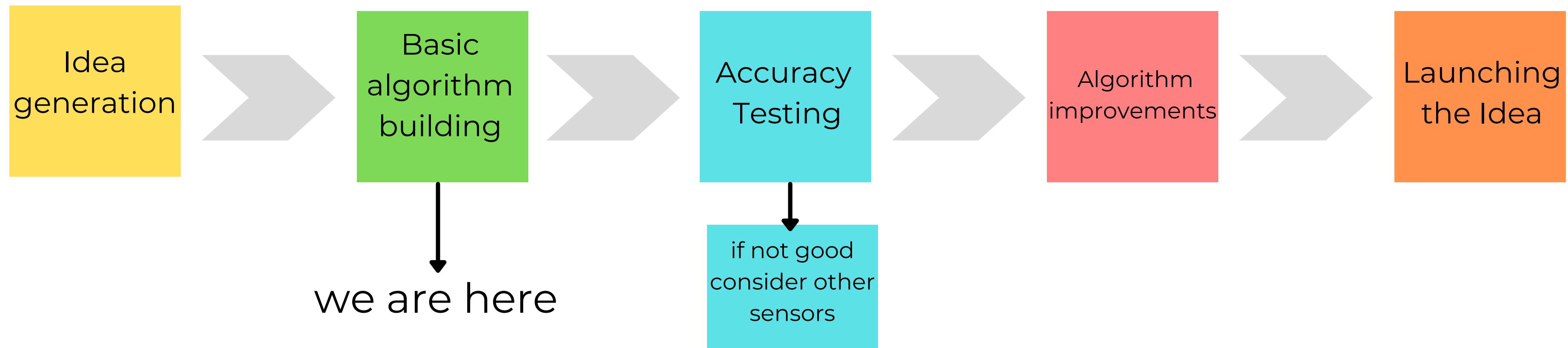


RISKS

- Sensors are weather conditioned
- Upon experimentation accuracy of the sensors could be not enough
- Customer acceptance



ROADMAP



ORION TEAM SQUAD

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Shuja

MECHANICAL ENGINEER



Kanaka

INDUSTRIAL & MANAGEMENT ENGINEER



Ronald

COMPUTER ENGINEER



Shuja

Benedetta

INDUSTRIAL ENGINEER



Francesco

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CONTACT US

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Thank you for the
attention !!!