

2 Iowa Safety Efforts:

Analyst Tool

&

Location Aggregation Project

FHWA SafetyAnalyst
Technical Working Group
Annual Meeting
July 8, 2003



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Location Aggregation

Development of New Strategies for Locating Safety Improvement Candidate Locations (Top 200+ List)

Iowa State University (ISU)/
Center for Transportation Research and Education (CTRE)
(Dr. Shauna Hallmark)

in collaboration with

Iowa Dept. of Trans. – Office of Traffic and Safety
(Michael Pawlovich)

July 2003-June 2004

Background

- SICL: one list with all feature types included (intersection-related, link, node)
- SICL method change
 - Old Index Method: Frequency (1/3), Rate (1/3), Severity (1/3) on 5 years
 - Severity: Fatal (\$1,000,000), Major (\$150,000), Minor (\$10,000), Possible/Unknown (\$2,500)
 - New Index Method: Frequency (1/5), Rate (1/5), **Severity (3/5)** on 5 years
 - Severity: **Fatal (200)**, **Major (100)**, Minor (10), Possible/Unknown (1)
- Change indicates willingness to do so
- Future: Bayes-based
- Crashes
 - pre-2000: quasi-coordinate link-node system [TRB, 1974] w/ all statistical information
 - 2000+: x,y-coordinates w/ all data
- Problem: SICL method **RELIES** on link-node system
- Must find new (replacement) location aggregation strategy(-ies)
- Major constraints: still want only **1** list and want generation by locals an option

Current Data

- Crash database w/ x,y-coordinates (2000+ and pre-2000 converted)
- Roadway database (GIMS)
 - segment-based
 - volumes, geometrics, other features
- Intersection location data
 - newly developed → points only
 - attribute data scarce but development underway
- **All spatial → Geographic Information System (GIS)**

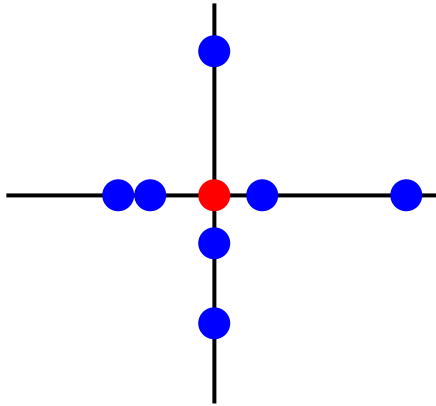
Identified Location Aggregation Options

- Intersection
 - intersection-only
 - intersection-related
 - within X distance
- Link/segment
- Corridor
 - urban
 - rural
- Sliding scale
 - standard
 - expanding/contracting
- Interchange
 - interchange ramps and junctions-only
 - interchange-related
 - within X distance
- Proximity
 - concentric (intersections)
 - linear (segments)
- Special case: rail, bridge, etc.

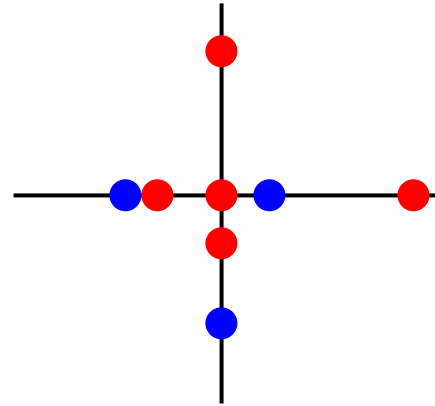
Intersection

Note: Each ● or ● could represent one or more crashes.

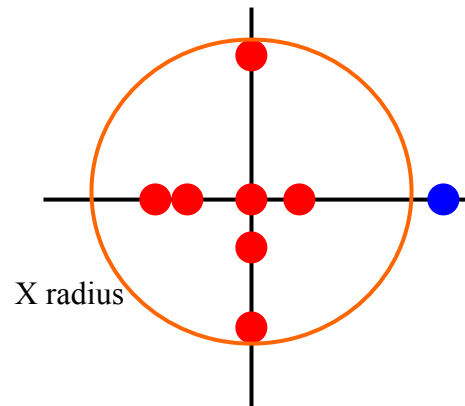
Intersection-only



Intersection-related

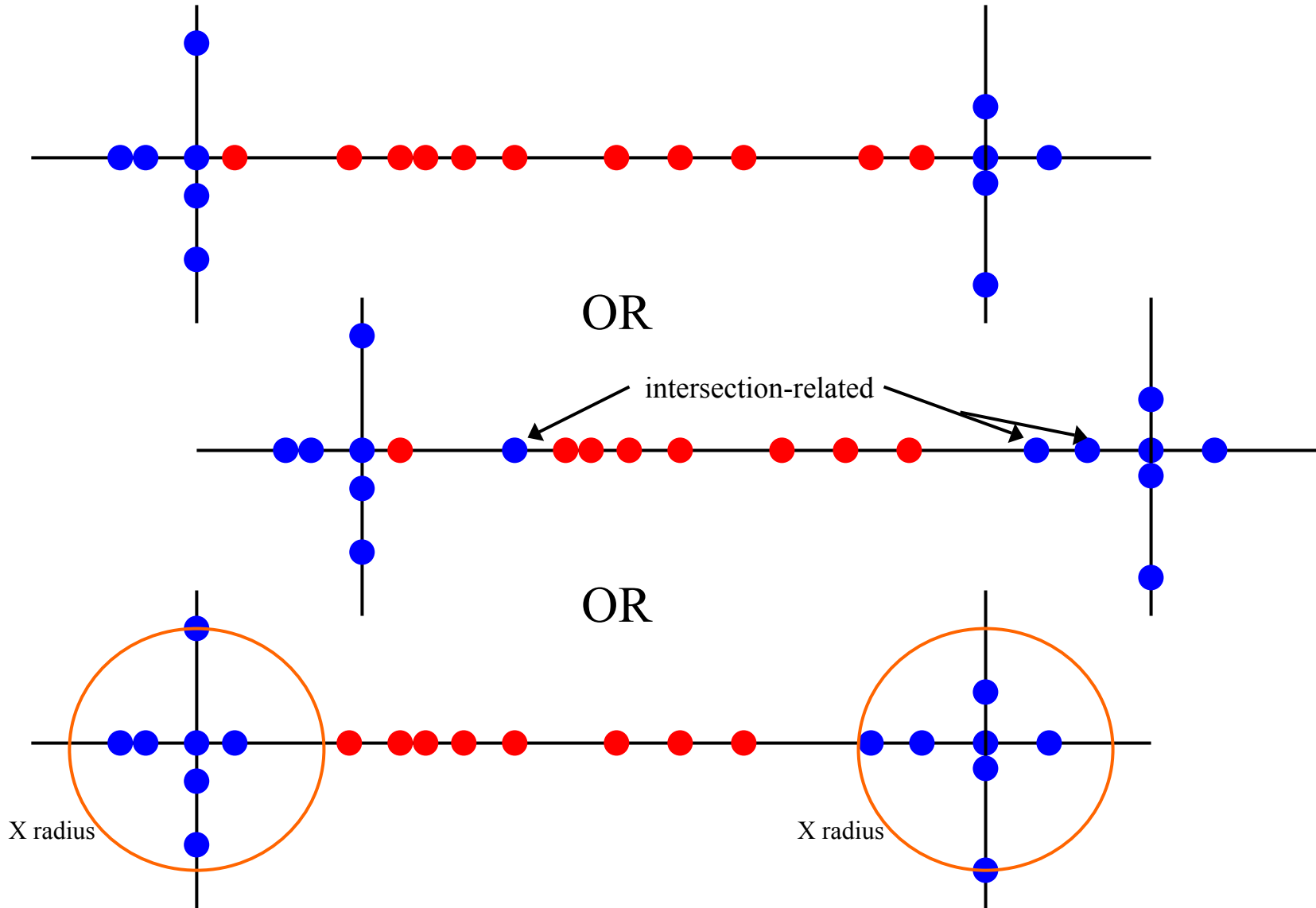


Within X Distance



Link/segment

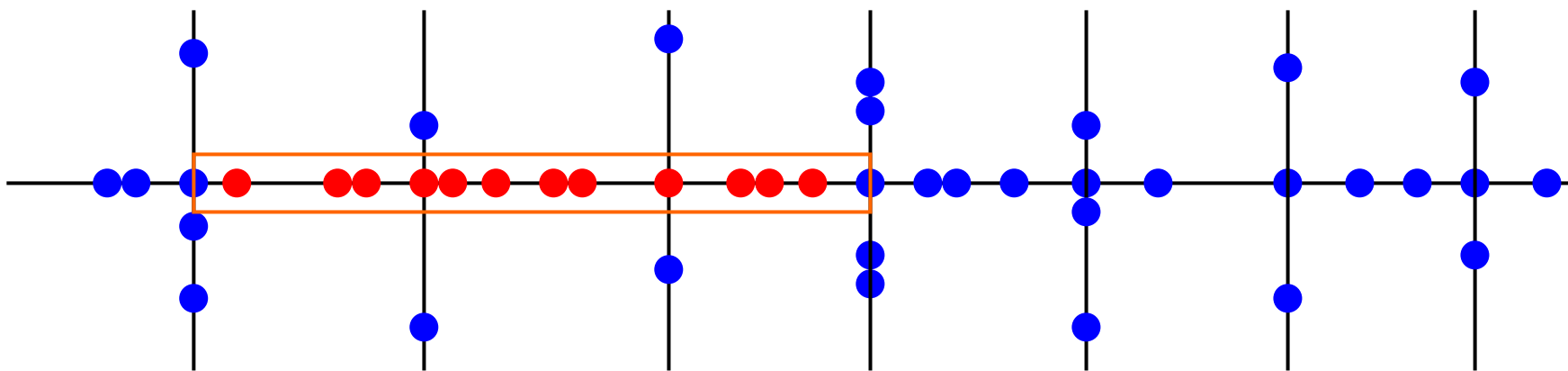
Note: Each ● or ● could represent one or more crashes.



Others...

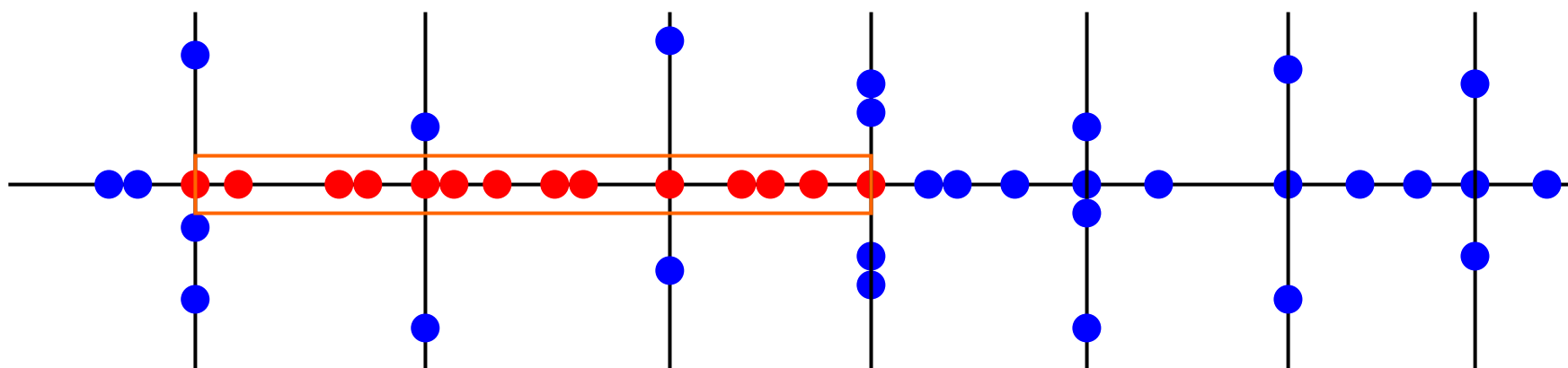
Corridor – 1a

Note: Each ● or ● could represent one or more crashes.



(exclusive)

OR

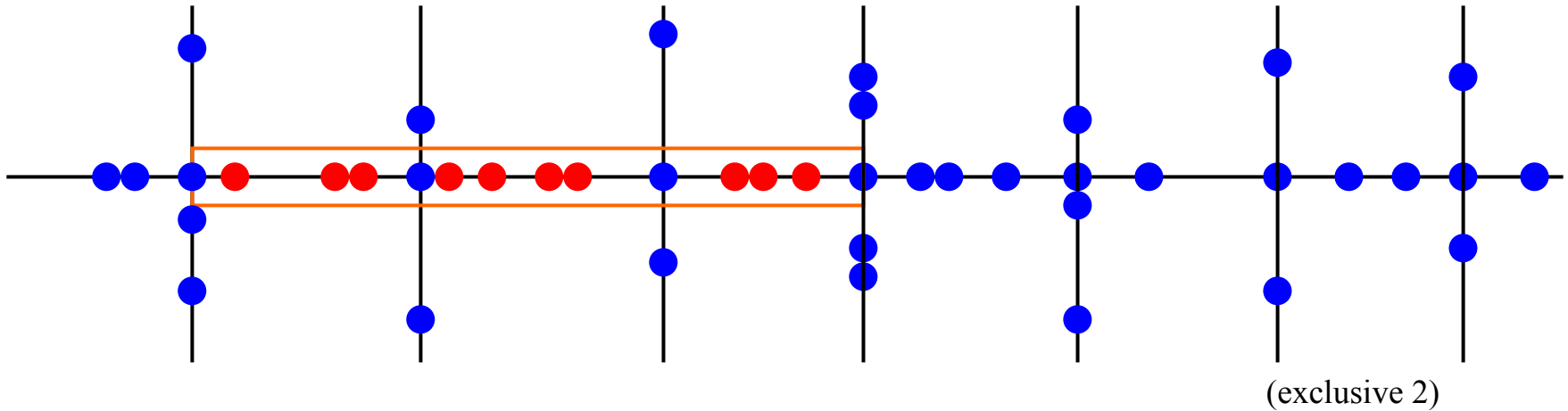


(inclusive)

OR

Corridor – 1b

Note: Each ● or ● could represent one or more crashes.



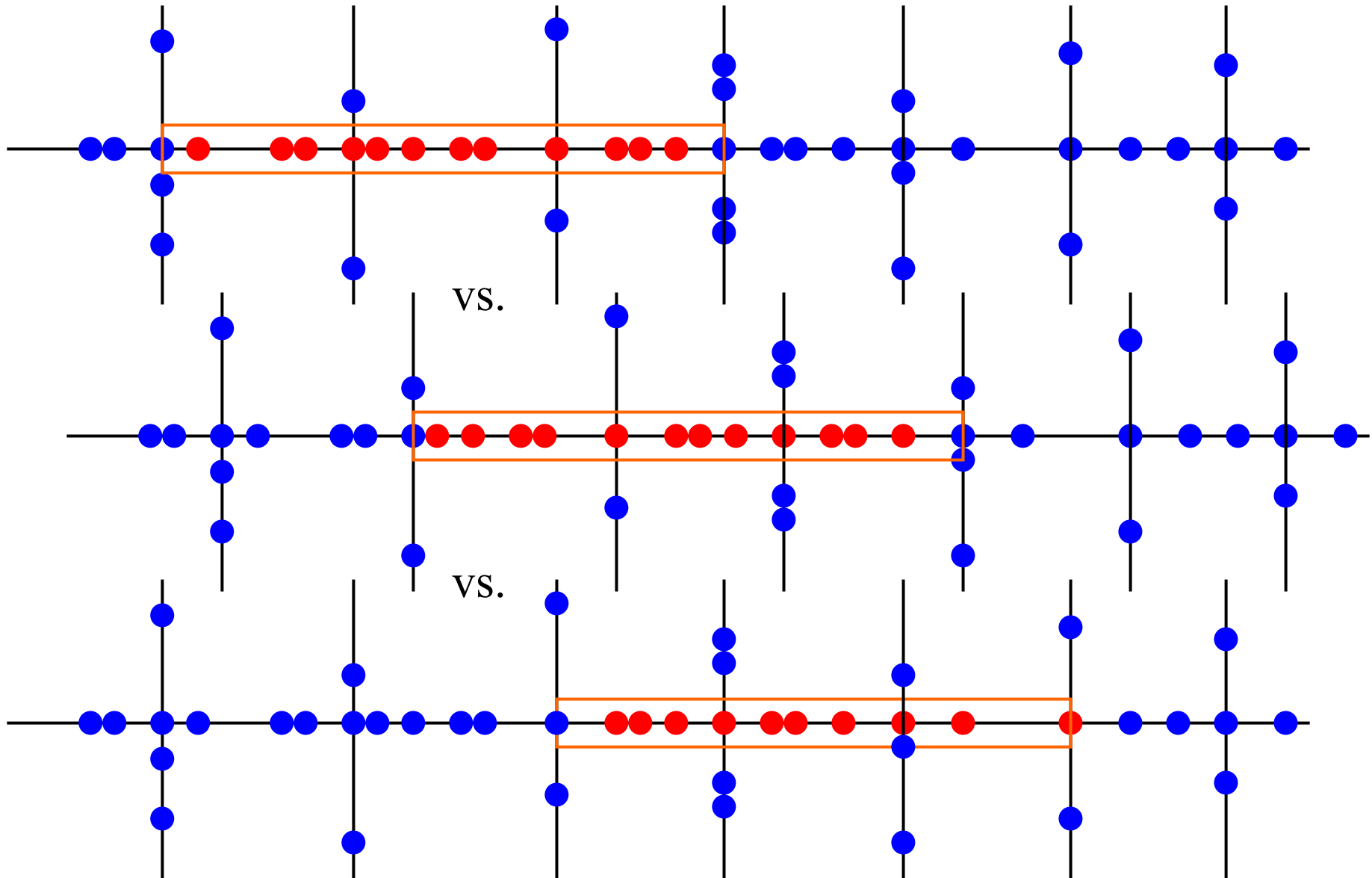
OR

- exclude intersection-related
- exclude within X distance of intersection

These make less sense unless ONLY non-intersection corridor upgrades were under consideration...

Corridor - 2

Note: Each ● or ● could represent one or more crashes.

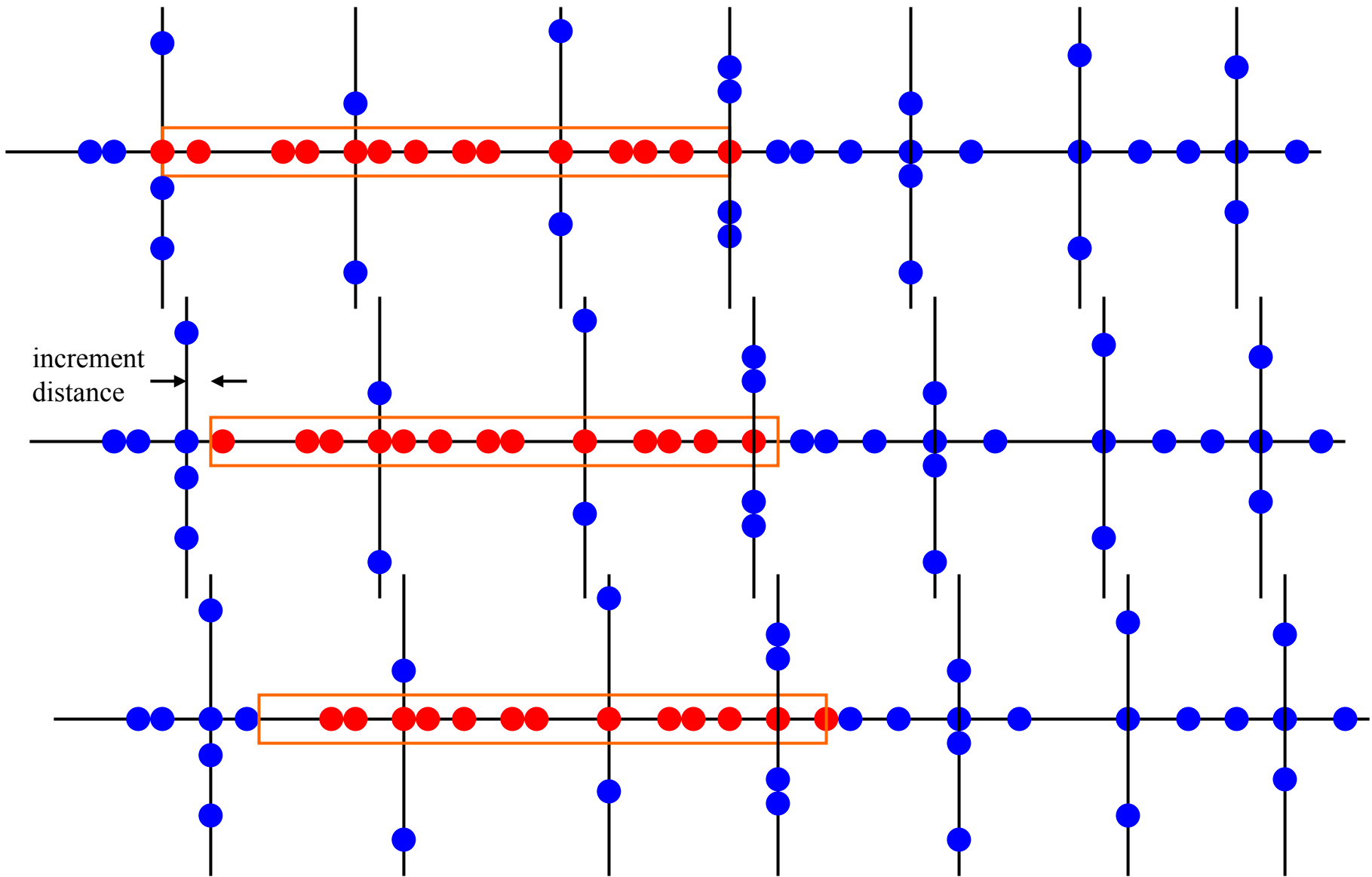


Corridor - 3

- Other considerations:
 - number of blocks for consideration – set number vs. expand/contract?
 - use blocks at all? – perhaps sliding scale is better...
 - consider side road crashes within X distance?
 - rounding corners – corridor definition database needed? (Iowa's LRS and updated GIMS!)
- Rural issues similar

Sliding Scale - standard

Note: Each ● or ● could represent one or more crashes.

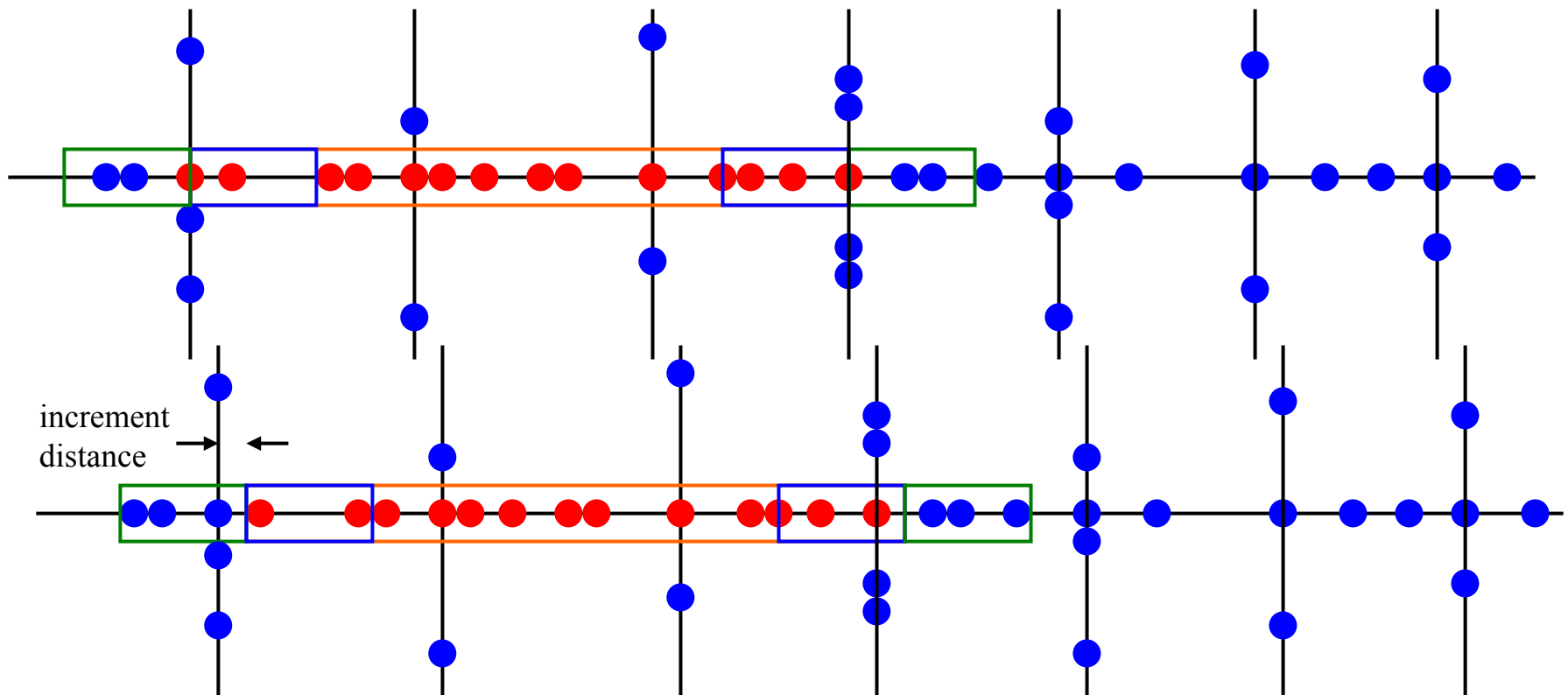
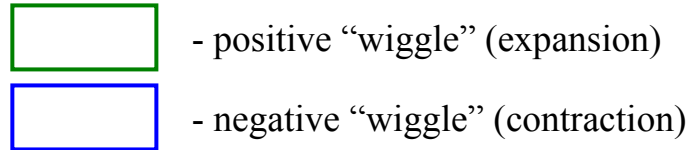


etc. – along entirety of corridor/network

Sliding Scale – expanding/contracting

Note: Each ● or ● could represent one or more crashes.

Standard plus...”wiggle” factor



etc. – along entirety of corridor/network

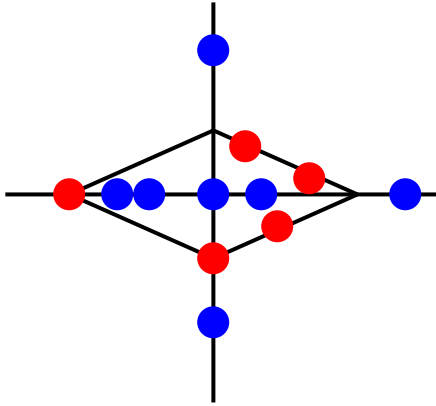
Sliding Scale

- Expansion/contraction additions:
 - expansion/contraction could occur simultaneously
 - expansion/contraction not set...based on crash spread → point is to find the region of most concern
- Other considerations (overall sliding scale):
 - set expansion/contraction?
 - how to treat intersections/junctions? – exclusive, inclusive, etc.
 - consider side road crashes within X distance?
 - rounding corners – corridor definition database needed? (Iowa's LRS and updated GIMS!)

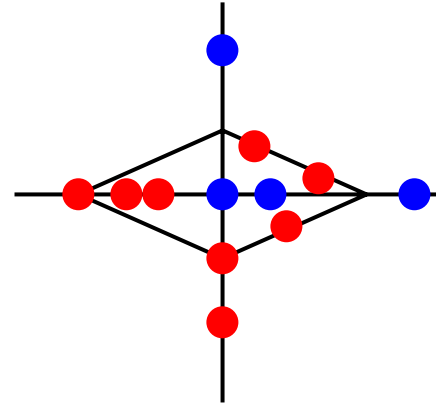
Interchange

Note: Each ● or ● could represent one or more crashes.

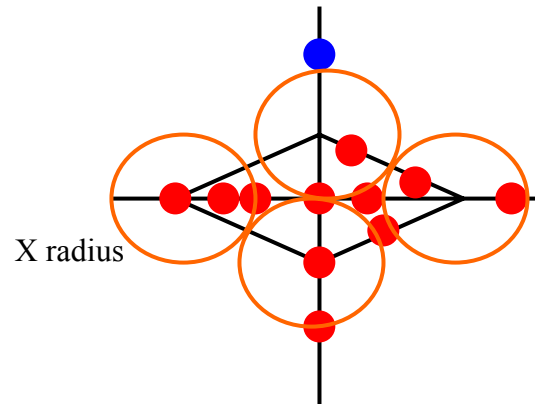
Interchange ramps and junctions-only



Interchange-related



Within X distance



(within interchange confines + X distance from junctions)

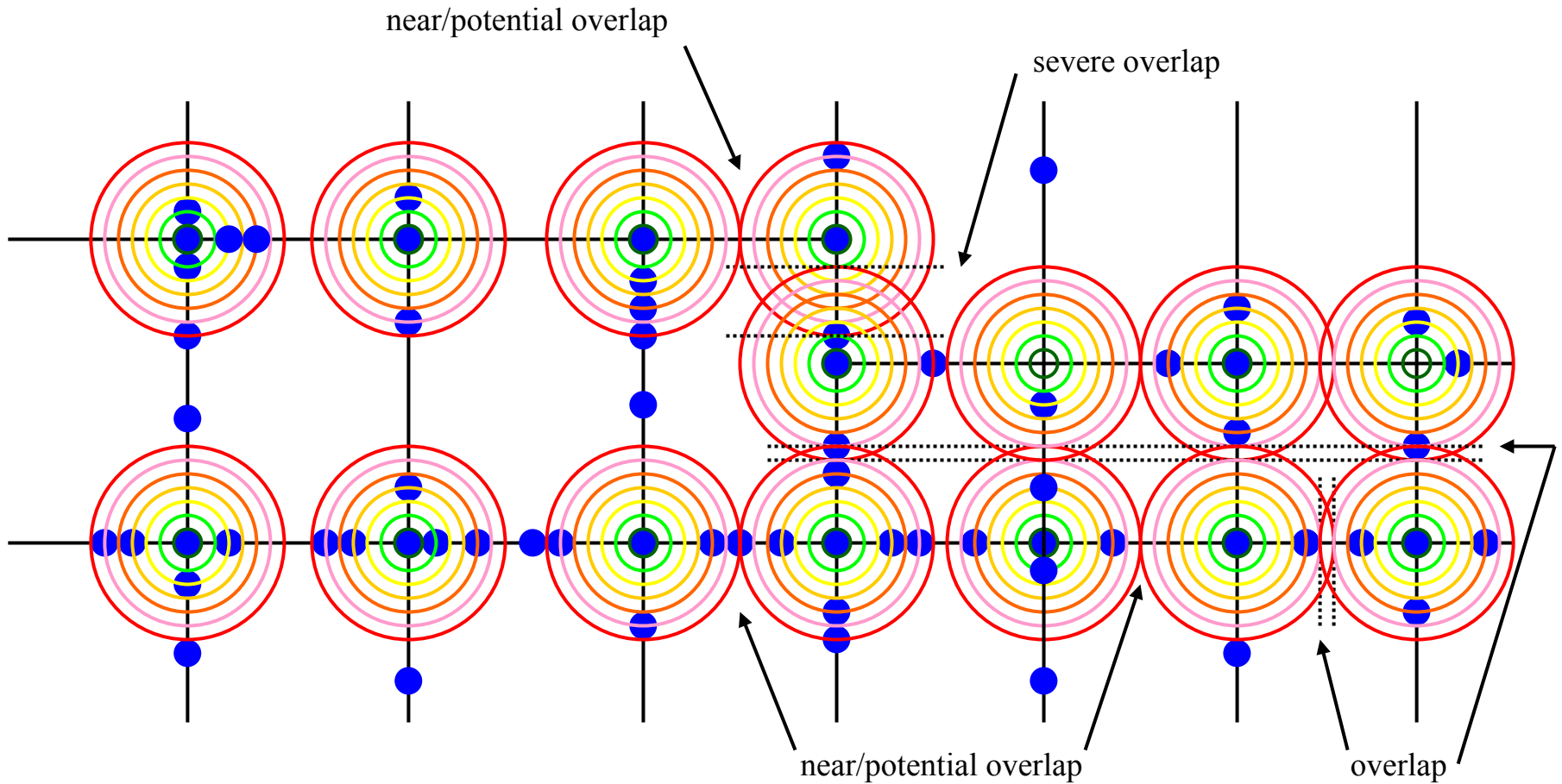
Interchange

Note: Each  or  could represent one or more crashes.

- Other considerations:
 - other interchange configurations
 - weaving sections
 - interchange-to-interchange interactions (close interchanges)
 - within X distance only on mainline?
 - different radii for mainline vs. crossroad?

Proximity - concentric

Note: Each ● or ● could represent one or more crashes.

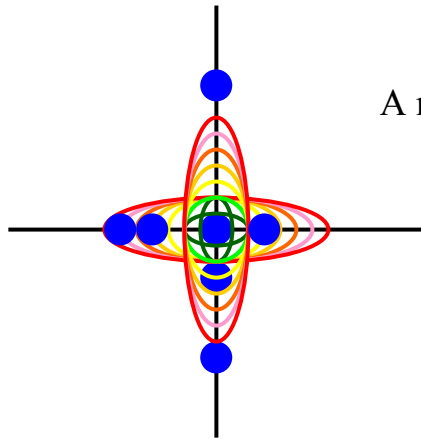


Linked to table, charts/graphs, better visuals for understanding + some statistical basis for constructing distributions – Bayes?

Proximity - concentric

Note: Each ● or ● could represent one or more crashes.

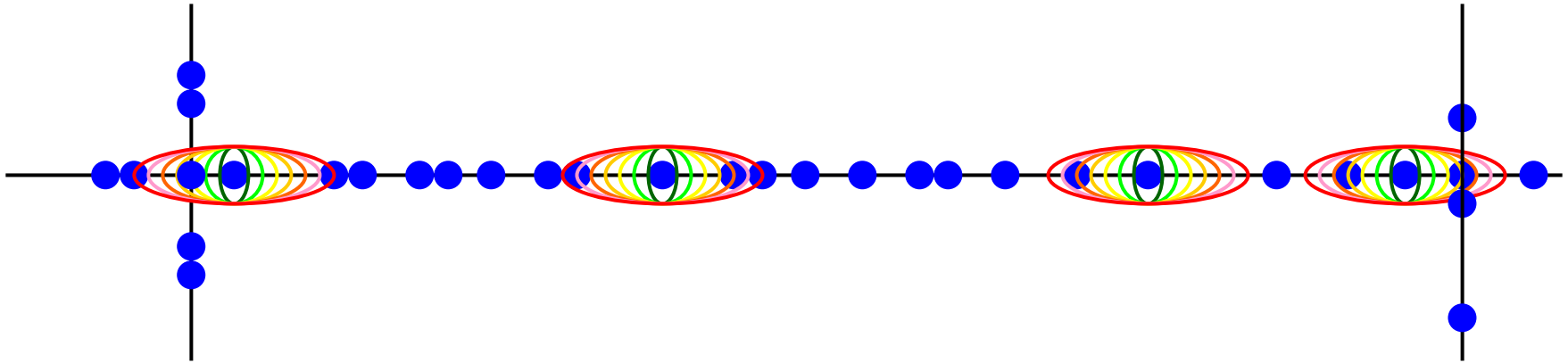
- Other considerations:
 - where to stop concentric circles?
 - concentric circle increment value
 - overlap – does it matter? → don't believe so, as point is to develop distributions for each intersection
 - statistical bases for comparison
 - presentation materials: tables, charts/graphs and maps best suited for conveying answer/message
 - concerns similar to intersection: intersection-only, intersection-related, etc.???



A more appropriate representation???

Proximity - linear

Note: Each ● or ● could represent one or more crashes.



- Other considerations:
 - where to stop linear “ovals”?
 - linear “oval” increment value
 - overlap – does it matter? → don’t believe so, as point is to develop distributions for each crash point
 - statistical bases for comparison
 - presentation materials: tables, charts/graphs and maps best suited for conveying answer/message
 - concerns similar to segments: exclusive, inclusive, etc.
- Can this expand to corridors? -- rounding corners and other issues

Overall statements

- Special cases (bridges, rails, etc.) have similar considerations – depending on analysis
- Crash attributes used extensively along with x,y-coordinate location
 - can expand further into specific issue analyses (e.g., older drivers)
- Not a substitute for statistical analyses for determining “most hazardous” locations, “sites with promise”, “blackspots”, etc.