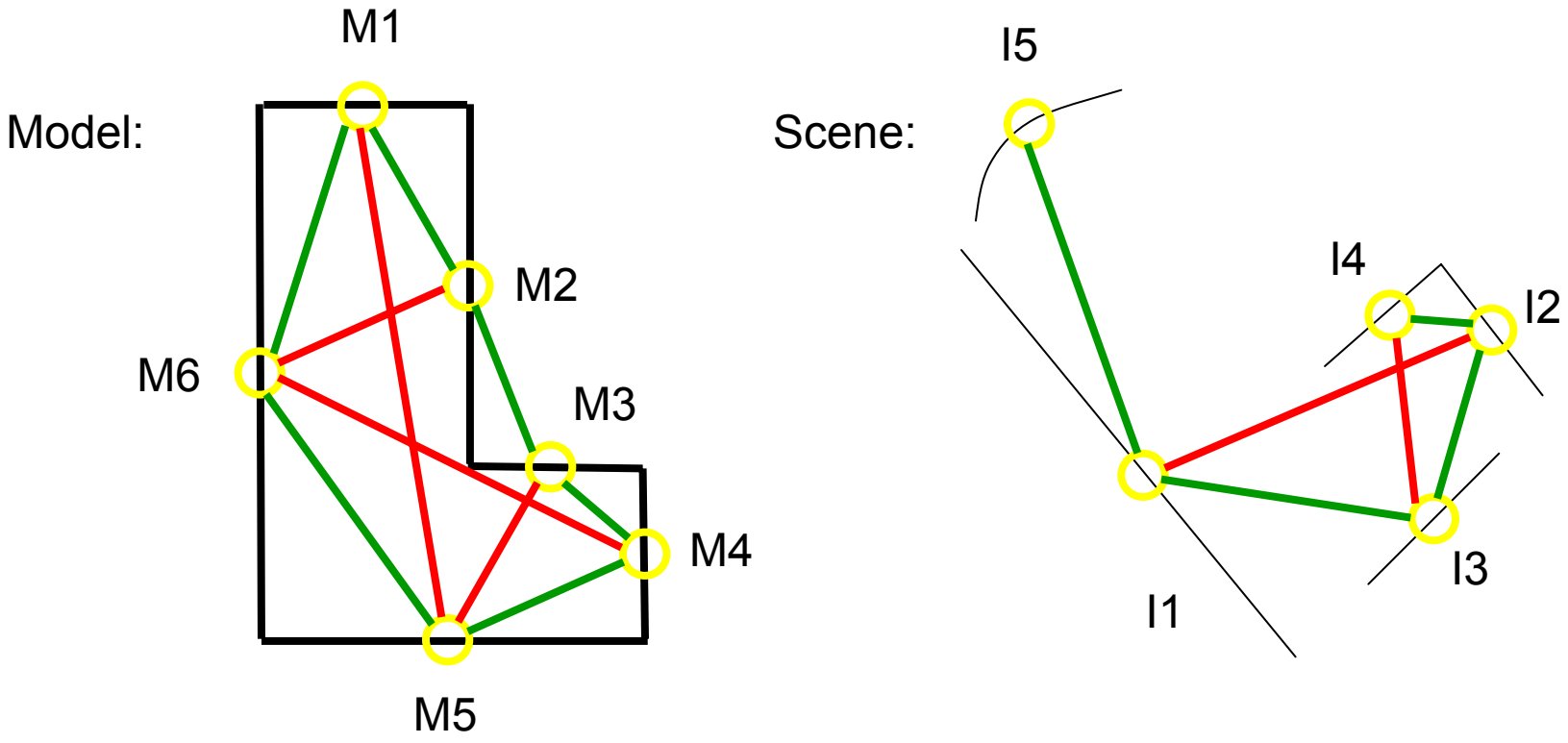
Contour-Based Recognition

- We now have a set of contours and their relations (proximal and parallel, since we can merge collinear contours into a single contour).
- These can be matched to a similar model description, made up of model contours and model relations (or constraints).
- How do we match the two?

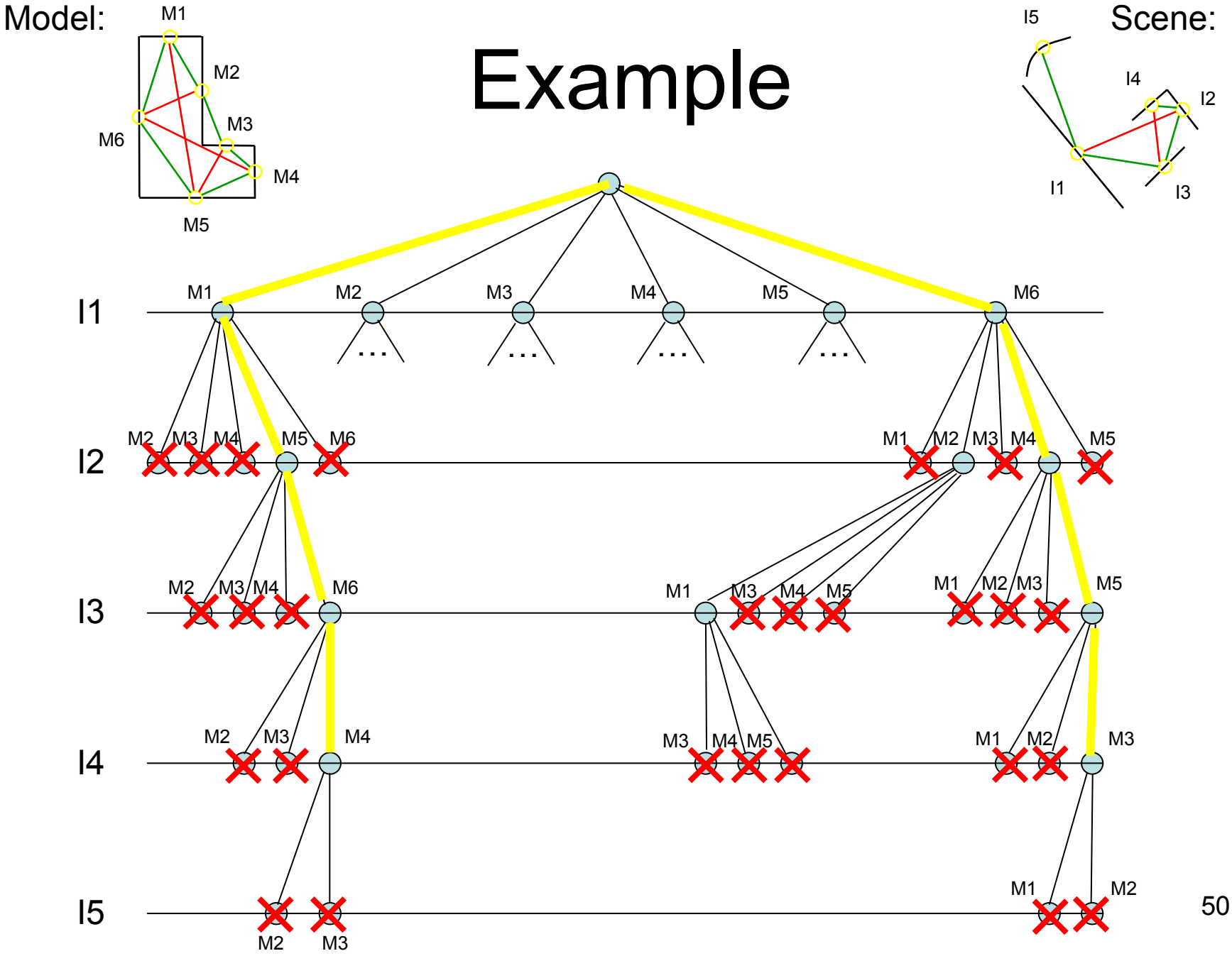
Interpretation Tree (IT) Search

- Introduced by Grimson and Lozano-Perez (1984).
- Equivalent to a constraint satisfaction problem (CSP), where model labels are assigned to image features subject to their satisfying model constraints.
- Equivalent to a subgraph isomorphism problem, where an edge- and node-attributed model (sub)graph is matched to an image graph.

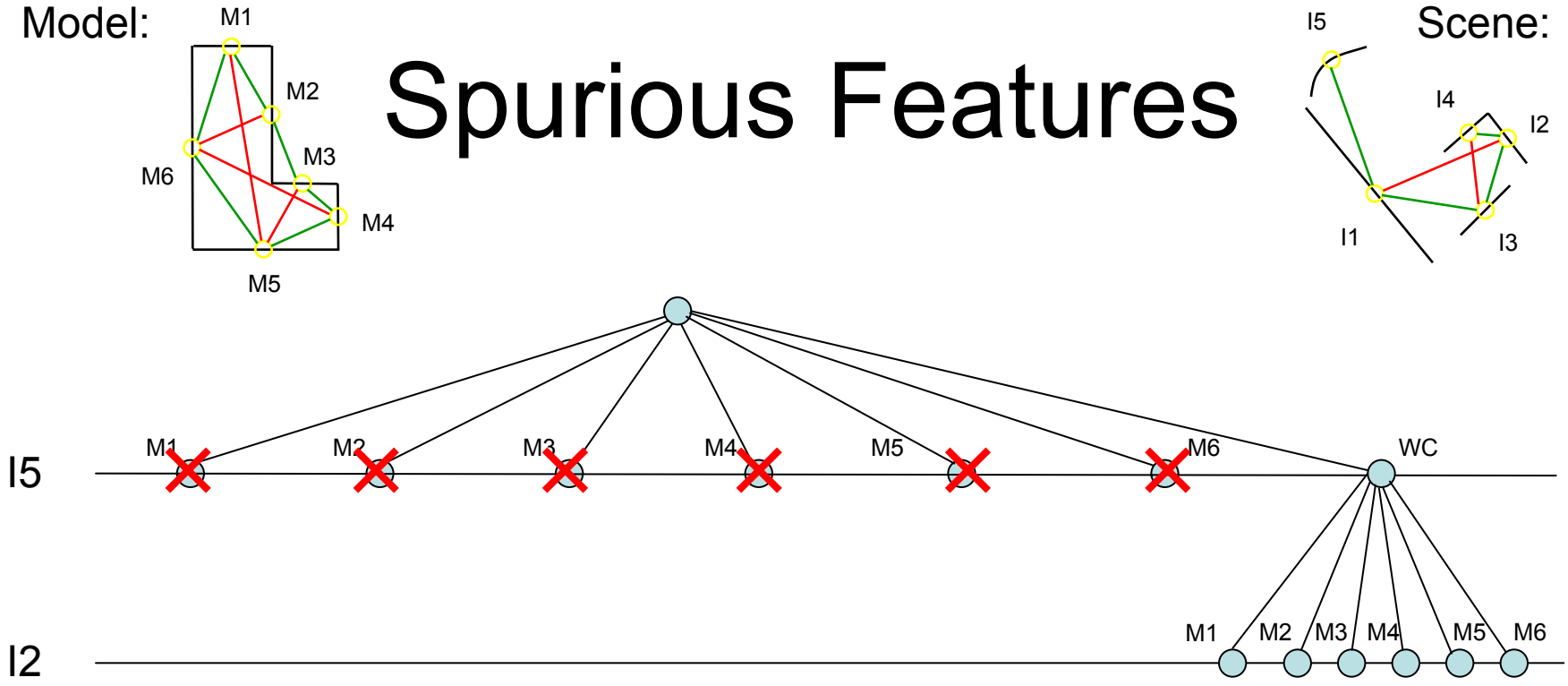
Example


Model:
M1
M2
M3
M4
M5
M6
Scene:
I5
I4
I2
I3
I1
Proximity (cotermination)
Parallelism
Object boundary

Example



Spurious Features



- Spurious features need wildcard assignment.
- Increases complexity of search significantly.

IT Epilogue

- Like any search problem, efficiency can be gained through correct feature ordering, e.g., match most discriminative (least ambiguous) features first.
- Nature of features and constraints dictates how categorical/exemplar the model is.
- The stronger the features/constraints, the more aggressive the pruning, but the more brittle (exemplar-based) the model.