

# Contents

|          |                                     |            |
|----------|-------------------------------------|------------|
| <b>1</b> | <b>Introduction</b>                 | <b>9</b>   |
| <b>2</b> | <b>Basics</b>                       | <b>15</b>  |
| 2.1      | Current Technology . . . . .        | 15         |
| 2.2      | Mathematical Foundations . . . . .  | 19         |
| 2.4      | Network Models . . . . .            | 27         |
| 2.5      | Localization Woes . . . . .         | 30         |
| <b>3</b> | <b>Boundaries</b>                   | <b>35</b>  |
| 3.1      | Problem Statement . . . . .         | 35         |
| 3.2      | Exploiting Uniformity . . . . .     | 37         |
| 3.3      | Deterministic Boundaries . . . . .  | 42         |
| 3.4      | Experimental Evaluation . . . . .   | 59         |
| <b>4</b> | <b>Clustering</b>                   | <b>69</b>  |
| 4.1      | Shape Segmentation . . . . .        | 69         |
| 4.2      | Cluster Graphs . . . . .            | 78         |
| 4.3      | Application Benefits . . . . .      | 81         |
| <b>5</b> | <b>Flows</b>                        | <b>83</b>  |
| 5.1      | Problem Definition . . . . .        | 83         |
| 5.2      | Variant Complexities . . . . .      | 86         |
| 5.3      | Centralized Approximation . . . . . | 91         |
| 5.4      | Distributed Approximation . . . . . | 94         |
| 5.5      | Problem Extensions . . . . .        | 96         |
| <b>6</b> | <b>Shawn</b>                        | <b>99</b>  |
| 6.1      | Design Principles . . . . .         | 100        |
| 6.2      | Simulator Details . . . . .         | 101        |
| <b>7</b> | <b>Conclusion</b>                   | <b>107</b> |
|          | <b>Bibliography</b>                 | <b>109</b> |
|          | <b>Index</b>                        | <b>119</b> |