Emergence of Top-Down strategies from Bottom-Up Attentional Processes

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Overview

- Attention in Nutshell
- Application
- Research Challenges Involved
- Motivation of the Research
- Deliverables
- Current Research
- and Results so far....

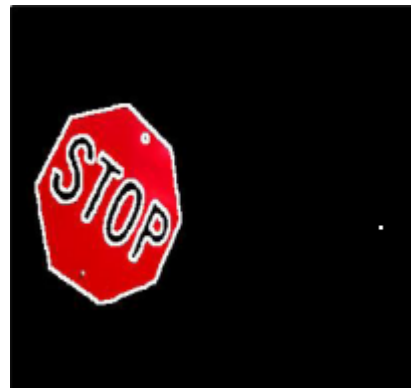
Attention in Nutshell

- Attention enables us to allocate limited perceptual and cognitive resources to task-relevant input.

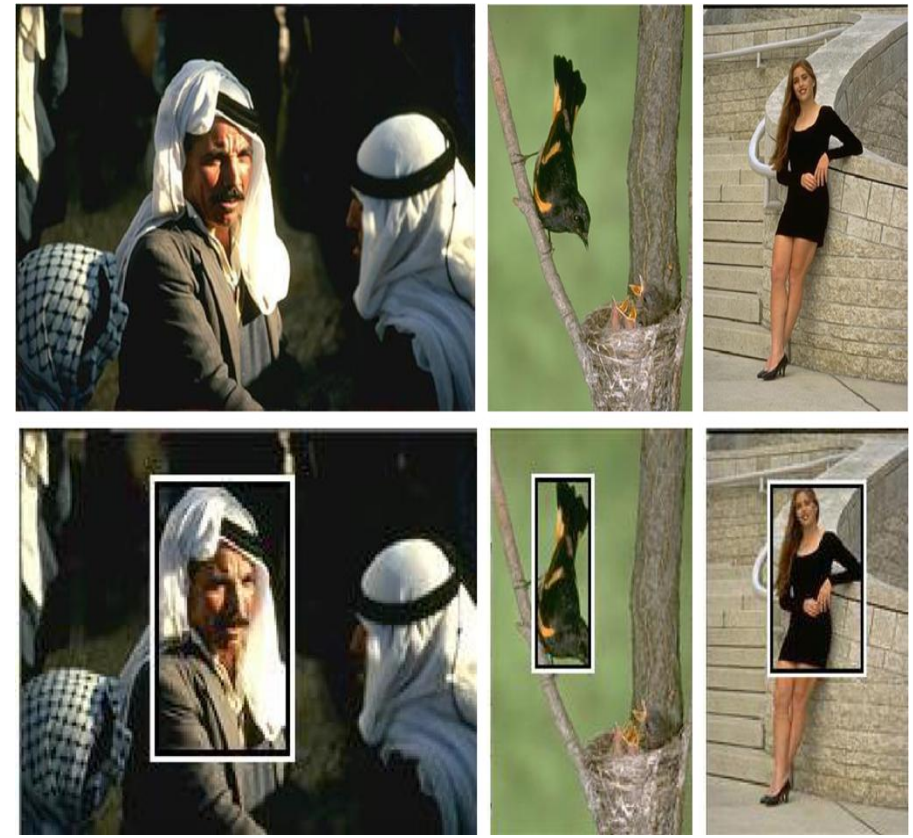
- Attention spans across modalities like Audio,Vision and other Sensory Inputs.

- Attention is again sub-classified into two types:
  - Bottom-Up Attention-which is stimulus driven
  - Top-Down Attention-which is goal driven

Illustrations for the applications of Computational Models of Attention



Salient Region Detection

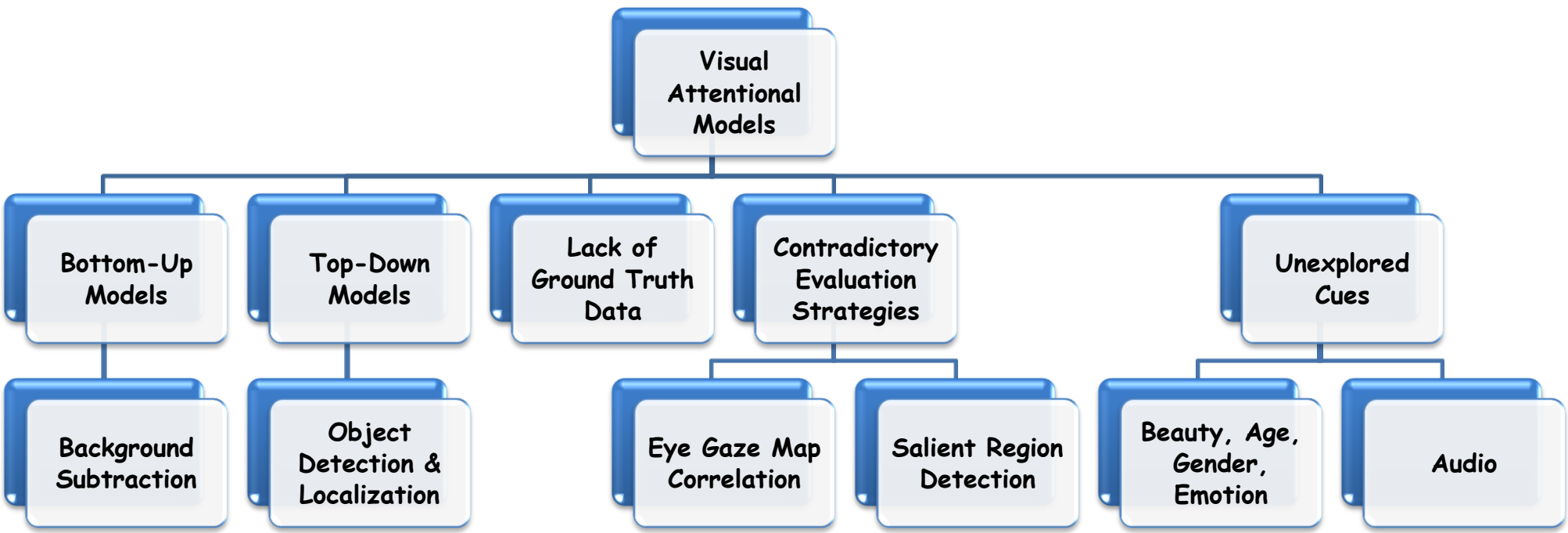


Object Detection and Localization

Applications of Computational Models of Attention

- Salient Region Detection
- Seam Carving
- Video Summarization
- Object Detection and Recognition
- Robot Eye Gaze Focusing
- Robot learning and interaction
- Image Compression and Quality Assesment

Current Issues and Implementation Bottlenecks

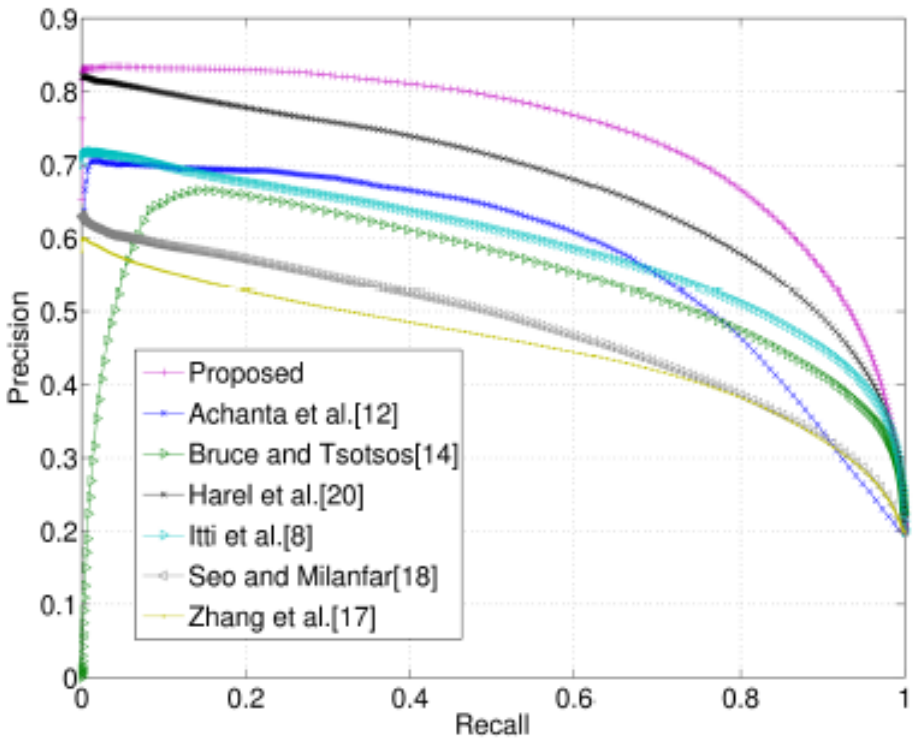


Motivation of this Research

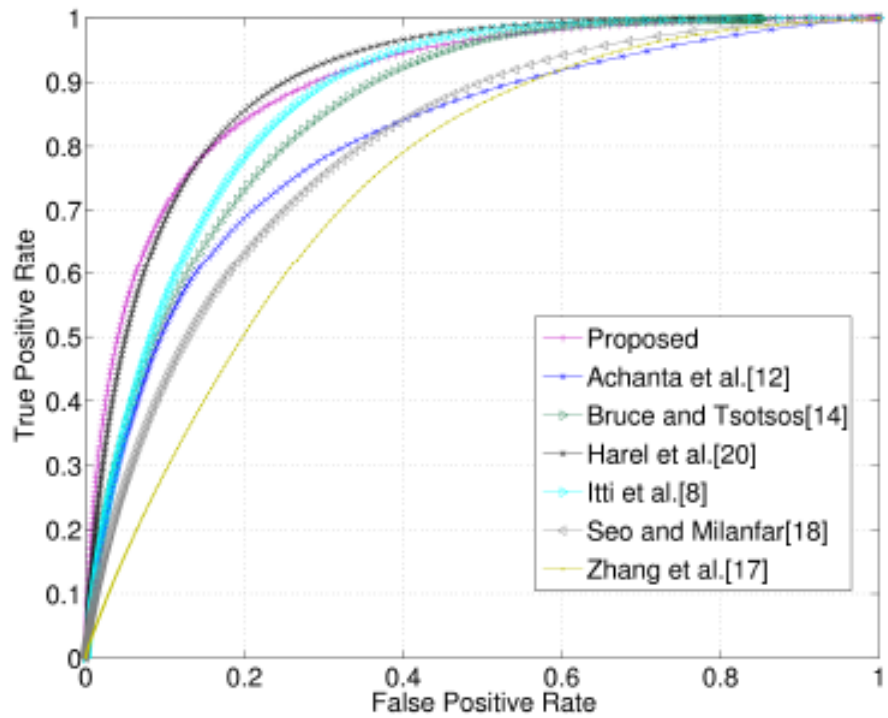
- Develop novel and efficient Bottom-Up and Top-down Attentional Models for Humanoid Robots
- Interaction through cognition, and not merely treated as a computer vision problem
- Propose Score Fusion Techniques for Bottom-Up and Top-Down model combination
- Evaluate the influence of various cues on Robot Learning and Interaction

Work Carried Out So Far

Results on Microsoft Research Dataset by the Proposed Bottom-Up Attentional Model

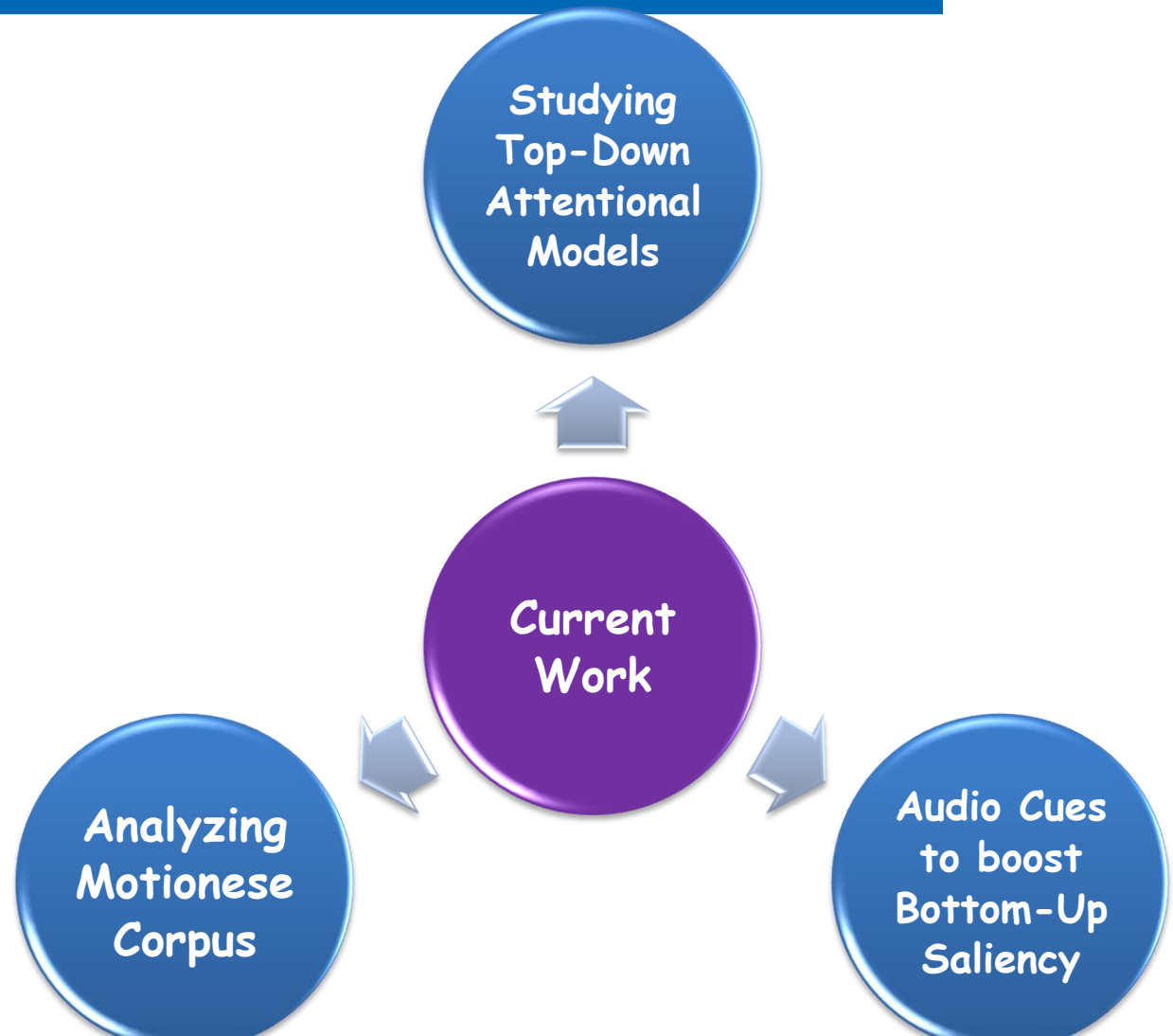


P/R Plot

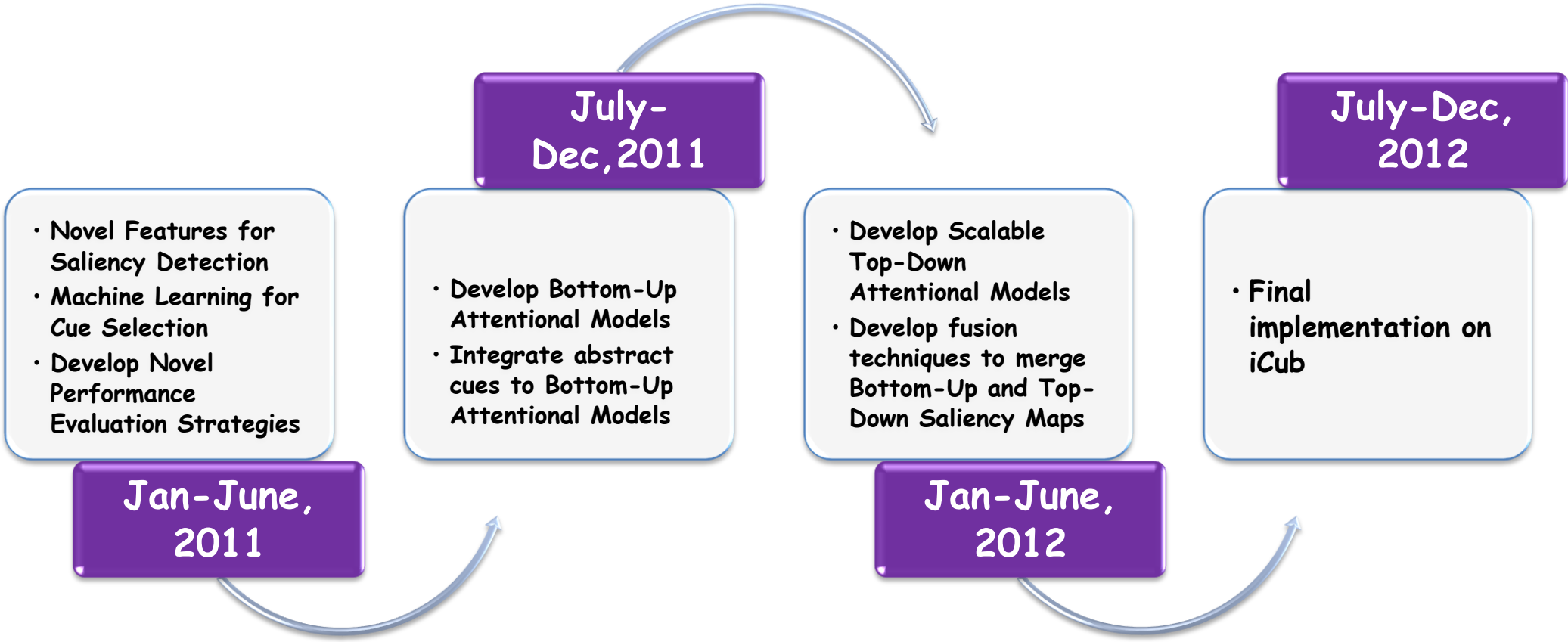


ROC Plot

Current Work



Future Work with Approximate Time Estimations



Results and Questions

Vikram T.N., Marko Tscherepanow and Britta Wrede. A Random Center Surround Bottom up Visual Attention Model useful for Salient Region Detection. Proceedings of IEEE Workshop on Applications of Computer Vision, Jan 5-7, 2011. Kona, USA