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Poster and Presentation

AI Research Methodology

Arif Nurwidyantoro

Computer Science UGM

LOCALLY ROOTED,
GLOBALLY RESPECTED

Outline

- Scientific Poster
- Presentation

Scientific Poster

Scientific Poster

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- A visual means for communicating a summary of research.
- Typically created for an academic or professional community.
- Should highlight the most important research findings in an aesthetically pleasing manner.
  - Show data
  - Describe experiments

Purpose of Poster Presentation

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- Rapid, concise and visual communication is the purpose of a scientific poster presentation.
  - Rapid : Convey your research / project quickly and clearly.
  - Concise : express your findings succinctly.
  - Visual Communication : Draw the audience with appealing design, figures, graphs and illustrations when possible.
- Poster have much greater visual impact
  - Less text
  - Most of the spaces will be used to illustrate the results (tables, graphs, images, charts)
  - The background, methods, and discussion sections are brief

Poster Audience vs Presentation

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Poster audience can

- Consentrate on parts they are most interested with
- Determine time to spend studying the materials
- Interact individually with presenter
- Walk around

Planning the Poster

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- Decide concept or question.
- Determine poster size (1 m × 1 m)
- Choose from PowerPoint, Latex, Frame maker…
- Choose poster orientation
  - Portrait
  - Landscape
- Make it easy to read
- Make it easy to understand
- People have only few minutes per poster

Poster Layout

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- Typically, use 3 to 5 columns
- Arrange material vertically from top left corner to bottom right corner
- Determine logical sequence of material
- Organize material into section
- Arrange material into column

Designing the Poster

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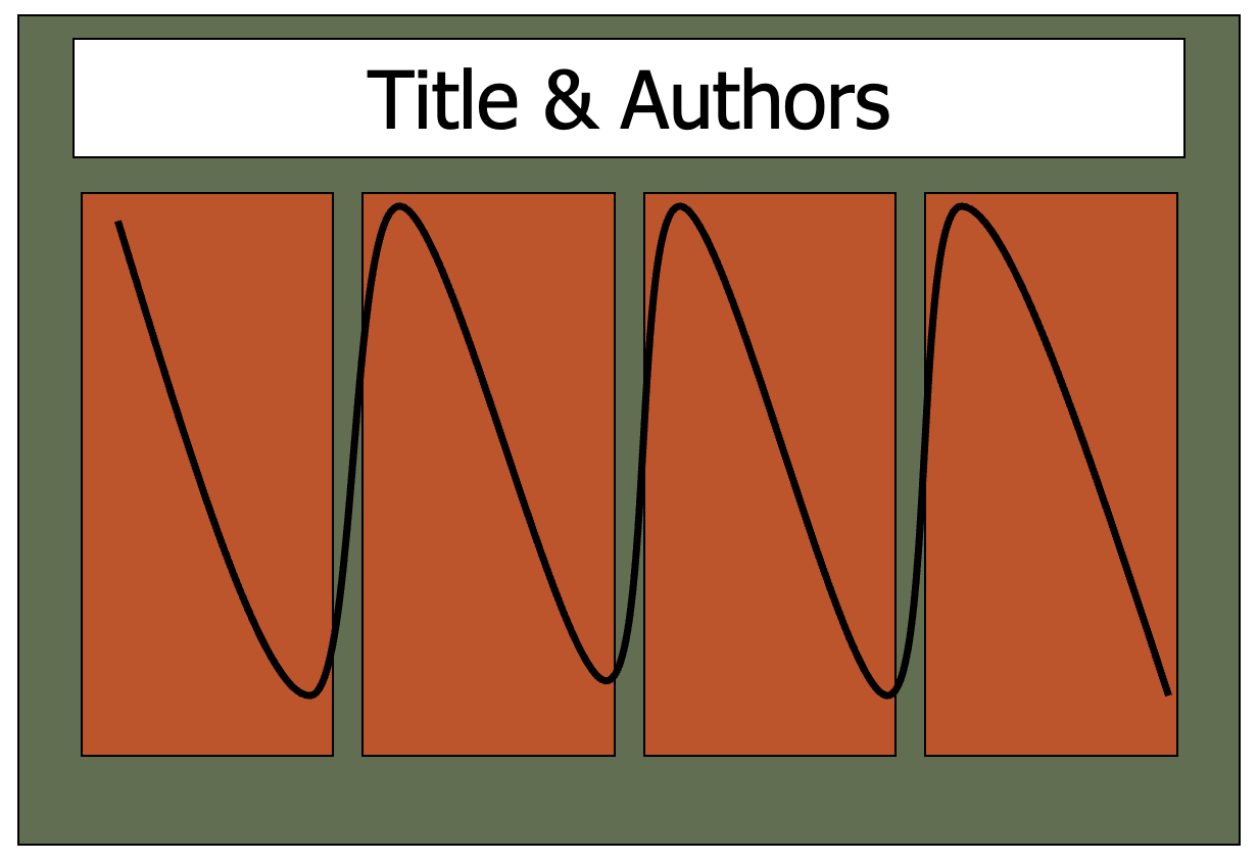
Left to Right, Top to Bottom flow



Designing the Poster (2)

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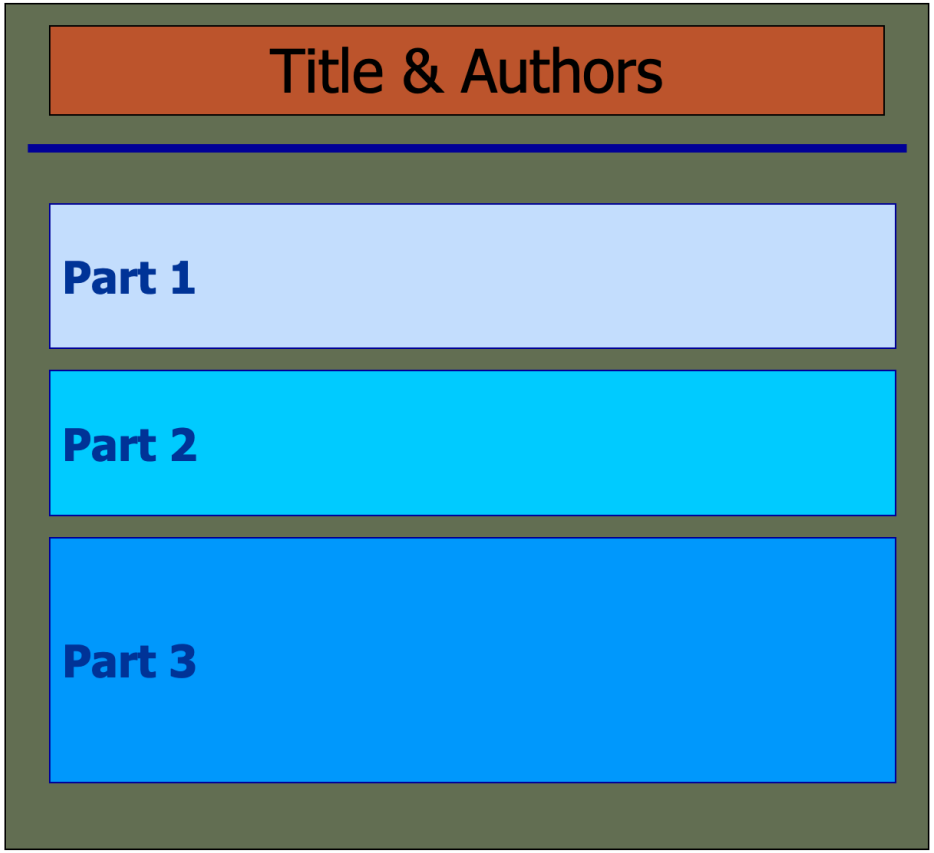

Designing the Poster (3)

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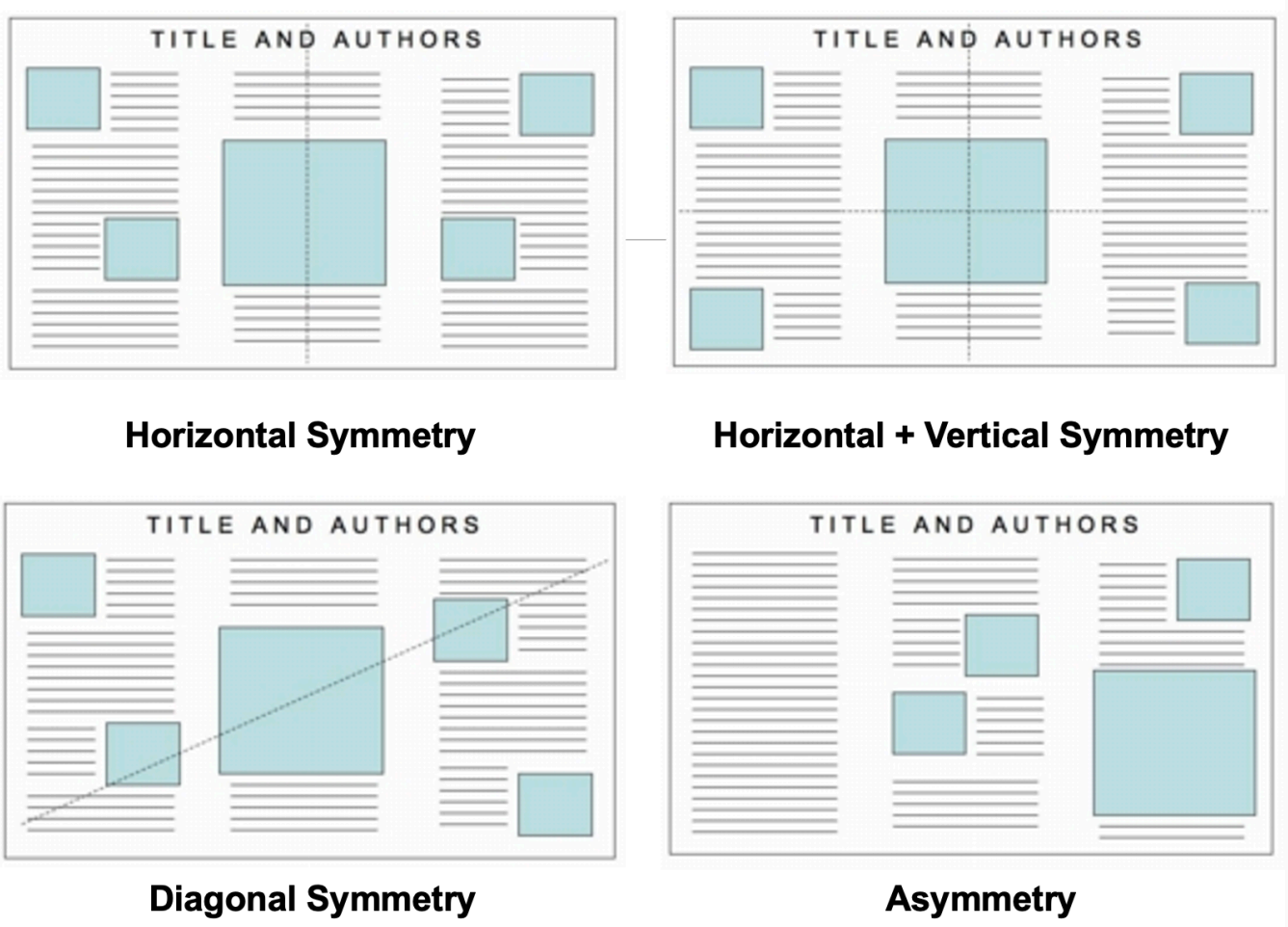
Designing the Poster (4)



Designing the Poster (5)

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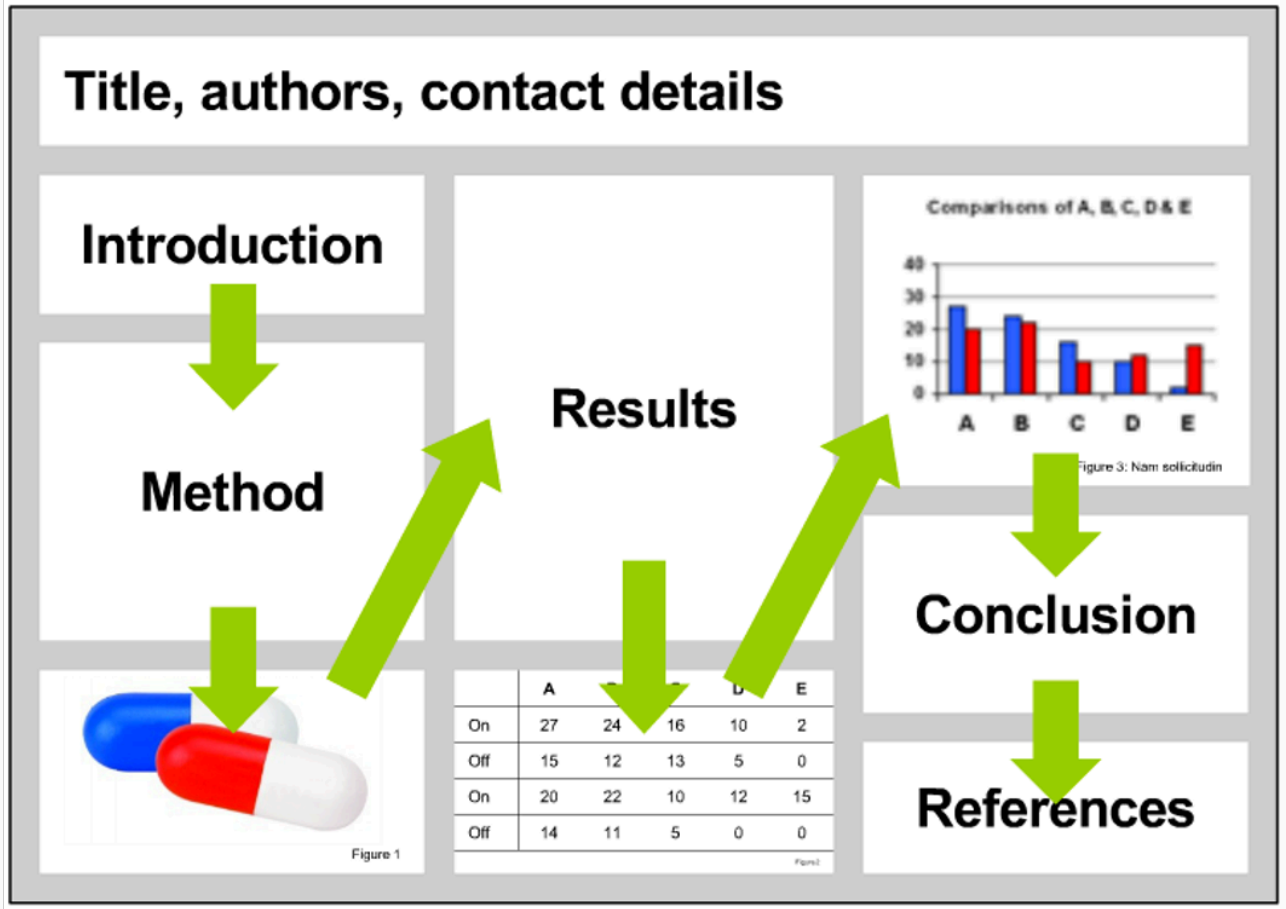

Content of the Poster

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1. Title
2. Abstract
3. Objective / Goal / Major Problem
4. Material and Method
5. Results / Findings
6. Conclusion
7. References
8. Acknowledgement

Poster Text

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- Keep it short and simple
- Remove all non essential information
- Attract visual attention : Use graphics
- Remember LESS IS MORE
- Try For :
  - 30 % Text
  - 40 % Graphics
  - 30 % Empty Space

Suggested Font Size

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- Title : 90
- Authors : 72
- Section Heading : 54 - 60
- Text : 32 – 40.
- Left align text
- Double space
- Pick one font and stick to it
- Use larger/colored font for emphasis
- Use bulleted points rather than paragraphs

Font Size in the Poster Layout

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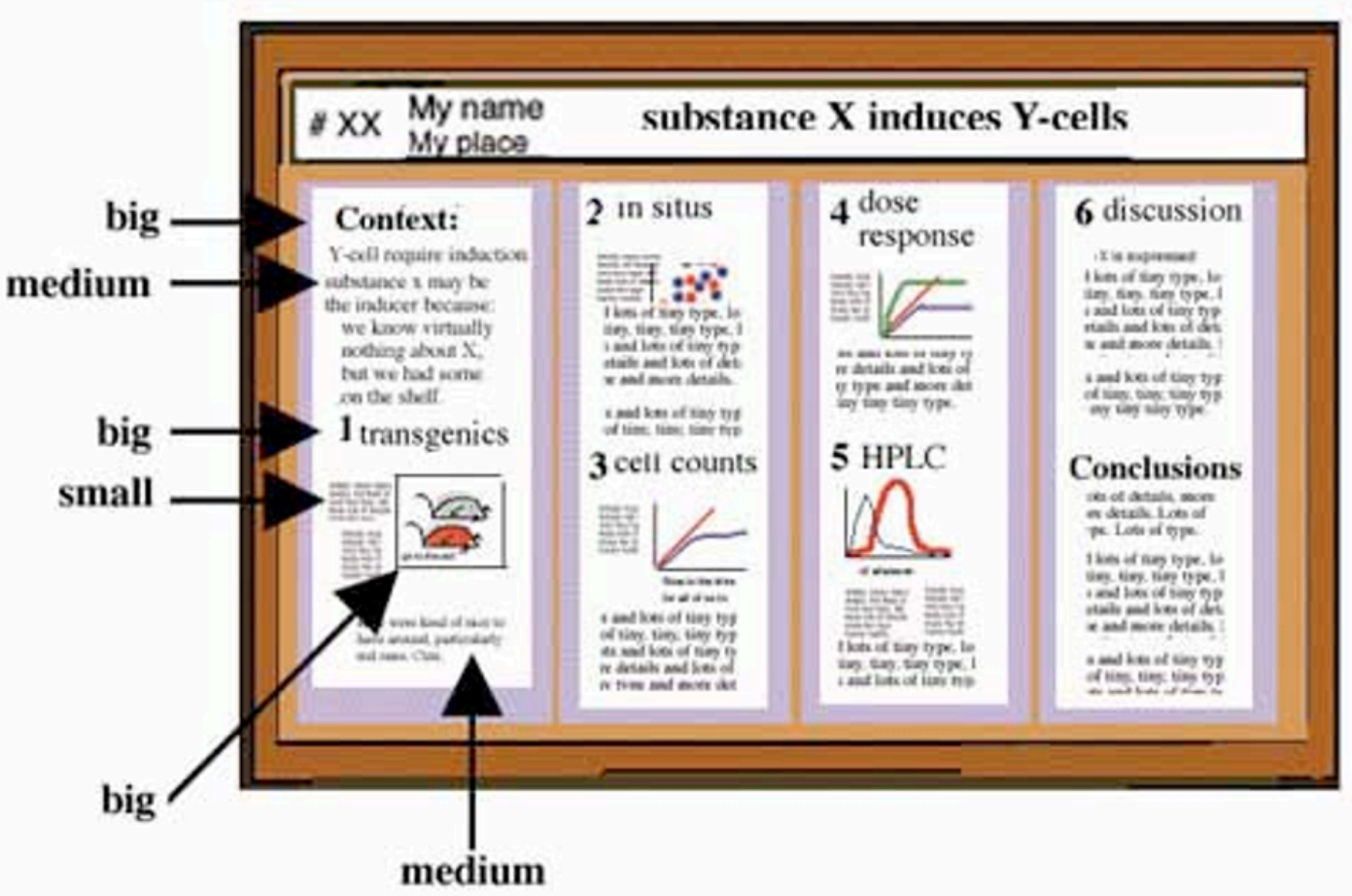

Poster Title

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- Make it interesting!
- You want to lure people from a distance
- Should be easy to read from 15 feet
- If title is too long, shorten it
  - Don't reduce the font size

Authors

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- Typically 1 - 2 lines
- Include first names
  - omit middle initials and titles

Include academic affiliation and its logo

- omit city and province

Color

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- One background color to unify poster
- Stick to muted colors
- Avoid red/green combinations
  - red/green color blindness is common
- Don't overuse color
- Be consistent

Graphics

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- Make large enough for viewing from at least 3 feet (~1 meter) away
- Text should support graphics, not vice versa
- Use heavier lines in tables and graphs for easier viewing

Poster Examples

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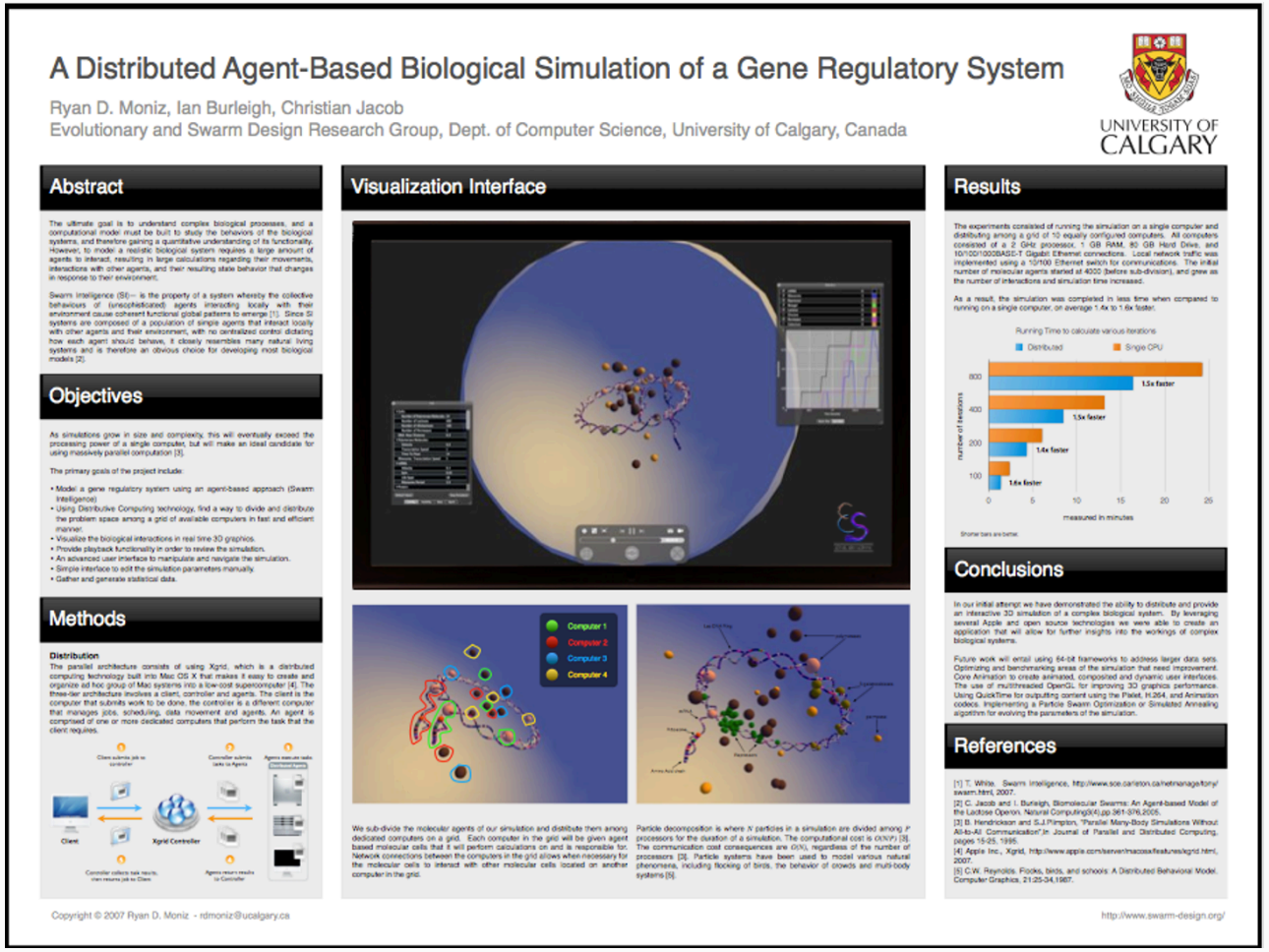

A Distributed Agent-Based Biological Simulation of a Gene Regulatory System

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UNIVERSITY OF CALGARY

Abstract

The ultimate goal is to understand complex biological processes, and a computational model must be built to study the behaviors of the biological systems, and therefore gaining a quantitative understanding of its functionality. However, to model a realistic biological system requires a large amount of agents to interact, resulting in large calculations regarding their movements, interactions with other agents, and their resulting state behavior that changes in response to their environment.

Swarm Intelligence (SI)— is the property of a system whereby the collective behaviours of (unsophisticated) agents interacting locally with their environment cause coherent functional global patterns to emerge [1]. Since SI systems are composed of a population of simple agents that interact locally with other agents and their environment, with no centralized control dictating how each agent should behave, it closely resembles many natural living systems and is therefore an obvious choice for developing most biological models [2].

Objectives

As simulations grow in size and complexity, this will eventually exceed the processing power of a single computer, but will make an ideal candidate for using massively parallel computation [3].

The primary goals of the project include:

- Model a gene regulatory system using an agent-based approach (Swarm Intelligence)
- Using Distributive Computing technology, find a way to divide and distribute the problem space among a grid of available computers in fast and efficient manner.
- Visualize the biological interactions in real time 3D graphics.
- Provide playback functionality in order to review the simulation.
- An advanced user interface to manipulate and navigate the simulation.
- Simple interface to edit the simulation parameters manually.
- Gather and generate statistical data.

Methods

Distribution

The parallel architecture consists of using Xgrid, which is a distributed computing technology built into Mac OS X that makes it easy to create and organize ad hoc group of Mac systems into a low-cost supercomputer [4]. The three-tier architecture involves a client, controller and agents. The client is the computer that submits work to be done, the controller is a different computer that manages jobs, scheduling, data movement and agents. An agent is comprised of one or more dedicated computers that perform the task that the client requires.

Visualization Interface

We sub-divide the molecular agents of our simulation and distribute them among dedicated computers on a grid. Each computer in the grid will be given agent based molecular cells that it will perform calculations on and is responsible for. Network connections between the computers in the grid allows when necessary for the molecular cells to interact with other molecular cells located on another computer in the grid.

Particle decomposition is where N particles in a simulation are divided among P processors for the duration of a simulation. The computational cost is $O(N/P)$ [3]. The communication cost consequences are $O(N)$, regardless of the number of processors [3]. Particle systems have been used to model various natural phenomena, including flocking of birds, the behavior of crowds and multi-body systems [5].

Results

The experiments consisted of running the simulation on a single computer and distributing among a grid of 10 equally configured computers. All computers consisted of a 2 GHz processor, 1 GB RAM, 80 GB Hard Drive, and 10/100/1000BASE-T Gigabit Ethernet connections. Local network traffic was implemented using a 10/100 Ethernet switch for communications. The initial number of molecular agents started at 4000 (before sub-division), and grew as the number of interactions and simulation time increased.

As a result, the simulation was completed in less time when compared to running on a single computer, on average 1.4x to 1.6x faster.

Conclusions

In our initial attempt we have demonstrated the ability to distribute and provide an interactive 3D simulation of a complex biological system. By leveraging several Apple and open source technologies we were able to create an application that will allow for further insights into the workings of complex biological systems.

Future work will entail using 64-bit frameworks to address larger data sets. Optimizing and benchmarking areas of the simulation that need improvement. Core Animation to create animated, composited and dynamic user interfaces. The use of multithreaded OpenGL for improving 3D graphics performance. Using QuickTime for outputting content using the Plated, H.264, and Animation codecs. Implementing a Particle Swarm Optimization or Simulated Annealing algorithm for evolving the parameters of the simulation.

References

[1] T. White. Swarm Intelligence, http://www.sce.carleton.ca/netmanage/tony/swarm.html, 2007.
[2] C. Jacob and I. Burleigh, Biomolecular Swarms: An Agent-based Model of the Lactose Operon. Natural Computing(04).pp.361-376,2005.
[3] B. Hendrickson and S.J.Plimpton, "Parallel Many-Body Simulations Without All-to-All Communication" In Journal of Parallel and Distributed Computing, pages 15-25, 1995.
[4] Apple Inc., Xgrid, http://www.apple.com/server/macosx/features/xgrid.html, 2007.
[5] C.W. Reynolds. Flocks, birds, and schools: A Distributed Behavioral Model. Computer Graphics, 21:25-34,1987.

http://www.swarm-design.org/

Poster Examples

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Conservation of Non-breeding Crested Caracaras in Florida

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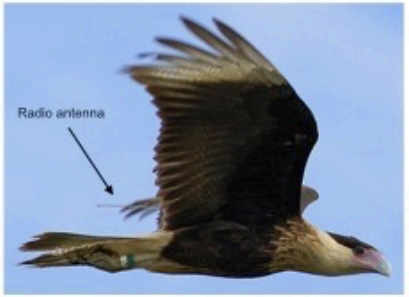

Figure 1) Radio-tagged juvenile caracara in flight (photo by Jack Rogers).

Introduction

- South Florida's upland habitats are being rapidly urbanized as human populations expand into traditionally rural areas.
- The resulting loss of uplands is contributing to the imperilment of many upland specialists.
- The crested caracara (*Caracara cheriway*) is one such species.
- Caracaras begin breeding at approximately three years of age, and conservation-focused research has thus far centered on breeding biology and nesting habitat.
- Little is known about caracaras outside of breeding areas, but non-breeding individuals must be conserved if the population is to thrive.
- This project tests hypotheses about the range, habitat, and flocking behavior of non-breeding caracaras.

Sponsors

MacArthur Agro-ecology Research Center

Study Area and Methods

- Our study covers the entire range of caracaras in Florida (Fig 2).
- We captured birds using a bal-chatri trap modified to accommodate carrion as bait, and we radio-tagged captured non- breeders (Fig. 1).
- We used aerial telemetry to find communal roosts, to document patterns of land use, and to quantify landscape characteristics.

Results

- We radio-tagged and tracked 31 non-breeding caracaras and identified 3 core use areas around communal roosts (Fig. 2).
- Radio-tracked non-breeding caracaras covered > 34,000 km² throughout south-central Florida (minimum convex polygon around all relocation data, excluding Lake Okeechobee).
- We collected land cover data at 118 aerial relocation points, and 141 random points.
- Non-breeding caracaras appear to use orange groves, harvested fields, and drained pastures currently occupied by cattle more than expected based on the availability of those land cover types within the species' range. Caracaras tend to avoid open water, wetlands, swamps, and urban areas (n = 249, X^2 = 54.911, df = 10, p < 0.001) (Table 1).
- Non-breeding caracaras regularly occur in flocks, and may benefit from flocking through increased foraging efficiency, decreased predation risk, or a number of other reasons.

Table 1. Land cover types where radio-tagged caracaras were relocated vs. random sites. Data collected during aerial telemetry flights from July 2006 through January 2007.

Land Cover Type	Caracara Location (n = 118)	Random Location (n = 141)
Drained pasture (cattle)	29	14
Orange grove	24	11
Drained pasture (no cattle)	22	17
Forest	15	22
Harvested field	12	14
Sod	9	10
Row crop	3	8
Scrub	2	3
Open water and wetland	2	16
Swamp	0	11
Urban / developed	0	15

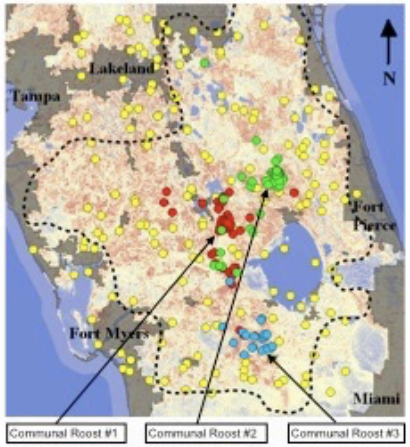

Figure 2) Aerial telemetry data collected July 2006 through January 2007. Black dashed line: range of caracaras in Florida. Red circles: aerial relocations of birds captured near roost #1. Green circles: aerial relocations of birds captured near roost #2. Blue circles: aerial relocations of birds captured near roost #3. Yellow circles: random points.

Discussion and Future Actions

- No communal caracara roosts were previously known in Florida. Conservation plans should protect roosts and roosting birds.
- Prior research indicates that farms, sugar cane, and orange groves are little used by breeding birds, and conservation measures have not considered these areas. Non-breeding birds use these areas as least seasonally, and future conservation plans should consider them.
- In the future, we will describe roost characteristics, and test multiple hypotheses to investigate how caracaras benefit from flock formation.
- These activities will facilitate environmentally sound management practices consistent with Virginia Tech's commitment to leadership in environmental discovery, outreach, and education.

Presentation

Academic Presentation

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- The activity of delivering research findings, ideas, or academic topics in a structured way in front of an audience
- Academic discussion
  - The process of exchaning opinions, critiques, and Q&A aimed at deepening understanding and enriching the topic

Purpose

- To convey the information clearly and systematically
- To influence or convince the audience
- To demonstrate mastery and understanding of the topic
- To receive feedback for improvement

Structure of Academic Presentation

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- Opening
  - Greeting and introduction
  - State the objectives and overview of the presentation*
- Content
  - Explanation of main material
  - Supporting data, facts, and examples
- Closing
  - Summary/conclusion
  - Recommendations or calls to action
  - Thank you note

Tips for Academic Presentation

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- Use formal and clear language
  - Avoid using non formal and ambiguous language
- Use visuals to support your points
  - Slides, charts, tables, graphics
- Conscious of the time
  - Prepare the presentation materials according to the allocated time
  - Practice, practice, and practice

Important Elements of Presentation

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- Message
  - Focus on what your audience needs to know, not what you know
- Visual
  - Make the audience feel captivated
  - A picture means a thousand words
- Delivery
  - Consider voice, volume, physical appearance, facial expressions, eye contact, general body movement

Voice and Volume

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- Soft and effective
- Pronounciation and articulation
- Simplify your voice
- Do not talk flat
- No vocal fillers
- Use pause
- Change your volume
- According to the need

Pyhisical Appearance

- Dress formally
- Looking interested
- Presenting calm exterior

Facial Expressions and Eye Contact

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- Make sure your expressions are natural and comfortable
- Keep eye contact
- Make sure you are trying to make them understand

General Body Movement

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- Stand with a Stable, Neutral Posture (Your "Home Position")
  - Feet shoulder-width apart
  - Weight balanced in both legs
  - Shoulders relaxed
  - Hands in natural position (not in pockets, not behind your back)
  - Facing the audience directly
- Use Purposeful Movement — Don't Wander
  - Move when transitioning to new topic, emphasizing an important point, engaging the audience

General Body Movement (2)

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- Use the “Three-Point Zone”
  - Mentally divide the room into three zones: left side, center, right side
  - Start from the center
  - Then move to the left zone for a topic
  - Center for the core explanation
  - Right zone for conclusion or other topics
- Use Gestures Naturally
  - Open and visible
  - Smooth and varied, but not excessive
  - Good gestures
    - numbered gestures, illustrative gestures (shape or size), emphatic gestures (open palm, confident pointing)

General Body Movement (3)

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- Face the Audience — Not the Screen
  - Glance at the screen
  - Speaking to the people
- Use Forward Movement to Emphasize
  - Step slightly forward, hold, deliver the key sentence, step back to neutral position afterwards
- Move Closer for Q&A
  - Slightly forward for people who asked
  - Maintain open posture

Academic Discussion

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- a structured conversation about a specific topic, often within a scholarly context
- Participants exchange ideas, explore different perspectives, and engage in critical thinking
- It is characterized by evidence-based dialogue, respect for differing viewpoints, and a focus on deepening understanding of the subject matter.

Etiquette in Academic Discussion

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- Listen carefully to others' opinions
- Answer questions clearly and precisely
- Avoid personal attacks, focus on the topic
- Accept criticism openly
- Use polite and professional language

Tips for Handling Academic Discussion

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- Prepare answers for possible questions
- Don't be afraid to admit if you do not know something
- Use data and references as the basis for your answers
- Stay calm and confident
- Use feedback as a learning opportunity

References

- https://www.slideshare.net/slideshow/poster-presentation-237530550/237530550
- https://www.slideshare.net/slideshow/poster-workshop-1/48826723?from_search=0
- https://www.slideshare.net/slideshow/academic-presentation-and-discussion-pptx/280549007?from_search=1