Gabriella Alves Bulhões Barros | Resume

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PhD Student at the New York University, computer scientist, developer, gamer. Interested in procedural content generation, especially based on open data, and artificial intelligence.

Academic Qualifications

- **Tandon School of Engineering, New York University** ***Current GPA: 3.604/4.0***
  PhD Student in Computer Science, New York, US *2016–Ongoing*
  Topic: Data Games. Supervisor: Julian Togelius
- **IT University of Copenhagen** **Copenhagen, DK**
  PhD Student in Computer Science *2014–2016*
  (Transferred to NYU.)
- **Federal University of Pernambuco** **Pernambuco, BR**
  M.Sc. in Computer Science, Cumulative GPA: 3.85/4.0) *2012–2014*
  Topic: Boss: Conception of Digital Games Based on the Blue Ocean Strategy. Related words: Game Design, Artificial Intelligence, Conceptualization.
- **Federal University of Alagoas** **Alagoas, BR**
  B.Sc. in Computer Science, Cumulative GPA: 7.82/10.00 *2008–2012*
  Topic: An Application of Genetic Algorithm to Checkers to Assist the Player's Learning. Related words: Genetic Algorithms, Dynamic Difficulty Adjustment.

Research

15 full- conference papers, 2 short- papers. All publications can be found at: http://bit.ly/2e4wDsm

- **2014 - current : Data Adventures/WikiMysteries.** Automated generation of point-and-click adventure game from Wikipedia and OpenStreetMaps. We use a crawler to obtain information from Wikipedia about a given person (a victim in a murder-style game), and evolve a set of suspects from people related to the victim. All information in-game is generated based on real data automatically, which can lead to absurd outcomes at times due to data being originally unsuited to be played with.
  Selected publication: Murder Mystery Generation from Open Data. Gabriella A. B. Barros, Antonios Liapis and Julian Togelius (2016). Proceedings of the International Conference on Computational Creativity (ICCC). Link: http://julian.togelius.com/Barros2016Murder.pdf
- **2016 : Story generation with machine learning.** Use of neural networks to learn an author's writing style and word corpus. This allowed us to automatically generate new stories, offer authoring assistant tools (with word prediction and correction) and "translate" text into the author's style.
- **2016 - current: WikiDate.** Exploration of the space of data games using the same input as Data Adventures, but abstracting the gameplay and focusing on non-player character generation.
- **2015: SMUG: Scientific Music Generator** We used Markov Chains to generate melodies, and NLP techniques to extract information from academic papers and create lyrics.
  SMUG: Scientific Music Generator. Marco Scirea, Gabriella A. B. Barros, *Selected publication: Noor Shaker and Julian Togelius (2015). Proceedings of the International Conference on Computational Creativity (ICCC). Link: http://julian.togelius.com/Scirea2015Smug.pdf*
- **2014 - 2015: Complete Video Game Description Language generation using algorithms performance profiles.** Generate simple 2D games, either by randomly piecing the game or evolving it based on human-made

games. Our fitness function was the difference in performance between different AI's. Based on the hypothesis that better designed arcade games show a greater skill differentiation between experienced and new players, compared to worse designed games.
Selected publication: Towards generating arcade game rules with VGDL. Thorbjørn S. Nielsen, Gabriella A. B. Barros, Julian Togelius and Mark J. Nelson (2015). Proceedings of the IEEE Conference on Computational Intelligence and Games. (Awarded best paper). Link: http://julian.togelius.com/Nielsen2015Towards.pdf

- **2014 - 2015: Generation of maps for FreeCiv using open data.** Automatic generation of maps using data from OpenStreetMaps. We use basic image processing to generate the topology of the map, and NSGA-II multioptimization algorithms to evolve the players' initial positioning.
  Balanced Civilization Map Generation based on Open Data. Gabriella A. B. Barros and Julian Togelius (2015). IEEE Congress on Evolutionary Computation (CEC). Link: http://julian.togelius.com/Barros2015Balanced.pdf
- **2013 - 2014 : Conceptualization tool using Blue Ocean Strategy**. My master project consisted of developing a tool that provided game concept ideas based on the Blue Ocean Strategy, in the context of a specific company called Manifesto Games.
- **2012 - 2014: Smartphone customization based on context.** Application of artificial intelligence to automate sound and vibration modes in android smartphones using contextual information from the user.

Experience

- **New York University** — **New York**
  Teaching Assistant — *January 2016–current*
  Teaching assistance for the courses: Artificial Intelligence for Games (Spring 2016, Spring 2017 and 2018), and Artificial Intelligence (Fall 2016).

- **Mobile Application Center - SAMSUNG-SIDI / CIn-UFPE** — **Pernambuco**
  Research Assistant — *April 2012–March 2012*
  My goal was to develop solutions that used artificial intelligence and contextual information to improve the usability of Samsung's android phones. My main project involved the development of a profile manager that updated the phone's status based on where the user was, what he was doing and the time of the use. I mainly worked with Java, focusing on the android platform.

- **Computer Institute, UFAL** — **Alagoas**
  Undergraduate Research Assistant — *April 2010–August 2011*
  During this period, I worked developing tools to assist Master students in multi-disciplinary graduate programs who were doing computer related thesis but could not program. Most of the projects were small, but the most interesting one involved the use of evolutionary algorithms to generate phylogenetic trees.

Publications

Gabriella A. B. Barros, Michael Green, Antonios Liapis, and Julian Togelius. Who killed Albert Einstein? From Open Data to murder mystery games. *IEEE Transactions on Games*, 2018.

Ahmed Khalifa, Gabriella A. B. Barros, and Julian Togelius. Deeptingle. In *Proceedings of the Sixth International Conference on Computational Creativity*, 2017.

Michael Cerny Green, Ahmed Khalifa, Gabriella AB Barros, and Julian Togelius. "press space to fire": Automatic video game tutorial generation. In *EXAG workshop at AIIDE*, 2017.

Gabriella A. B. Barros, Antonios Liapis, and Julian Togelius. Playing with data: Procedural generation of adventures from open data. In *Proceedings of the First Joint Conference DIGRA-FDG*, 2016.

Marco Scirea, Gabriella A. B. Barros, Noor Shaker, and Julian Togelius. Smug: Scientific music generator. In *Proceedings of the Sixth International Conference on Computational Creativity*, page 204, 2015.

Thorbjørn S Nielsen, Gabriella Alves Bulhões Barros, Julian Togelius, and Mark J Nelson. Towards generating arcade game rules with vgdl. In *Proceedings of the IEEE Conference on Computational Intelligence and Games (CIG)*. IEEE, 2015.

Thorbjørn S. Nielsen, Gabriella A. B. Barros, Julian Togelius, and Mark J. Nelson. General video game evaluation using relative algorithm performance profiles. In *Applications of Evolutionary Computation*, pages 369–380. Springer, 2015.

Gabriella AB Barros and Julian Togelius. Balanced civilization map generation based on open data. In *Evolutionary Computation (CEC), 2015 IEEE Congress on*, pages 1482–1489. IEEE, 2015.

Gabriella A. B., Antonios Liapis, and Julian Togelius. Data adventures. In *Proceedings of the FDG Workshop on Procedural Content Generation*, 2015.

Gabriella A. B. Barros, Julian Togelius, et al. Exploring a large space of small games. In *Proceedings of the IEEE Conference on Computational Intelligence in Games*, pages 1–2, 2014.

Organizational Activities

- Proceedings chair for the IEEE Conference on Computational Intelligence and Games (2017).
- Organizer of the 3rd ICCC workshop on Computational Creativity and Games (2017).

Notable Projects

- **Data Adventures / WikiMysteries:** *'A Data Game with Wikipedia, OpenStreetMap and Wikimedia Commons'*

  Part of my PhD project, these two games build on the idea of using Wikipedia as a source for generating adventure games. In Data Adventures, the player inputs two people (whom must have Wikipedia articles), and the system finds a path that connects them: a series of articles between them. This path is automatically transformed into game locations, objects and characters, with dialogues and mini-puzzles. Gameplay is akin to classic point-and-click adventures and heavily inspired by the Carmen Sandiego's series. WikiMysteries expands on this project adding multiple paths and the idea of solving a crime. This project was showcased at the opening of the Alan Turing Institute of Technology, and three papers (2 full, 1 short) were published on it.
- **Super W-Hack** *'Procedurally generated rogue-like turn-base game'*

  This game, developed alongside two colleagues, is a rogue-like homage to several titles, such as Binding of Isaac, Super Crate Box and Rogue, among others. Its premise is that the player encounters procedurally generated levels, weapons and enemy behaviors. Visuals are top-down and minimalistic and gameplay is turn-based. I was responsible for weapon generation and bosses' behaviors, and was involved in most game design decisions. The game can be played at: http://bit.ly/2e4rD6L or http://bit.ly/2eLtL4R.

Technical and Personal skills

- **Programming Languages:** Java (advanced), C++ (intermediate), C (intermediate), Prolog (intermediate), C# (beginner), Javascript (beginner), Typescript (beginner), Python (beginner).
- **Languages:** Brazilian Portuguese (native), English (proficient).
- **Other skills:** Phaser, Unity, Game Maker, RPG Maker XP and MV, ChoiceScript, Inform 7, Ren'Py, CSS, HTML, SQL, experience writing and presenting academic papers.

Awards

- Best Paper Award for Towards generating arcade game rules with VGDL. 2015.
- Best Paper Award for Which features matter to make a successful mobile game? 2013
- Certificate of Achievement - Honorable Mention South America Brazil First Phase, International Collegiate Programming Contest - ACM. 2012 and 2011
- PhD scholarship from CAPES, Brazil. 2014 - current.
- Selected for the 2016 Rising Stars in EECS workshop.