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ADAM Lab

The Adaptive Media Lab explores how to create digital media experiences that tailor themselves to individual users. These adaptations may occur for dramatic purposes (e.g. interactive narrative), educational purposes (e.g. serious games), and / or purely for entertainment. This research involves work in design, artificial intelligence, and human computer interaction.

Website: http://adam.cc.gatech.edu

Director: Brian Magerko

Faculty: Mark Riedl, Jason Freeman

Drawing Apprentice: Co-Creative Drawing Partner

Room 325

Collaboration is known to push creative boundaries and help individuals sustain creative engagement, explore a more diverse conceptual space, and synthesize new ideas. While the benefits of human collaboration may seem obvious, the cognitive mechanism and processes involved in open-ended improvisational collaboration are active areas of research. Our research group has developed a co-creative drawing partner called the Drawing Apprentice to investigate creative collaboration in the domain of abstract drawing. The Drawing Apprentice draws with users in real time by analyzing their input lines and responding with lines of its own. With this prototype, we study the interaction dynamics of artistic collaboration and explore how a co-creative agent might be designed to effectively collaborate with both novices and expert artists. The prototype serves as a technical probe to investigate new human-computer interaction concepts in this new domain of human-computer collaboration, such as methods of feedback to facilitate learning and coordination (for both the user and system), turn taking patterns, and the role control and ambiguity plays in effective collaboration.

Research Focus Areas: Artificial Intelligence, Cognitive Science

Sound Happening

Room 325

Sound Happening is a playful installation space in which participants generate improvisational music by interacting with colorful foam balls.

Research Focus Areas: Music Technology

Space Table: The life of a star

Room 325

The Space Table is an interactive informal experience to teach children about the formation of solar systems and how gravity, and mass play a role in their creation. Additionally, the project will explore the concepts of different celestial bodies such as stars, planets, asteroids, neutron stars, black holes and others. The installation will make use of three tangibles, one for a different star size. Interactors will use the tangibles to “stamp” a star on the table, which will spawn a digital star. After the star is created, interactors will be able to create asteroids and other space debris by sliding their fingers on the screen, which will in turn create bigger objects (such as moons or planets) when they collide with other small celestial bodies. Once the system is created, the expectation is for interactors to experiment with the celestial bodies, leading them to the discovery of cosmological concepts.

Research Focus Areas: Educational Technologies

Tangible Program Learning Table

Room 325

This project is a responsive tabletop application with a tangible user interface. The intention is to teach basic computer programming concepts to middle school-aged to high school-aged children (9-15 years old) using physical blocks that work as snippets of code. Each block has a unique design on the bottom that when placed on the acrylic surface of the table is identified by the software using cameras mounted underneath the acrylic surface of the table. When the arrangement of blocks is recognized, the application outputs musical and visual feedback. Users compose short songs by building chains of blocks that represent code.

Research Focus Areas: Educational Technologies, Graphics and Animation, Music Technology

Viewpoints AI: An Exploration of Human - AI Movement Improvisation

Room 325

Viewpoints AI is an interactive art installation that explores the improvisation of proto-narrative movement between humans and virtual AI agents using full body, expressive, movement-based interaction. Interactors can co-create movement with an autonomous virtual agent that learns movement, response, and improvisation directly from interacting with human teachers. It analyses their movement using Viewpoints movement theory.

Research Focus Areas: Artificial Intelligence, Cognitive Science, New Media

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Augmented Environments Lab

Lab activities focus on understanding how to build interactive computing environments that directly augment a user's senses with computer-generated material. Researchers are interested in augmenting the user's perception, and place particular emphasis on the interaction between the users and their environment.

Website: http://ael.gatech.edu/lab/

Faculty: Blair MacIntyre, Jay Bolter

Applying Design Studio Pedagogy in STEM Learning with Novel Presentation and Sensing Technologies

Room 233

We use Augmented Reality presentation and sensing technologies to integrate design studio learning models into screen-based classrooms. The goal for this approach is to create STEM learning experiences that encourage creativity, innovation and help build strong peer learning environments. To accomplish this goal we implement room-scale augmented reality technology with projection-based presentation and sensing technologies -- projecting on surfaces and using depth sensing for unencumbered interaction (see http://research.microsoft.com/en-us/projects/roomalive/). This approach allows everyone in the space to participate in the experience, and the cost is fixed regardless of the number of participants. Two practices from the studio model for learning we build upon are: – Pinups: In design studios, students will pin their work (completed parts, sketches, parts in-development) on a wall, and the teacher and students will walk the walls in order to comment on the pinned-up work. Pinups make both the artifacts and process of design work visible, and make it possible to compare and contrast approaches when all students work is pinned up at once. – Meetups: Students working together in a design studio can look over to see what others are doing. Collaboration is fluid and at multiple levels. Sometimes, two students move their work near one another to work together (literally, "closely"). Sometimes, two students just look at each other's work to share ideas.

Research Focus Areas: Augmented Reality, Educational Technologies

Argon: AR-Enabled Web Browser

Room 233

Argon is a mobile web browser designed to bridge the gap between Augmented Reality and The Web. Following in the tradition of web browsers like Chrome and Firefox, which differentiate themselves by providing custom functionality that is not yet standardized across all browsers, Argon exposes the core technologies needed to make AR possible. By making computer vision tracking (via the Qualcomm's Vuforia library) available to web pages, Argon provides a browser-based platform for rapid development of fully-interactive 2D/3D AR content & applications. Come see projects & demos built using the Argon platform.

Research Focus Areas: Augmented Reality

Auburn Avenue: Augmented Reality for Cultural Heritage

Room 233

We are developing a suite of media experiences to introduce visitors to the rich cultural and economic history of Auburn Avenue. From about 1900 to 1960, Auburn Avenue was the center of African-American cultural and economic life in the city. The street also played a key role in the civil rights movement. From the 1960s on, the street suffered decline, and the local community disintegrated because of a range of social, economic, and urban planning factors. In recent years, however, the community has been the focus of revival efforts with attractive apartments and homes at its eastern end and increased economic activity along its more blighted corridor. In 2014 or 2015, a new streetcar line promises to bring even more tourists to its main attractions: the Martin Luther King Visitors Center, King's birth home, the Ebenezer Baptist Church, and the King Memorial. Sweet Auburn was designated a National Historic Landmark in 1976. We are working in collaboration with Central Atlanta Progress and the History Preservation Division of the Dept of Natural Resources of the State of Georgia to bring this history to thousands of visitors and residents through an integrated integrated media strategy. Our media strategy centers on a prototype of a mobile app using the Argon browser. This will be supported by web applications that can run on other mobile devices as well as a web site. The content types and features that we will explore include: a. audio, images and text delivered on location at places of interest along the avenue. b. panoramas and historical photographs to depict the visual history of Sweet Auburn. c. informative texts to replace or complete existing physical signage; d. forms of interaction that trigger the delivery of these images, audio, and text: for example, when users walk down the street, GPS tracking can tell the phone when to play certain audio or show certain images. e. links to social media so that visitors can record their experience of the tour of the avenue for friends or for their own later use. Our ultimate goal is to ensure the broadest possible class of visitors and web users to have a satisfying and informative experience of Auburn Avenue and make sure that the digital media application is a successful and sustainable informational companion that supports the preservation and revitalization efforts in this area.

Research Focus Areas: Augmented Reality

Aware Home Research Initiative

Generally, people spend a good amount of time in their home performing everyday activities like: sleeping, eating, cooking, relaxing, entertaining, and so on; thus, it comes as no surprise that the home plays a key role in our health, lifestyle, and well-being. The Aware Home Research Initiative (AHRI) at Georgia Institute of Technology is an interdisciplinary research endeavor aimed at addressing the fundamental technical, design, and social challenges for people in a home setting. Central to this research is the Aware Home, a 3-story, 5040 square foot facility designed to facilitate research, while providing an authentic home environment.

Website: http://awarehome.gatech.edu

Director: Brian D. Jones

Connected Living Research Initiative

Room 309

Connected living is the fast-growing intersection of mobile, wearable, home, community, car and other technologies to assist individuals in accomplishing more seamless interactions and goals in daily life. Mobility and cloud computing are two pillars of growth that has brought about significant changes in industry. Cloud computing, big data, mobility and low-cost sensors are driving the internet of things and connected industries, and the internet of things is forcing transformation and innovation across the connected home, connected workplace and connected city. It is estimated that the Connected Living market will reach 730 Billion USD by 2020. We are in the process of defining the Connected Living Research Initiative (CLRI) to bring together industry stakeholders, academic/research faculty and civic partners in defining the future of the connected life. CLRI is currently on boarding partners to delineate research goals that include (but is not limited to) the future impact of big data, improved user experience in daily activities, and data security and privacy in this ever more connected daily experience. For more information contact: Brian Jones or Siva Jayaraman

Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Cue - Connecting U Everyday

Room 309

No matter what age we are, we have likely forgotten to turn off the stove or oven, iron, heater or even water. Forgetfulness can lead to serious events that may result in costly damage to the home or even injury or death. Older adults are more prone to such forgetfulness. When an older adult forgets to turn off a hazardous appliance, it is often attributed to losing mental capacity and may lead to loss of self-confidence, embarrassment, and judgment from others. Many families turn to monitoring when they discover such hazards, but this can result in their loved one feeling a loss of independence. We feel there is an opportunity before monitoring to use technology to provide gentle reminders or cues that empower the resident to determine for themselves when such appliances should be turn off. Introducing cue. The system would consist of several ambient and/or wearable reminder products that would integrate with existing connected home systems and provide those gentle reminders both at and away from the primary hazard. We have designed, a couple of example reminder concepts, mainly for the stove, oven, iron, or heater to address this need. The latest consists of a device in proximity of the stove that provides a larger/brighter light than most stovetops with an integrated proximity sensing capability and a smartwatch with ability to vibrate and alert through sound and visuals. If motion is no longer detected in the kitchen, the watch would alert the user of the potential hazard. The user may also choose to snooze the reminder. While we focused on hazardous appliances, this same system may support cues related to medication taking, water leaks, door lock status, smoke detector battery level, feeding or walking the do, or similar needs.

Research Focus Areas: Health Informatics, Mobile and Ubiquitous Computing

RERC TechSAge: A Mobile Application to Measure Gait Speed

Room 309

Multiple studies have shown a consistently strong association between gait speed of frail older adults and negative functional (e.g., survival) and activity outcomes. However, health care professionals have been slow to measure this physiologic parameter, largely due to the lack of a simple, standardized way of measuring it. The purpose of this project is to develop a reliable, simple, and cost-effective mobile app to measure gait speed and demonstrate the feasibility of this measure as a predictive tool to identify risk of functional decline and activity limitation in frail elders who are aging with ambulatory disability.

Research Focus Areas: Health Informatics, Mobile and Ubiquitous Computing

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Comp.Social Lab

The comp.social lab focuses on the design and analysis of social media. According to their website they "like puppies, mixed methods and new students (particularly MS)."

Website: http://comp.social.gatech.edu

Director: Eric Gilbert

Algorithmically Bypassing Censorship on Sina Weibo with Nondeterministic Homophone Substitutions

Room 339

Like traditional media, social media in China is subject to censorship. However, in limited cases, activists have employed homophones of censored keywords to avoid detection by keyword matching algorithms. In this paper, we show that it is possible to scale this idea up in ways that make it difficult to defend against. Specifically, we present a non-deterministic algorithm for generating homophones that create large numbers of false positives for censors, making it difficult to locate banned conversations. In two experiments, we show that 1) homophone-transformed weibos posted to Sina Weibo remain on-site three times longer than their previously censored counterparts, and 2) native Chinese speakers can recover the origi- nal intent behind the homophone-transformed messages, with 99% of our posts understood by the majority of our participants. Finally, we find that coping with homophone transformations is likely to cost the Sina Weibo censorship apparatus an additional 15 hours of human labor per day, per censored keyword. To conclude, we reflect briefly on the opportunities presented by this algorithm to build interactive, client-side tools that promote free speech.

Research Focus Areas: Social Computing

Analyzing the Affordances of a Location-Based App to Provide Safety

Room 339

There are not many computing systems available that will help keep individuals safe when meeting up with strangers offline. Therefore, our team has developed an application that will help keep these individuals safe. In order to improve our current system, we will conduct a two-part research experiment: an interactive activity and interviews. This data, along with the data from the activity, will help to address whether or not using a computer system helps people feel safer when traveling alone. The study will be conducted on the campus of the Georgia Institute of Technology.

Research Focus Areas: Social Computing

Automod: Machine Learning-Based Approaches Toward Combatting Abusive

Behavior in Online Communities

Room 339

Since its earliest days, flaming, trolling, harassment and abuse have plagued the Internet. Our aim is to computationally model abusive online behavior to build tools that help counter it, with the goal of making the Internet a more welcoming place. In particular, we look at a novel approach to identify online verbal abuse using cross-community linguistic similarities between posts on different communities. This work will enable a transformative new class of automated and semi-automated applications that depend on computationally generated abuse predictions.

Research Focus Areas: Online Communities, Social Computing

CREDBANK: A Large-scale Social Media Corpus With Associated Credibility Annotations

Room 339

Social media has quickly risen to prominence as a news source, yet lingering doubts remain about its ability to spread rumor and misinformation. Systematically studying this phenomenon, however, has been difficult due to the need to collect large-scale, unbiased data along with in-situ judgements of its accuracy. In this paper we present CREDBANK, a corpus designed to bridge this gap by systematically combining machine and human computation. Specifically, CREDBANK is a corpus of tweets, topics, events and associated human credibility judgements. It is based on the real-time tracking of more than 1 billion streaming tweets over a period of more than three months, computational summarizations of those tweets, and intelligent routings of the tweet streams to human annotators—within a few hours of those events unfolding on Twitter. In total CREDBANK comprises more than 60 million tweets grouped into 1049 real-world events, each annotated by 30 human annotators. As an example, with CREDBANK one can quickly calculate that roughly 24% of the events in the global tweet stream are not perceived as credible. We have made CREDBANK publicly available, and hope it will enable new research questions related to online information credibility in fields such as social science, data mining and health.

Research Focus Areas: Human-Computer Interaction, Social Computing

Designing the front-end of a tool that facilitates bypassing censorship on Sina Weibo

Room 339

Like traditional media, social media in China is subject to censorship. However, in limited cases, activists have employed homophones of censored keywords to avoid detection by keyword matching algorithms. This project focusses on designing an interactive, client-side tool that promotes free speech. An iterative design process, involving the inputs of end-users will deliver a final design. In the evaluation of the design we will target the following research questions: RQ 1. Does the UI workflow fit into context of use of the users?RQ 2. What the user preferences in terms of providing input and receiving output?RQ 3. Do users prefer a desktop version or mobile or both?RQ 4. Does the design feel familiar and similar to the UIs in China?RQ 5. Does the UI feel trust-able (does the UI breed and draw trust from the users?) For the info on the algorithm, see project: Algorithmically Bypassing Censorship on Sina Weibo with Nondeterministic Homophone Substitutions

Research Focus Areas: Human-Computer Interaction, Social Computing

Real Time Aggregation of Keywords from Censored Posts on Sina Weibo using Hadoop and Cron

Room

With the increasing presence of censorship on Chinese social media, it is imperative to provide the users of platforms such as Sina Weibo a way to freely share information without alerting the censors and systems of surveillance on social media. The aim of this project is to implement a Real-Time Keyword Aggregator that collects keywords that have most

likely resulted in censorship of posts from various publicly available archives of censored sina weibo posts. In this work, utilize a Distributed Computing based technique to identify additional possible keywords from the posts using a TF-IDF based technique. The result of this project will be a large, continuously populated and curated homophone dictionary for currently censored keywords on Sina Weibo.

Research Focus Areas: Social Computing

Scraping big data without API

Room 339

Using scrapy a python framework to scrape Sino Weibo without the API.

Research Focus Areas: New Media, Online Communities, Social Computing

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Computational Enterprise Science Lab

The Computational Enterprise Science Lab focuses on the design, analysis, and management of complex enterprise systems (e.g. organizations, supply chains, business ecosystems) using information visualization, modeling/simulation, and system science approaches.

Website: http://www.cc.gatech.edu/people/rahul-basole

Director: Rahul C. Basole

dotlink360: Visual Business Ecosystem Intelligence

Room 334

Business ecosystems are characterized by large, complex, and global networks of firms, often from many different market segments, all collaborating, partnering, and competing to create and deliver new products and services. Given the rapidly increasing scale, complexity, and rate of change of business ecosystems, as well as economic and competitive pressures, analysts are faced with the formidable task of quickly understanding the fundamental characteristics of these interfirm networks. Existing tools, however, are predominantly query- or list-centric with limited interactive, exploratory capabilities. We have designed and implemented dotlink360, a web-based interactive visualization system that provides capabilities to gain systemic insight into the compositional, temporal, and connective characteristics of business ecosystems. dotlink360 consists of novel, multiple connected views enabling the analyst to explore, discover, and understand interfirm networks for a focal firm, specific market segments or countries, and the entire business ecosystem.

Research Focus Areas: Information Visualization

Contextual Computing Group

The Contextual Computing Group focuses on projects to develop applications and interfaces for the computer to be aware of what the user is doing and to assist the user as appropriate. Several current projects at the research stage are envisioned to work together to assist a user in routine tasks such as automatically scheduling an appointment, re-directing an urgent phone call appropriately based on the user's schedule and current activity, and recognizing that the user is engaged in conversation and would prefer to take the phone call later.

Website: https://research.cc.gatech.edu/ccg/

Director: Thad Starner

CopyCat

Room 243

This project involves the design and evaluation of an interactive computer game that allows deaf children to practice their American Sign Language skills. The game includes an automatic sign language recognition component utilizing computer vision and wireless accelerometers. The project is a collaboration with Dr. Harley Hamilton at the Atlanta Area School for the Deaf.

Research Focus Areas: Educational Technologies

Order Picking with Wearable Computers

Room 243

Warehouses throughout the world distribute approximately $1 trillion in goods per year from nearly a million warehouses. Order Picking is the process of collecting items from inventory and sorting them into orders for distribution. It represents one of the main activities performed in warehouses. About 60% of the total operational costs of these warehouses is order picking. Most are still picked by hand, often using paper pick lists. Our objective is to implement and compare various order-picking systems, including: • Pick-By-Paper list • Pick-By-Light • Pick-By-Tablet • Pick-By-HUD (Heads-Up Display).

Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Passive Haptic Learning

Room 243

Passive Haptic Learning (PHL) is the acquisition of sensorimotor skills without active attention to learning. Vibrations are used to passively 'teach' the motor skill and are typically delivered by a wearable, tactile interface. Our group has previously demonstrated Passive Haptic Learning of piano melodies and of typing skills for text entry on a unique 10-key keyboard. We now investigate whether Passive Haptic instruction facilitated by wearable computers may be a feasible method of teaching Braille typing.

Silent Speech Recognition

Room 243 (LAB)

In this study, we address the problem of performing continuous speech recognition where audio is not available (e.g.,due to a medical condition) or is highly noisy (e.g. during ?re?ghting or combat). Our Tongue Magnet Interface (TMI) uses 3-axis magnetometers to measure the movement of a small magnet glued to the user's tongue. Tongue movement corresponding to speech is isolated from the continuous data by comparing the variance of a sliding

window of data to the variance of signal corresponding to silence. Recognition relied on hidden Markov model (HMM) based techniques. Using a custom headset with four magnetometers placed close to the cheeks of the participant, a maximum user dependent recognition rate of 99.8% is achieved for a ?xed phrase set of 12 sentences spoken by able-bodied participants. The average accuracy across four users is 95.9%. Using the single magnetometer aboard Google Glass, a commercial wearable computing device worn at eye level, one of 12 phrases could be selected with 93.8% average accuracy. To improve the latter recognition result we introduced a new interface, known as the Outer Ear Interface (OEI), which captures the lower jaw movements by measuring the deformation it causes in the ear canal. This measurement is done using a pair of infrared proximity sensors, one in each ear. We hypothesize that combining features from both interfaces will improve accuracy results significantly.

Research Focus Areas: Artificial Intelligence, Human-Computer Interaction, Mobile and Ubiquitous Computing

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Contextualized Support for Learning

http://home.cc.gatech.edu/csl/uploads/1/eup.png

Website: http://home.cc.gatech.edu/csl

Director: Mark Guzdial

CSLearning4U: Creating Electronic Books for Teacher CS Learning

Room 329

A key idea in CSLearning4U is that we can design CS learning opportunities. Simply wrestling an interpreter or compiler can't be the best way to learn about computer science. Throwing people into the deep end of the pool can teach people to swim, but there are better ways. We want to do better than a book for CS learning, and we want to design the phonics of computing education to integrate with the "whole language learning" of programming. We are creating a new distance-learning medium for computing education especially for in-service high school teachers based on ideas from instructional design and educational psychology. In-service high school teachers are particularly time-constrained (and thus need efficiency) and they are more metacognitively aware than other students (and thus able to better inform the project design). The new medium will combine multiple modalities, worked examples, and structure based on cognitive models of designers' knowledge. The research questions are that (1) the teachers will learn CS knowledge in the on-line setting, (2) the teachers will be more efficient at programming tasks, and (3) the teachers will find the materials useful and satisfying. Because of its focus on teachers, the project can potentially have broad impact, in particular on the strategies for training the 10,000 teachers envisioned in the CS 10K Project. The project will establish models and design guidelines that can be used for the creation of other learning materials, including materials for students in, for example, the proposed new CS Principles AP course.

Research Focus Areas: Educational Technologies, Human-Computer Interaction, New Media

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Culture And Technology Lab (CAT)

The CAT Lab studies how culture impacts the use and production of technology with a focus on learning applications, computer science education and designing new technologies with culture as a point of convergence.

Website: http://catlab.gatech.edu/

Faculty: Betsy DiSalvo

design[ED] Lab

Room 328

Students solved these problems in design[ED] Lab ("Design Education Lab"), a user experience workshop that introduced teenagers and pre-professional adults to design-thinking, to encourage problem solving and critical thinking skill development. This workshop was in partnership with The Bridge Academy (College Park, GA), a full-time High School Diploma and GED Prep program offering a nontraditional path for students. Students used a design-thinking approach to respond to problems based on the College Park Comprehensive Plan (2011 – 2031), by defining the problem, brainstorming solutions, thinking empathetically, iterating on the prototype, and critiquing the work. design[ED] Lab aims to expose underrepresented minorities to design-thinking as a method to solve important problems within their community. Empowered with the tools to make a difference, we hope to inspire the minds that will change the world. design[ED] Lab is a research project created and facilitated by Monet Spells, a Master's student at Georgia Institute of Technology studying Human-Computer Interaction.

Research Focus Areas: Educational Technologies

Designing Virtual Character Appearance in Informal Learning Environments for Children

Room 328

The rise of ubiquitous technology has resulted in opportunities for the design of new interactive museum exhibits that can be customized to families. Children's museums can be engaging, informal settings in which children learn fundamental science, technology, engineering, and math (STEM) concepts through hands-on experiences. In order to optimize and personalize learning experiences in such informal environments, we propose the concept of a virtual buddy that uses personal, physical, and social context knowledge regarding the child to facilitate new opportunities for STEM learning. To understand how children choose, perceive and interact with a virtual buddy and how that may impact STEM learning, we conducted participatory design activities with 18 children in a local museum. The goal of this project is to inform the design of a Virtual STEM Buddy (VSB) that could provide contextualized explanations, to seed parents contextualized explanations and to bridge the museum experience to other informal learning experiences.

Research Focus Areas: Educational Technologies, Human-Computer Interaction, Virtual Reality

Technology in museums: Avenues for personalized parent-child conversations

Room 328

Parents and children work together in museums and other informal learning settings to make meaning of the world around them. The parent-child conversations, the child's interests (islands of expertise) and the surrounding technology influence the overall informal learning experience. We conducted two studies at the Children's museum of Atlanta to better understand the interplay amongst those conversations, child's interest and technology. Drawing on the insights from the field studies and participatory design activities conducted with parent-child dyads, we created a prototype of a companion mobile app which may create avenues for having in-depth, contextualized and personalized parent-child conversations, which may, in turn, improve the informal learning experience.

Research Focus Areas: Educational Technologies, Human-Computer Interaction, Mobile and Ubiquitous Computing

Design and Social Interaction Studio

DESIGN & SOCIAL INTERACTION STUDIO

Design and Social Interaction Studio brings an interdisciplinary group of faculty and students together to examine the experiential and participatory dimensions of digital media and their relationship to establishing and supporting democratic forms of social interaction. Research at the studio spans both theoretical inquiry and experimental design, situated at the intersection of Design, the Humanities, and Human Computer Interaction. We design and investigate a variety of design products and services (e.g., locative media, visualizations and mapping, policy media, social and educational media) drawing on a range of design methods and strategies, most notably participatory and co-design methods, ethnographic methods, and experimental designs. Projects are often in collaboration with other units on campus, other schools, as well as local non-profit organizations. Among current collaborators are Schools of Public Policy and Electrical Engineering at Georgia Tech; the iSchool at the University of British Columbia; Mayo Clinic; and local organizations such as Marcus Autism Center, Children's Healthcare of Atlanta, Fulton County Department of Health, and Central Atlanta Progress.

Website: http://designstudio.gatech.edu

Director: Nassim JafariNaimi

An Interactive Journey Through Modern Physics

Room 209

Research Focus Areas: Educational Technologies, Graphics and Animation, Human-Computer Interaction

Conversational Media: Designing a Decision Aid for Diabetes Medication Choice

Room 209

Over 29 million people in the U.S. live with type II Diabetes. There are many types of medications available to help manage Diabetes, and these medications impact patients' lives in unique ways. Following tenets of evidence-based medicine, participatory design and shared decision making, design researchers at the Mayo Clinic have created a set of cards for use in patient-physician conversations, to help both parties reach a decision on diabetes medication choice. I'm working on an updated digital version of this decision aid, which offers opportunities for tailored content and easier-to-update information while aiming to maintain the flexible, accessible spirit of the original tool.

Research Focus Areas: Human-Computer Interaction

Participatory Locative Media: Sweet History of Auburn

Room 209

This project is an alternate wayfinding method for the Sweet Auburn district, highlighting key landmarks and businesses that played a pivotal role in Atlanta's history.

Research Focus Areas: Collaborative Work, Graphics and Animation, Information Visualization

Particle in a Box (An Experiential Approach to Quantum Mechanics Education)

Room 209

Theories of Quantum Mechanics(QM) have been central to the philosophical and technological advances in physics and related fields. Some of the most important aspects of these theories are outside the bounds of human experience, predominantly explained and taught drawing on abstract mathematical formulas. How can we advance experience-based learning of abstract concepts such as QM so students develop the in-depth understanding needed to further advance these theories by generating and testing new hypotheses? This research project addresses this question through a series experimentations with digital media (e.g., by designing interactive games based on the rules of QM) engaging whether and how digital media could serve as the basis for an experiential understanding of QM concepts. For more information and to play the latest version of the game please visit, http://learnqm.gatech.edu

Research Focus Areas: Educational Technologies, Gaming, Information Visualization

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Electronic Learning Communities

The concept that people learn best when they are making something personally meaningful - also known as constructionism - is the lab's guiding philosophy. Computer networks have the potential to facilitate community-supported constructionist learning. The Electronic Learning Communities Lab examines ways communities of learners can motivate and support one another's learning experiences.

Website: http://www.cc.gatech.edu/elc/index.shtml

Faculty: Amy Bruckman

Copyright and Social Norms in Online Creative Communities

Room 338

Every day, ordinary Internet users engage with complex copyright laws. Particularly in the context of creative work and appropriation, they are making decisions related to legal areas that are notoriously gray. Where legal knowledge is imperfect, social norms and ethical intuitions fill in the gaps. This research attempts to understand how these decisions are made, how norms and knowledge differ in different creative communities, and what lessons can be derived for online community management and design.

Cuba Intercambio: Information and Cultural Exchange Between the US and Cuba

Room 338

Cuba has been called the second most isolated country in the world, partially due to its tightly controlled internet, but that may soon change. This research examines social media and Internet use by Cubans during this critical time of potential change. Through qualitative research with Cuban citizens, we have found that as a result of major constraints to online access, Cubans are highly collaborative in their use of the internet, often conducting research and posting photos for friends with less access. Based on these findings, we are creating a way for Cubans to more easily access information on the internet via a crowdsourced system that will also serve as a cultural exchange between Cubans and the rest of the world.

Research Focus Areas: International Development, Online Communities, Social Computing

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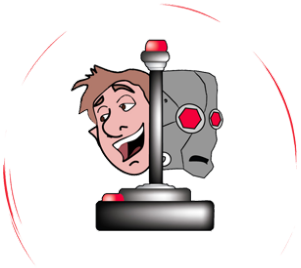

Entertainment Intelligence Lab

The Entertainment Intelligence Lab focuses on computational approaches to creating engaging and entertaining experiences. Some of the problem domains they work on include, computer games, storytelling, interactive digital worlds, adaptive media and procedural content generation. They expressly focus on computationally "hard" problems that require automation, just-in-time generation, and scalability of personalized experiences.

Website: https://research.cc.gatech.edu/eilab/

Faculty: Mark Riedl

Augmented Reality Mario

Room 228

Augmented Reality gaming promises new ways for humans to engage with their physical environment by overlaying gameplay elements via a head-mounted display. We present an artificial intelligence technique to automatically generate novel gameplay content for mixed-reality environments. We demonstrate the technique with a game we call "Augmented Reality Super Mario Bros.", a platform game in which the level content was procedurally generated.

Research Focus Areas: Artificial Intelligence, Gaming

Automatically Generating Game Levels from Gameplay Videos

Room 228

Check out videos of the system: here and here Intelligent tools can ease the burden of game development. One approach to easing this burden is the use of co-creative, artificial agents, capable of helping a human developer by making suggestions or extending an initial design. However, agents capable of design have historically required a large amount of hand-authored design information—domain-specific rules, heuristic functions, or formal logic rules. Due to the time it takes to author this knowledge, such approaches do not remove the development burden, but shift it to the author of the agent. To solve this problem we present a demonstration a level-authoring tool with a co-creative agent informed by knowledge learned from gameplay videos. The technique is demonstrated in the popular game, Super Mario Bros.

Research Focus Areas: Artificial Intelligence, Gaming

Learning Robot Behavior from Stories

Room 228

The Quixote system is an artificial intelligence technique for teaching robots and artificial virtual agents how to do things by telling them stories. Stories present a natural means of communicating complicated, tacit procedural knowledge. Quixote thus reads in natural language stories and learns to emulate the behaviors of the characters in the stories. The long term goal of the project is to make AI programming accessible to non-programmers and non-AI experts. We have also shown that stories can be an effective means of demonstrating ethical behavior to robots and AIs.

Research Focus Areas: Artificial Intelligence, Robotics

Scheherazade Story Generator

Room 228

Story generation is the problem of automatically selecting a sequence of events that meet a set of criteria and can be told as a story. Story generation is knowledge-intensive; traditional story generators rely on a priori defined domain models about fictional worlds, including characters, places, and actions that can be performed. Manually authoring the domain models is costly and thus not scalable. We present a novel class of story generation system--called an Open Story Generator--that can generate stories about any topic. Our system, Scheherazade, generates plausbile sounding, but fictional stories about real world situations. It automatically learns a domain model by crowdsourcing a corpus of narrative examples and generates stories by sampling from the space defined by the domain model. Scheherazade can also be used to create interactive narratives in which a player gets to choose the actions for a particular character in the crowdsourced story world. See a video of the system in action: https://www.youtube.com/v/znqw17aOrCs

Research Focus Areas: Artificial Intelligence, Cognitive Science, Gaming

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Everyday Computing Lab

We introduce a new area of interaction research, everyday computing, by focusing on scaling ubiquitous computing with respect to time. Our motivations for everyday computing stem from wanting to support the informal and unstructured activities typical of much of our everyday lives. Our goal is understanding the transformation of everyday life as computing is ubiquitously integrated into informal, daily activities and routines.

Website: https://research.cc.gatech.edu/ecl/

Director: Beth Mynatt

Designing Adaptive Technology to Provide Personalized Support to Cancer Patients

Room 342

We design, deploy, and evaluate mobile health tools that support and meet patients needs over time from diagnosis of a chronic disease, through treatment and into survivorship. Our research explores the ability for personalized, adaptable, mobile tools to support patients over the course of their individual breast cancer journeys. Our technology needs to anticipate and recognize barriers to care that occur at various points in a cancer journey, adapt with the patient as they navigate these barriers, and successfully provide patients with the tools and resources they need to manage and mitigate such barriers. The goal of our work is to improve patient health outcomes by supporting patients' outside of the clinic by helping them to learn about, engage with, and manage their disease alongside the demands of daily life.

Research Focus Areas: Health Informatics, Human-Computer Interaction, Mobile and Ubiquitous Computing

Eating Disorders and Social Media - Characterizing the Presentation of Eating Disorders Online

Room 342

Within the computing field, little has been done to systematically analyze online eating disorder (ED) communities. This research project focuses on understanding how individuals use social media platforms to promote and share their eating disorders with their networks and with the world. We use social computing techniques to identify and anzlye content generated across several popular social media platforms. Through this characterization of eating disorder activities online, we draw attention to the increasingly important role that technologists play in understanding how the platforms and technologies that we create are used and misappropriated for negative health purposes. CAUTION: This project includes media that could potentially be a trigger to those dealing with an eating disorder or with other self-injury illnesses.

Research Focus Areas: Health Informatics, Online Communities, Social Computing

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Experimental Television Lab

Georgia Tech's ETV Lab explores the future of narrative forms in the new digital medium that is emerging as TV converges with computational formats. The lab prototypes applications on current and hypothetical platforms, using narrative material drawn from actual and planned television shows and by creating its own narratives specifically designed for interactivity. Drawing on students in the Georgia Tech's graduate program in Digital Media, the group has prototyped interactive video applications for delivery on the internet, dvd, and consumer TV platforms.

Website: http://etv.gatech.edu

Faculty: Janet Murray

Harry PottAR

Room 322

An augmented reality mobile application that brings the wizarding world of Harry Potter to the real world for the purpose of answering the following research question: How do the following factors - timers, audio, interacting with virtual objects in the real world, interacting with real objects in the virtual world - increase or decrease a user's motivation to follow an interactive location-based narrative? This project will inform a set of design guidelines for motivating users to follow an interactive location-based narrative.

Research Focus Areas: Augmented Reality

Heads-Up

Room 322

Heads-Up is a Google Glass prototype that functions as a translucent second screen over the television while re-watching a favorite show. Our demo will focus on HBO's highly acclaimed series, Game of Thrones. The intention of the design is to allow the user to continue viewing the TV screen while receiving synchronized commentary through Google Glass rather than be distracted away from the screen by a computer, phone, or tablet.

Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Nutshell

Room 322

Nutshell is a video editing tool that allows users to isolate clips from their favorite TV shows and create "supercuts" that summarize complex plot arcs and compile recurring inside jokes.

Research Focus Areas: Online Communities, Social Computing

Graphics Lab

The Graphics Lab is dedicated to research in all aspects of computer graphics, including animation, modeling, rendering, image and video manipulation and augmented reality.

Website: http://www.cc.gatech.edu/graphics/

Faculty: Greg Turk, Karen Liu, Jarek Rossignac, Irfan Essa, Jim Rehg, Blair MacIntyre

Curve Averaging

Room 230

We present our work on computing an average curve given a set of planar input curves, with select applications. This work, to be soon presented at the Symposium on Geometric and Physical Modeling, provides a mathematical formulation and a fast algorithm for the problem of finding an average curve, given a set of input curves. Applications in the field of animation and statistical analysis are highlighted.

Research Focus Areas: Graphics and Animation

Information Interfaces Group

At the Information Interfaces Lab, computing technologies are developed that help people take advantage of information to enrich their lives. The lab group develops ways to help people understand information via user interface design, information visualization, peripheral awareness techniques and embodied agents. The goal is to help people make better judgments by learning from all the information available to them.

Website: http://www.cc.gatech.edu/gvu/ii/

Faculty: John Stasko

Facebook Review

Room 334

We have created a visualization that presents one week of a person's Facebook messages and notifications. The focus here is to allow someone to quickly catch up with what has been going on in their feed, which messages were "hot", who has been active, etc. The tool leverages a number of different visualization techniques and can benefit from a very large display.

Research Focus Areas: Information Visualization

GLO-STIX

Room 334

Graph-Level Operations (GLOs) are a holistic vocabulary of encapsulated manipulations of graph visualization elements. GLOs allow analysts to explore their network data in new and interesting ways, freeing them from being restricted to predefined graph visualization techniques. GLOs also provide software engineers with an alternative, extensible means of writing extensible graph visualization applications. Finally, GLOs provide an elegant method for generating animated transitions between graph visualization techniques. GLO-STIX is a user-centered application for exploring a network using GLOs.

Research Focus Areas: Information Visualization

Information Visualization on Tablets and Mobile Platforms

Room 334

Visualization has an important role in science and technology. People rely on visualizations to better understand problems they have to solve. Information visualization has recently increased its domain, from being used for representations of business data, to more political and social uses via groups like visualizing.org and infosthetics.com. In parallel with this growth we have seen the widespread acceptance of mobile technology by masses. Mobile phones, today, are being used for everything from email to ticketing and web browsing to watching videos. As society becomes more mobile, it is important to consider the application of information visualization on mobile and other touch based devices. The aim of this project is to understand if and how traditional information visualization techniques like line charts, bar graphs, and treemaps can be useful in a mobile environment and what the best style of interaction with those charts should be.

Research Focus Areas: Human-Computer Interaction, Information Visualization

Jigsaw: Visual Analytics for Text Document Collections

Room 334

Many types of investigators routinely perform analysis that involves large collections of documents. The Jigsaw system helps investigative analysts with reasoning and sense-making in such scenarios. Jigsaw acts like a visual index onto a document collection. It first analyzes the documents, identifies entities, clusters related documents, analyzes sentiment, and summarizes each document. Next, it provides multiple visualizations of the documents, entities within, and the analysis results. We have used Jigsaw to explore a wide variety of domains and document collections including academic papers, grants, product reviews, business press releases, news articles, intelligence and police reports, statutes, and even books such as the Bible.

Research Focus Areas: Information Visualization

Multi-touch Dust and Magnet

Room 334

This demo shows a system called Dust and Magnet (DnM) that is a general purpose data visualization system. DnM represents data items as iron dust. Each attribute of the data then is a magnet. The system is implemented on a large multi-touch display where the analyst can deploy magnets and drag them around the view. Data points will then be attracted more strongly or weakly depending on that data item's value of the attribute represented by each magnet. This system provides a very hands-on, visceral data exploration experience.

Research Focus Areas: Human-Computer Interaction, Information Visualization

RSketch: Streamlined Mars Rover Path Planning

Room 334

Large, multisensor datasets are available covering a large portion of Mars. Analysis and display of these datasets are currently in use for path planning tools that provide a precise, low-level visualization that fosters precision planning for Rover Planners at NASA Jet Propulsion Laboratory. However, these visualizations do not foster path planning at a higher level of abstraction. In addition, planning a path uses a non-intuitive process of generating rover commands, simulating them, visualizing the results, and then tweaking the commands until the path looks correct. RSketch expedites path planning for JPL Rover Planners by allowing them to intuitively generate and assess rover paths. The path generation process in RSketch must be influenced by traversability measures, incorporate and visualize multisensor data used for the traversability analysis, enable rapid path generation and comparison between alternatives, and export generated paths to mission operations tools. The prototyped RSketch system aims to provide a

streamlined path generation and analysis tool for Rover Planners. The tool uses processed data, raster images, and rover state files as the basic dataset. RSketch uses this dataset to provide the Rover Planner with situational awareness of the rover's state and the surrounding environment in a 2-dimensional map space. The Rover Planner can select and modify the display of the overlaid data on the map, as well as view annotations such as the long-term path. In order to plan out a path, RSketch provides Rover Planners a simple sketching capability to drop and modify waypoints that define a driving path. These waypoints can later be imported into the rest of the Rover Planner's system as localized waypoints – other parts of the Rover Planner system then generate low-level rover commands from the exported path in RSketch. This export feature allows Rover Planners the ability to integrate with the rest of their system. When sketching out a path, Rover Planners are able to visualize data along the entirety of the rover path. The data is visualized in two different forms: directly on the path and along a slideout panel. Both of these visual forms afford varying analysis modalities. The data along the path, coupled with path sketching affords the ability to make informed decisions on how a modification affects the rover's planned traversal. The slide-out graphs allow Rover Planners to conduct summative analysis at different chronological points of the path planning process by visualizing all data parameters at once.

Research Focus Areas: Human-Computer Interaction, Information Visualization

SpaceSketch - Multitouch Exploration of Urban Public Safety Data

Room 334

Visualization tools for spatio-temporal data utilize map-based representations to help a user understand trends and outliers within a given region over time. Multitouch visualization tools allow us to recreate many of the capabilities of sketching directly on maps while still taking advantage of computational models of public safety. We will be demonstrating SpaceSketch, a multitouch approach to spatio-temporal visualization. Visitors will be allowed to explore crime and transit data in the city of Atlanta using our high-resolution Perceptive Pixel Interface.

Research Focus Areas: Human-Computer Interaction, Information Visualization

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INTERACTIVE
PRODUCT
DESIGN
LAB

Interactive Products Design Lab

The Interactive Product Design Lab (IPDL) is a purpose-built lab designed to support both teaching and research by allowing students to investigate, explore, and experiment with an extensive array of new technologies. Central to this concept, the School of Industrial Design has placed a high priority on the need to foster and develop interdisciplinary, team-based collaboration with other educational and research units from across the campus, including the School of Interactive Computing, the School of Mechanical Engineering, the Graphics Visualization and Usability Lab (GVU), and the Center for Assistive Technology and Environmental Access (CATEA). The Interactive Product Design Lab was built in the summer of 2011 and opened in time for the 2011 fall semester. http://www.id.gatech.edu/research/labs

Website: http://ipdl.gatech.edu

Director: Jim Budd

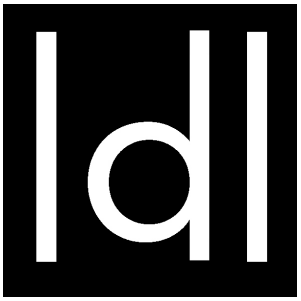
Faculty: James Hallam, Matt Swarts, Clint Zeagler

Seed: Sensors and electronics educational database

Room 226

http://ipdl.gatech.edu/seed/ Seed is a sensor and electronics educational database developed for use at the Interactive Product Design Lab. The lab teaches designers electronic prototyping skills-- Seed assists in this mission my providing information on electronic components through an online database, physical RFID card library, and RFID sensing unit. Parts are categorized into 6 groups: logic, power, input, output, tools, and projects. When a student needs information about a component, they can select a card and place it on the RFID reader. This brings up an information sheet on that component, complete with step-by-step start guides, wiring diagrams, sample code, and even past projects.

Local Data Design Lab



At the Local Data Design Lab, we use design as a language for critical reflection on data and their place in network culture. Today, data frame and name everything that is accessible through digital networks. But despite their proliferation, data are surprisingly limited in scope. Even the largest data sets, promoted as "big data," are merely aggregated indexes to local knowledge. Making space for regional categories, historical terminology, place-based values and workplace errors can help us interpret data as an aggregate, rather than a monolithic source of information. We make use of theory and methods from design, science and technology studies, and media studies to illuminate the ways in which data are local: bounded by places, moments, communities and rituals. Across domains—architecture, urbanism, environmentalism, education and journalism—we ask, what are the social and spatial implications of data provenance? Moreover, we develop critical and speculative design tools to examine the relationship between data and place. Website: http://www.yloukissas.com

Website: http://www.yloukissas.com

Director: Yanni Loukissas

Data Artifacts

Room 209

The term "artifact" has at least two meanings. From a technical perspective, an artifact is an unintentional pattern in data, arising from processes of collection and management. From a cultural perspective, an artifact is a designed object, with a social and material history. At metaLAB, which is grounded in both technical and cultural methods, we are examining digital artifacts with both meanings in mind. In Data Artifacts, we are developing visual methods of revealing the often-unacknowledged patterns in digital data that speak to the social and material history of its accumulation. Never raw, all data carries traces of human labor, intentions and values. Data Artifacts is an inquiry into the deep history of digital collections. Digital cultures, which devote vast resources to the harvesting and handling of data sets, can be understood in part through the particular ways in which they pattern data. Artists and designers with knowledge of computing are poised to uncover such data artifacts through visualization. However, most formal approaches to visualization call for data to be filtered and standardized at the outset. In contrast, we focus on the heterogeneity inherent in human-made data. The messiness of data sets can tell us much about the history of their production. The ambition of Data Artifacts is to develop new tools to contemplate such large-scale collection processes and enable richer discussions about their technical and cultural significance.

Research Focus Areas: Human-Computer Interaction, Information Visualization

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MS-HCI Project Lab

Students in Georgia Tech's interdisciplinary MS in Human-Computer Interaction program do multiple group class projects, and a capstone individual project. Some projects are presented as part of other labs listed here; others are showcased in the MS-HCI Project Lab. The two-year program spans four schools: Industrial Design; Interactive Computing; Literature, Media and Communications (Digital Media Program); and Psychology. Approximately 50 new students enroll each fall semester.

Website: http://mshci.gatech.edu/research/labs

Faculty: Richard Henneman, Carrie Bruce

Addressing Well-being and Social Support with an Online Platform

Room 346

The goal of the research is to identify the ways in which social media could play a role in assisting Georgia Tech students find mental health support. Mental health disorders are extremely prevalent on college campuses, and anxiety and depression in particular have been shown to have a negative effect on academic success. Despite the fact that mental health professionals and program are available to students with mental health conditions, many are not seeking help from their campus resources. Social support is a key component in preventing mental health issues from becoming serious problems, and it has been shown to be a top factor in preventing suicide attempts. By examining the mental health status of current Georgia Tech students as well as their social media usage and behavior, the proposed project aims to discover how a social platform could be used to provide social support to Tech students facing mental health issues.

Research Focus Areas: Human-Computer Interaction, Social Computing

AlmaBase - Understanding you Alumni Network

Room 348

Networking and peer inspiration from alumni of your program/school is important when making decisions about the next steps in your career. However, schools lose touch with alumni once they graduate and find it difficult to keep a track of where they are. Networking platforms such as Linkedin are helpful but do not provide a big picture of your alumni network. AlmaBase is a Linkedin extension, that shows a visualization of career trajectories of alumni from your program, for you to find the "right" alumni to network with and get inspired.

Research Focus Areas: Human-Computer Interaction, Information Visualization

Evaluating the Effectiveness of a new Lecture Aid

Room 346

This research project is a MSCHI 2nd year Masters project that attempts to design a wearable device that will reduce distraction in classrooms by making it easier for professors to deal with technology issues that may occur (e.x. The wifi cutting out) in a way that will help them maintain focus on the subject matter of the class.

Research Focus Areas: Human-Computer Interaction, Wearable Computing

Evidence-Based vs. Technology-Based Design

Room 346

Research Focus Areas: Human-Computer Interaction, Robotics

Grocery Pool - A ride sharing system to help students in food deserts get better access to food

Room 346

Despite growing awareness of the term food desert millions of people still have poor access to healthy food. The focus of the research is to help students living in food deserts get better access to grocery stores. Grocery Pool is a mobile application that students can use to collaborate and plan trips to grocery stores.

Research Focus Areas: Human-Computer Interaction

MyDrinkPal

Room 346

A Beginner's Guide Empowering Cocktail Making

Packaging a maker based prototyping curriculum for Instructors

Room 346

Participatory Publics Lab

The Participatory Publics Lab is a group of researchers concerned with community engagement and design. We are part of the Digital Media program in the School of Literature, Media, and Communication at Georgia Tech. We explore the design of mobile and social media in the context of community development and activism. We do this through different modes of participation: in the design of these technologies; in the development of discourses about these technologies; in the use, adoption, and appropriation of these technologies. We investigate forms of civic and community engagement through participatory design, design research, ethnographic research, and critical scholarship. Our research is supported by the National Science Foundation (NSF) and as part of the Intel Science and Technology Center in Social Computing (ISTC-Social).

Website: http://dm.lmc.gatech.edu/research/labs/participatory-publics-lab/

Faculty: Christopher Le Dantec

Community Historians

Room 323

This project is developed through an ongoing collaboraton with the Historic Westside Cultural Arts Council. Through a series of design workshops and public events we are co-designing mobile and social technologies to help cultivate a shared community identity to support local civic engagement. By working directly with community members, we are able to build technology platforms suited to their specific needs and which amplify their values and concerns as the community goes through significant changes.

Research Focus Areas: Civic Computing, Collaborative Work, New Media

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Problem Solving and Educational Technology (PSET)

Located in the School of Psychology at the Georgia Institute of Technology, the Problem Solving and Educational Technology (PSET) Lab brings together a diverse group of faculty and students interested in an equally diverse range of topics. Students in the PSET Lab, under the direction of Dr. Richard Catrambone, are currently examining a range of problem solving and human-computer interaction issues.

Website: http://www.psychology.gatech.edu/probsolvelab/

Faculty: Richard Catrambone

Worked Examples and Subgoal Labeling: Impacts on Learning

Room 324

Procedural instructions and worked examples have been shown to be effective learning aids in science, technology, engineering, and mathematic (STEM) learning materials. Procedural instructions are texts that describe a general method to reach a goal, while worked examples demonstrate how to apply this method to a specific instance. Research supporting the use of advanced organizers predicts that if learners see the worked example first, they can develop a basis for the problem solving procedure. Learners can then use the procedural text to abstract their understanding, increasing both the initial and transfer performance. Subgoals have been shown to increase novice performance when included in procedural text and worked examples. A subgoal groups a set of solution steps by their purpose, which allows novice learners to create a framework for problem solving. The proposed research investigates the potential interactions of instructional order and subgoal labeling on performance.

Research Network Operations Center (RNOC)

The Georgia Tech Research Network Operations Center (GT-RNOC) exists to accelerate innovation in networking, computing, mobility and convergence by enabling communities of collaboration. GT-RNOC provides, supports and maintains a unique end-to-end infrastructure within a realistic operational setting, accessible to world class students, researchers and innovators from various disciplines across the many Georgia Tech research centers. GT-RNOC leverages the unique position of Georgia Tech as a pre-eminent network and network service hub in the state, the region and increasingly in the world. It provides researchers with access to this unique network infrastructure. It provides network administrators and service providers with an invaluable tool for developing and testing new management solutions in a cutting edge environment. Industry members of GT-RNOC include leaders in wireless, telecom, and cable, plus equipment, application, and content providers. http://rnoc.gatech.edu

Website: http://rnoc.gatech.edu

Director: Matt Sanders, Russ Clark

Faculty: Siva Jayaraman, Brian Davidson

GT Class

Room 333

GT Class is designed for students of Georgia Institute of Technology to be able to quickly and easily access their T-Square class information from their mobile device. Using GT Class, students can download their class assignments and announcements, as well as any attachments for their assignments. Features: * Easily see what assignments are due next. * Download class information from T-Square for offline access on your mobile device. * Add assignment due dates to your device's calendar. * Download attachments for east access. * Search through assignments and announcements.

Research Focus Areas: Collaborative Work, Educational Technologies

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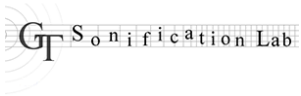
Sonification Lab



The Georgia Tech Sonification Lab is an interdisciplinary research group based in the School of Psychology and theSchool of Interactive Computing at Georgia Tech. Under the direction of Prof. Bruce Walker, the Sonification Lab focuses on the development and evaluation of auditory and multimodal interfaces, and the cognitive, psychophysical and practical aspects of auditory displays, paying particular attention to sonification. Special consideration is paid to Human Factors in the display of information in "complex task environments," such as the human-computer interfaces in cockpits, nuclear powerplants, in-vehicle infotainment displays, and in the space program. [Random Image of Auditory Interface] Since we specialize in multimodal and auditory interfaces, we often work with people who cannot look at, or cannot see, traditional visual displays. This means we work on a lot of assistive technologies, especially for people with vision impairments. We study ways to enhance wayfinding and mobility, math and science education, entertainment, art, music, and participation in informal learning environments like zoos and aquariums. The Lab includes students and researchers from all backgrounds, including psychology, computing, HCI, music, engineering, and architecture. Our research projects are collaborative efforts, often including empirical (lab) studies, software and hardware development, field studies, usabilty investigations, and focus group studies.

Website: http://sonify.psych.gatech.edu

Faculty: Bruce N. Walker

Advanced Auditory Menus

Room 222

Many electronic devices, from desktop computers to mobile phones to DVD players, can be thought of as a menu of functions. These functions can be accessible to a blind user if the menus are spoken aloud. However, this is extremely inefficient, so we have been enhancing auditory menus with sophisticated text-to-speech, spearcons, spindex, and other audio extensions. These can also be applied in many different languages and research is ongoing to look at more language applications, including tonal types.

Research Focus Areas: Human-Computer Interaction, Information Visualization, Mobile and Ubiquitous Computing

Auditory STEM: Math and Science Education for Students with Vision Impairment

Room 222

The graphs and figures that are so prevalent in math and science education make those topics largely inaccessible to blind students. We are working on auditory graphs that can represent equations and data to those who cannot see a visual graph. A number of new areas we're starting research on is looking at teaching astronomy concepts through (like the Solar System) and the teaching and understanding of weather information through a combination of sonification and auditory description. Additionally we are working on making statistical output accessible for blind users to assist with higher level mathematics applications. We have a whole ecosystem of software and hardware solutions, both desktop and mobile, to help in this space. This project is in collaboration with the Georgia Academy for the Blind and the Center for the Visually Impaired of Atlanta.

Research Focus Areas: Educational Technologies, Human-Computer Interaction, Information Visualization

Automated Driving Displays

Room 222

Automated safety systems, a first step toward autonomous vehicles, are already available in many commercial vehicles. These are systems such as adaptive cruise control, which has the capability to slow down due to traffic, and automatic lane keeping, which maintains position within a lane without driver intervention. In order to ensure that these systems are properly used by drivers it is essential that they understand and appropriately trust the technology. We are currently investigating personal characteristics and driving environments that influence acceptance and use of automated safety systems and developing multimodal displays to increase situation awareness.

Research Focus Areas: Human-Computer Interaction, Information Visualization, Mobile and Ubiquitous Computing

Bone Conduction Audio

Room 222

Most sound comes through our ears. However, it is also possible to pass vibrations through the bones of the head, and bypass much of the normal hearing pathway. This is called bone conduction audio, and can be used in situations where the ears need to be plugged, or where you need to leave the ears open to hear ambient sounds. We are studying the psychoacoustics as well as the applied aspects of bone conduction audio.

Research Focus Areas: Mobile and Ubiquitous Computing, Perception, Wearable Computing

Enhanced In-Vehicle Technologies: Novel Interfaces and Advanced Auditory Cues to Decrease Driver Distraction

Room 222

In-vehicle technologies such as modern radios, GPS devices, eco-driving displays, and smartphones require users to interact with multiple types of visual-based menus and lists while driving. Modern technologies require users to navigate these screens using physical buttons and touch screens, although recent advances have included the use of steering wheel buttons, turn wheels, Head Up Displays (HUDs) and others. Through design and prototyping of novel menu system interfaces through innovative visual display methods, interaction techniques, and the application of advanced auditory cues to old designs and these novel interfaces, we can attempt to decrease driver distraction, therefore allowing for better driving performance, while also improving search times and decreasing cognitive load on the driver.

Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing, Perception

In-Vehicle Assistive Technologies

Room 222

There are many populations who need assistive technologies while driving such as the millions of Americans suffer traumatic brain injuries each year, and the majority of them return to driving at some point following their recovery. However, the residual effects of TBIs can affect perception, cognition, emotion, and motor abilities. In collaboration with the Shepherd Center we are developing software that can help improve the attention and abilities of drivers post-TBI. The system could help all kinds of drivers who may have attention lapses, cognitive processing issues, or other issues that impact driving. Similar types of applications could be built for many other types of issues as well (e.g., novice drivers, aging adults, & quote stressed out drivers).

Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing

Mwangaza Project

Room 222

The Mwangaza Project is a collaboration among the Sonification Lab, inAble, and Kenyatta University to develop and deploy accessible STEM educational resources to schools for the blind throughout Kenya. Projects that we are working on include accessible weather and climate education, math software for accessing graphing and number lines, and renewable energy as a component of STEM education and support for educational technologies.

Research Focus Areas: Educational Technologies

Sonified Fantasy Sports

Room 222

The Sonified Fantasy Sports project has been exploring various ways to add sounds to online (web or mobile apps) fantasy sports in an attempt to make a more immersive user experience while also adding to the accessibility of fantasy sports for visually impaired or print disabled users. After identifying information needs and various strategies employed by users (who ranged from beginners to power users) we were able to identify a hierarchy in which to present information about 'my team' and 'players' using sound. Ongoing investigation is exploring additional ways to employ optimal soundscapes that will result in the most seamlessly integrated audio-visual experience while offering as much accessibility as possible

Research Focus Areas: Gaming, Human-Computer Interaction, Online Communities

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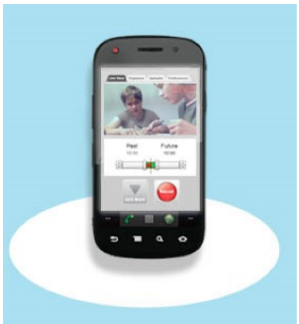


Ubiquitous Computing Group

We are interested in ubiquitous computing and the research issues involved in building and evaluating ubicomp applications and services that impact our lives. Much of our work is situated in settings of everyday activity, such as the classroom, the office and the home. Our research focuses on several topics including, automated capture and access to live experiences, context-aware computing, applications and services in the home, natural interaction, software architecture, technology policy, security and privacy issues, and technology for individuals with special needs.

Website: http://ubicomp.cc.gatech.edu

Making Smarter Transportation Choices

Room 243

Owning a vehicle and driving alone are the dominant forms of personal transportation in the United States today. However, there are an increasing number of transportation choices available, many of which are supported by mobile computing. People can hire a car service (Uber), rent a car as needed (Zipcar), or share a ride (SideCar). Public

transportation is easier to use through apps such as NextBus or Google Maps. For each of these alternatives, you pay by the trip.

Cost is one factor people may consider in their transportation choices. Transportation is the second highest expense for the average American household, ahead of food and healthcare. However, it is not easy to compare the cost of a driving trip to one of the above alternatives. That's because the cost of owning and operating a vehicle is spread over multiple expenses, beyond just fuel. For example, you may fill up the gas tank once a week, make a monthly car payment, and pay insurance twice a year.

We have developed a mobile app that estimates the total cost of each driving trip. People can see how much it costs for their actual drives to work, shopping, or restaurants. We are investigating how information technology can help people make better informed choices regarding their transportation options.

Research Focus Areas: Civic Computing, Human-Computer Interaction, Mobile and Ubiquitous Computing

Novel Smartwatch Interactions

Room 243

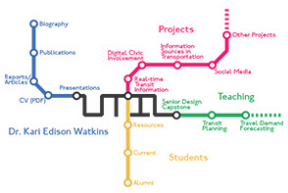
Research Focus Areas: Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Using Visualization to Explore Social and Communicative Behaviors

Room 334

Psychology researchers use basic statistical visualizations such as bar charts, line charts, and box plots to explore their datasets. These charts are useful for visualizing one- or two-dimensional data but too simple to capture more complex data such as social and communicative behaviors. To more deeply explore temporal behavioral patterns, especially among a large group of subjects, researchers could use better visualization tools. We developed visualization tools to help developmental psychology researchers explore social and communicative behaviors. Based on our conversations with researchers, we learned that they need tools to find groups of children that exhibit commonalities in their behaviors. Our sample dataset consists of dyadic social interactions between a child and an examiner. Many behaviors from four modes of communication: gaze, speech, gesture and vocal affect from the children were coded by human annotators and visualized. We designed two visualization tools. One explicitly group children by their behaviors and the other implicitly suggests groups of children with commonalities in their behaviors.

Research Focus Areas: Information Visualization



Urban Transportation Information Lab

Under the direction of Dr. Kari Edison Watkins in Civil & Environmental Engineering, UTIL conducts research to improve sustainable transportation through better information. The members of the lab are interested in real-time information for transit, open data to enable the creation of tools to overcome barriers to transit use and digital civic engagement to solve transportation problems.

Website: http://util.gatech.edu

Faculty: Kari Watkins

OneBusAway Web App

Room 323

Research Focus Areas: Human-Computer Interaction, Information Visualization

Real-Time Dispatching on Atlanta Streetcar

Room 323

Background The streetcars run in the heart of downtown. They are subject to unstable operating conditions caused by traffic congestion, basketball games, and obstructed right-of-way. These perturbations make the Atlanta Streetcar prone to streetcar-bunching, which causes undue passenger wait and crowding. We have developped a real-time dispatching method that considers every streetcar on the route to dispatch them with even headways, while maintaining a high frequency of service. The dispatching method will replace the current schedule on the Atlanta Streetcar as a case study for several weeks. We will evaluate the impact of real-time dispatching on operations, driver behavior, and passenger waiting time.

Research Focus Areas: Civic Computing, Information Visualization, Perception

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Visual Analytics Lab

VA.lab

Our goal is to help people make sense of data. We research and develop interactive visualizations that couple machine learning with visual interfaces of data for exploration and sensemaking.

Website: http://va.gatech.edu/

Director: Alex Endert

IAL - Interactive Analytics Library

Room 334

User interaction is central to the data analysis process fostered by interactive visual analytic interfaces. However, in many current systems, user interaction is represented as an ephemeral action taken by a user that moves the system from one state to another. User interactions are quantitative bits of the analytic dialog between people, the system, and the data - and when modeled - can be tactfully integrated into visual analytic systems. We propose a library to help researchers and developers capture, interpret, and model interactions in web-based visual analytic tools. We introduce Interactive Analytics Library, a JavaScript library which enables developers create data models of a user's interest based on their interactions with the system. By encapsulating interaction as an attribute of the data, managing weight vectors, and providing analytical models pre-tuned to generate results tailored to user interest, Interactive Analytics Library offloads responsibilities from developers of visual analytics so that they can focus more on the data representation and other front end system components.

Research Focus Areas: Human-Computer Interaction, Information Visualization

Podium: Helping People Rank Their Data Using Mixed-Initiative Visual Analytics

Room 334

People often rank and order data items as part of making decisions. Multi-attribute ranking systems are a common tool used to make such data-driven decisions. Machine learning approaches can produce rankings based on the weights that users apply to attributes. Users set the weights of attributes according to how important they believe an attribute is to their decision. However, these systems assume that users have an intuitive understanding of what attribute weights mean, and further, they require that users are able to quantify their conceptual understanding of how important particular attributes are. To address these challenges, we present a technique to infer attribute weights based on a user's preferences. To demonstrate the feasibility of the proposed model, we developed a prototype system, Podium, that

allows users to drag rows in the table indicating where they think data items belong based on their knowledge or preferences. Our system then infers a weighting model that satisfies the user's preferences as closely as possible. This makes powerful machine learning techniques more usable to those who may not have expertise in these areas.

Research Focus Areas: Human-Computer Interaction, Information Visualization

PUNGA: Provenance-supported Undirected Node Graph Analytics

Room 334

PUNGA (Provenance-supported Undirected Node Graph Analytics) is a tool for intelligence analysts. PUNGA assists analysts in making sense of a large textual-based dataset by supporting data processing (Named Entity Recognition), data cleaning, data analysis, and analytic provencance. PUNGA provides users the ability to combine, format, clean the data as per their convenience before and during analysis with the Entity View. PUNGA also facilitates user interaction with the data sets in a number of linked views. These visualizations include the Document Viewer, the Node Graph View, and the Calendar View. Finally, PUNGA provides a Provenance View that displays quantitative values that summarize the analysis session and more importantly help in analytic provenance.

Research Focus Areas: Human-Computer Interaction, Information Visualization

SCADE - Supportive Computational Analysis, Discovery and Exploration

Room 334

SCADE is a visual text analytic tool. The goal of the project is to help analysts make sense of a larger number of text document while tracking the analyst's provenance.

Research Focus Areas: Collaborative Work, Information Visualization

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