

Navigation

- News
- Sports
- ▶ Opinion
- Arts & Entertainment
- Classified Ads
- On The Web
 - ▶ Podcasts
 - ▶ Sun Blogs
 - RSS Feed
- 2007 Summer Sublet Guide
- April 1 Front Page
- Cornell Days 2007
- Remembering Vonnegut
- Interact
 - E-mail Edition
 - Student Survey
 - Forums
 - Polls
 - Daybook
 - Submit to Daybook
- ▶ Advertising
- ▶ Links
- recent posts
- ▶ create content
- ▶ about The Sun
- search

User login

Username: *

Password: *

- [Create new account](#)
- [Request new password](#)

Paid Advertisements

Home

C.U. Student's Software Uses Sound to Aid Blind

By Archives
Feb 17 2005

A computer program that translates pixels of digital computer images into musical notes has been a critical tool in the research efforts of Victor Kai-Chiu Wong grad, electrical and computer engineering. With a little over a semester of testing, the program has allowed Wong, who has been blind since the age of seven, to quickly interpret photographs and other graphical data of upper atmospheric phenomena, the focus of much of his research.

"[The software] converts the actual pixel information in an image into sound," said engineering student Ankur Moitra '07, the author of the program. With the use of a Wacom tablet and stylus, a device similar to a mouse that associates positions on a computer screen to points on a tablet, Moitra's program translates the color of a point on the screen into a musical note.

"We used the sound, a pitch of the piano - that way we could actually explore a three-dimensional figure," Wong said.

For instance, during Wong's inspection of upper atmospheric emissions, the color dimension allowed Wong to gather crucial information about the wavelength and intensity of the emitted radiation - information that for visible light is relayed through color and brightness and for invisible light is often converted to color for interpretation.

"These [emission] lines ... come from the transition of the state of molecules and atoms," Wong said. The wavelengths provided information about the chemical makeup of the upper atmosphere, while the perturbations in intensity implied changes in "certain parameters such as electron density," Wong added. Collectively, the data provided Wong with knowledge of the current state of the high-altitude weather surrounding the earth, which affects communication, the Global Positioning System and even radio broadcasting.

The work on the software began this past summer, when other techniques of translating visual data for Wong became too difficult and time-consuming.

"We started with the basic research question of how to represent a detailed color-scaled image to someone who is blind," said research associate James Ferwerda in a press release. "The most natural approach was to try sound, since color and pitch can be directly related and sensitivity to changes in pitch is quite good," Ferwerda added.

Nonetheless, when writing the program, Moitra faced other conceptual and technical challenges.

"It [was] very difficult to determine the edge of the image, and that is the first thing you want to determine," Moitra said. The problem was solved through the use of an "advanced edge-detection algorithm" that prints out a three-dimensional copy of the image's edge. That copy could then be overlaid on the tablet, so that Wong could feel the outlines of an image.

A second challenge arose from the need to simplify the copious amounts of data that are encoded in extremely high-resolution images.

"Oftentimes it is more beneficial to get a less fine resolution," Moitra said. Accordingly, the translating software reduces the number of points, but retains most of image's information through a process called a Gaussian blur.

"What you actually do is average the points around so that it gives you more of a smooth feel," Moitra explained.

Wong's success with the program thus far has inspired many ideas for improving the software. For instance, "we are trying to get a pattern recognition done - have the software automatically scan for major features of an image," Wong explained. Currently, despite the benefits of the Gaussian Blur, Wong has to explore an image point by point to identify its major features.

"If there are lots of data and the data are complex, this process [can] be very time consuming," Wong said. However, with pattern recognition, the translating program would be able to identify large blobs of a single color and provide the user with a faster global interpretation of an image.

*Archived article by David Andrade
Sun Staff Writer*

By Archives at Feb 17 2005 - 8:00pm

Post new comment

Your name: *

E-mail: *

Search

Current weather

Ithaca, New York



- Clear sky
- Temperature: 77 °F
- Wind: Northwest, 8.1 mph
- Pressure: 30.07 inHg
- Rel. Humidity: 57%
- Visibility: 10 miles

Reported on:

June 1, 2007 - 10:56am

New on CornellSun.com

- [Max Wasserman](#)
Tennis: Making Hockey Seem Popular Since I Really Don't Care
- [Morghan Transue](#)
A Tip for Presidential Candidates: Take a Break at a Highway Rest-stop
- [Morghan Transue](#)
Why Rising Gas Prices are Good in Some Ways
- [Morghan Transue](#)
The Suburban Lawn (aka grass)

[more](#)

Active forum topics

- [Cool Websites](#)
- [T.I. Yells at College Student Crowds](#)
- [Slope Day Performers](#)
- [Cornell Grads are Public Embarrassments](#)
- [Video: Flashmob on Ho Plaza](#)

[more](#)

Poll

Where should Cornell's next international campus be?:

- China
- India
- Afghanistan
- France
- Czech Republic
- Mexico
- Canada

Upload and Download Course Material For FREE

- *Outlines
- *Study Guides
- *Formula Sheets
- *Lecture Notes
- *Essays

TheCollegeFreeway



COVER AFRICA is a non-profit student organization dedicated to raising awareness of African culture & the preventable suffering caused by malaria, eradicating malaria, as well as the direct distribution of aid in Africa

FOR MORE INFORMATION PLEASE CONTACT: eas73@cornell.edu

Malaria is a problem that we have the tools to solve. Now is the time to implement them.

The content of this field is kept private and will not be shown publicly.

Homepage:

Subject:

- Venezuela
- Antarctica
- Other (submit answer as comment)

Vote

Comment: *

- Allowed HTML tags: <a> <code> <dl> <dt> <dd> <i> <u> <h2> <hr>
- Lines and paragraphs break automatically.
- Images can be added to this post.

More information about formatting options



Captcha Validation: *

Please type in the letters/numbers that are shown in the image above.

Preview comment Post comment

READ THIS Before Posting! CornellSun.com Comment Guidelines:

- Try to **keep posts on topic**. For example If the article is about a football game, do not post about the baseball game, or the lecture in Bailey Hall the other day.
- Use a **clear subject** that describes what your message is about.
- **Be polite**. Don't make personal attacks against the author or any other commenter.
- If you choose to supply a link, it must point to a **"safe" site that is relevant to the topic at hand**.
- Please note that off-topic, inflammatory, inappropriate, illegal, or offensive comments **will simply be deleted rather than censored**.
- Repeat offenders of this policy may have commenting privileges revoked indefinitely.

Please note: Anonymous comments are subject to moderator approval before appearing on the site. Comments posted by registered users will appear instantly. [Click here](#) to register an account.

Paid Advertisement

Advertise with Us **Reach Students the Easy Way**

The New Cornell Daily Sun Online

4 Year College? No No NO
Earn a Bachelors Degree Online in 1 year instead. Financial Aid too!

Cornell Dubilier Products
Search for Components at Newark.com In Stock Items Ship Same Day

Posts and Comments are the exclusive property of their owners.

All other content © 2007 The Cornell Daily Sun

All Rights Reserved.

[Contact The Sun](#)

Paid Advertisements

Newspaper Advertisements

Great Newspaper Advertising Info From Leaders in Newspaper Trade
www.NewspaperMedia.cc

Cornell University Hotels

Rates and reviews for hotels near Cornell University in Ithaca.
www.mytravelguide.com

Cornell Student House

Rooms for rent in a student house close to Cornell campus.
www.Rent-in-Ithaca.com

Ithaca Real Estate

The Russell Team has over 30 years of local experience.
www.bradrussellhomes.cc

Gugino Real Estate Office

Attorney Real Estate Closings Buyer Broker Service, Listings 5.8%

www.mark-is-an-attorney.com

Cornell University

Get Info On Campus Life, Professors & Admissions. Real Student Surveys!

www.Vault.com/College

Cornell - Can you get in?

Get your percentage chance of admission. Accuracy guaranteed.

www.go4college.com

Human Resource Management

HR Studies Certificate from Cornell University - online via eCornell

eCornell.com/HRstudies/