National Federation of the Blind Youth Slam
Instant Messaging Chatbots and Location-Aware iPhone Apps

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Blindness Statistics

- Population at Large
  - > 10 million visually-impaired people in U.S.
  - > 1.3 million blind in U.S.
  - 45 million visually-impaired people worldwide

- Students (ages 16 - 25)
  - 11% of school-age children disabled
  - > 4 million students
  - > 20,500 blind students

NFB Youth Slam

- Exploring
  - Especially STEM fields

4 days at Johns Hopkins University

60 blind mentors

200 blind high school students

NFB Youth Slam
Goals for Project

- Illustrate an exciting application(s) of CS
- Ample opportunities for personalization
- Integrate problem solving
- Realistic but quick to start
- Project should be accessible
  - Screen reader
  - Low vision software
Related Work

- Inspiring Students
  - LOGO, Lego Mindstorms,
  - CMU’s Alice, CS Unplugged, ...
  - Game of Life (UW DOIT)
- Many visual projects
  - What about blind students?
- Chatbots
  - Eliza, AOL’s SmarterChild, etc.
  - Cool Terminal Programs
Outline

- Introduction
- Chatbots Project
- Accessible Tools and Curriculum
- Results
An IM Client that Talks Back

- Otherwise known as a chatbot

Students will build a fun chatbot that can talk to them (or their friends) through instant messenger. Chatbots are software robots capable of carrying on simple conversations. Students will be able to create a personal chatbot endowed with unique personas, such as those resembling a psychologist, Yoda from Star Wars, or anyone else that they can imagine. The chatbots will draw information from the web and be able to answer useful questions like "What's the weather in Baltimore?", "Who won the Orioles game last night?", or "Where's the nearest Chinese restaurant?" Students will return home with basic knowledge of artificial intelligence, natural language processing and web programming, along with a personalized chatbot that they can continue to use on their home computers.

No prior computer programming experience required.
Chatbot Demo

- Created by a student
- Read by a screen reader
Chatbot Demo

Responses triggered by simple regular expressions.

Chatbots work with remote web services – today’s weather, news and dictionary.
Programming from the Start¹

- Build confidence w/ realistic environment
  - Not facsimile of programming
  - Real programming

- Teaching the power of programming
- Taste of what programming is like
- Building excitement, not capacity

Instructors and Mentors

- Many Instructors
  - 1 instructor per 4 students
  - Provided personal attention
  - Supplemented by tutorial

- Blind mentors
  - Some knew how to use screen readers
  - Incredibly helpful
Example Code

class HowAreYouBot : BasicBot {
    public override string HandleMessage (string message, string user, BotMemory bm) {
        if(bm ["asked"] == "yes") {
            bm ["asked"] = "no";
            return "That’s great!";
        } else {
            bm ["asked"] = "yes";
            return "How are you today";
        }
    }
}

User: Hello
Bot: How are you today?
User: Great.
Bot: That’s great!
class IfElseBot : BasicBot {
    public override string HandleMessage(string message, string user, FlatFile ff) {
        if (message == "cake") {
            return "Yum!";
        } else {
            return "Yuk. No thanks.";
        }
    }
}
Outline

- Introduction
- Chatbots Project
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- Results
Accessible Tutorial

- Unfortunately, not everything was accessible...
  - CAPTCHAS, even audio  

Example 1  
Example 2
Choosing Software

- Consulted Blind Programmers
- JAWS Screen Reader
- ZoomText for Students with Low Vision
- Chose accessible, free approach
  - C# on most computers
  - More readable errors
  - Curriculum on Web Page (easily converted)
  - TextPad
  - Windows Live Messenger (Formerly MSN)
Why Windows Live?

- Balance of Accessibility and Functionality
  - Most accessible IM client
  - Ability to be signed on an off often

- Chatbots compatible with many IM clients
  - Windows Live, AOL, Yahoo, Jabber (GTalk)
  - Bots can talk to friends
Lessons Learned

- Diverse set of abilities
  - Technical sophistication
    - Familiarity with screen reader
  - Preferred Accommodation
    - Screen reader (JAWS and Window-Eyes)
    - Screen Magnifier (ZoomText)
    - Sitting close to the screen

- Anyone can help
  - No prior experience required (but helpful)
  - Bring an audio splitter 😊
Results

“After the first day, we realized that programming is hard, but after we got into it, it was really fun!”

- 2 students continued after the workshop
  - Followed up over several weeks
  - Easy to set up on their own computer
2011 Update

- Reworked the Curriculum for iPhone

- Location-Aware iPhone Applications
  - where am I?
  - directions to a location
  - GPS tag
```java
int x = getEasting();
int y = getNorthing();
int x = getx1();
y = gety2();

x = goal.x;
y = goal.y;
x_0 = coordinates[0];
y_0 = coordinates[1];

al[1] = longitude;

`'Bearing: ' +
```
Code and curriculum at:
webinsight.cs.washington.edu/chatbots

http://roc.cs.rochester.edu/youthslam

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Short History of Chatbots

- Eliza – a psychologist
  - User: I am happy.
  - Chatbot: Do you enjoy being happy?
  - User: Yes, very much
  - Chatbot: I understand.
  - User: That's great
  - Chatbot: Tell me more...
  - User: It's really, really great
  - Chatbot: Come, come, elucidate your thoughts.

- SmarterChild (AIM)
  - Chatbot on AOL Instant Messenger