SAMHT — Suicidal Avatars for Mental Health Training

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Abstract
Psychosocial assessments and treatments are effective for a range of psychological problems. One particular area of concern is youth suicide. This paper reports on the SAMHT intelligent tutoring system, which provides youth suicide risk assessment training. SAMHT’s interactive avatar interface is based on an intelligent backend, and provides a believable interaction that is effective for training mental health professionals.

Introduction
Many empirical studies have documented the effectiveness of specific psychosocial assessments and treatments for a range of psychological problems. However, these Evidence-Based Practices (EBPs) are rarely used in community settings, where they can help the most clients. One particular area of concern is suicide risk assessment training. Although empirically informed risk assessment protocols exist, only 50\% of psychologists report receiving formal training in risk assessment by the time they begin a clinical internship (Dexter-Mazza and Freeman 2003).

One obstacle to the widespread use of EBPs is training therapists in ways that are engaging, cost-effective, and improve skills. Brief, affordable trainings (e.g., 2-day workshops) can increase therapist knowledge, but rarely result in durable improved skills. Intensive live trainings offer abundant opportunities for practice and feedback, but face several practical constraints (Herschell et al. 2010). A promising solution to these challenges is the use of standardized virtual patients (VPs) embedded in an Intelligent Tutoring System (ITS). VPs have been associated with positive outcomes in medical training, including improved skills with live patients (Cook and Triola 2009). However, VPs have rarely been used in mental health training. VPs allow safe behavioral rehearsal of skills with high risk “clients”, and ITS features can track individual competence to provide targeted training experiences with feedback that supports learning. Two examples of existing VP systems are (Stevens et al. 2006) and (Kenny and Parsons 2011).

This paper reports on the SAMHT intelligent tutoring system, which provides youth suicide risk assessment training. The system is based on an interactive avatar interface with an intelligent backend that provides parameterized avatar personas. SAMHT provides a believable interaction that is effective for training mental health professionals.

The Avatar Interface
A trainee interacts with SAMHT through a web browser. A conversation is initiated by selecting an avatar. Each avatar has a face and voice, and a persona based on over 60 personality and life-experience parameters, such as family relationships, prior suicide attempts, drug use, etc. Figure 1 shows the interface seen by a trainee after a conversation has been started. The avatar pane on the left shows the animated life-like avatar that moves as a whole, has eyes that move as if tracking, and whose lips move when speaking. The main component of the interaction pane on the right is the list of questions that can be asked. The questions are in the boxes in the top part of the interaction pane. The question boxes are tagged and color coded according to their domains: Rapport, Ideation, Capability, Plans, Stressors, Connections, and Repair. (The next section explains the origins of these domains.) The tags and colors allow the trainee to quickly identify questions in each of the domains. The control buttons in the interaction pane provide options to show questions in only a selected domain, to change the sort order of the questions, to undo an interaction, and to replay what the avatar has just said.

A trainee converses with the avatar by selecting a question, which is spoken back by a disembodied voice (as if the trainee were asking the question). The question is sent to an intelligence server (described in the next section) that provides an appropriate answer based on the persona of the avatar. Alternative answers with the same underlying meaning are available for many questions, so that multiple conversations with a selected avatar are randomly different. The answer is processed by a graphics/speech server, and rendered in the avatar as speech with corresponding movement. After each exchange the list of questions is updated, removing the question just asked and adding new questions that have become meaningful in the context of the conversation. A sample conversation starts as follows:
Trainee: “Hello. How are things going?” (Rapport)
Avatar: “I’ve been doing really bad in school.”
Trainee: “Have things ever gotten so bad that you’ve thought..."
about killing yourself?” (Ideation)
Avatar: “Yeah, I’ve been thinking about it lately.”
At this point a new question becomes available, and the
trainee chooses to ask it next. Note that this question would
not have made sense before the previous answer, and is thus
made available only in this new context.
Trainee: “How often do you think about it?” (Ideation)
Avatar: “Oh, probably like once a week.”
Trainee: “Have you ever tried to kill yourself?” (Capability)
Avatar: “Well, I’ve thought about it.”

etc. etc. When the trainee believes (s)he has enough information
to make a risk assessment, the conversation is ended
by selecting the level of risk from a pulldown menu, one of
None, Mild, Moderate, High, or Extreme.

In order to support assessment of trainees’ activities, all
interactions in a conversation are logged with a time stamp.
In future work this data will be mined to evaluate the system
and the trainees, and will also be used to provide real-time
feedback to trainees.

In addition to the avatar and interaction panes, the trainee
interface provides a panel that allows the trainee to add ar-
bitrary notes to the conversation log. This feature is initially
aimed at obtaining suggestions and debugging information
from trainees during their use of the system, but in the long
term will be useful for trainees to make clinical notes during
their conversation with the avatar.

Intelligence Architecture
Figure 2 shows the SAMHT system architecture. The heart
of the avatars’ intelligence is the decision tree, which pro-
vides the answers for the questions sent from the trainee’s
web browser interface. Figure 3 shows an excerpt from a
graphical rendering of the decision tree. The decision tree is
an irreflexive directed tree with four types of nodes: question
nodes (rectangles in Figure 3), decision nodes (ovals), ran-
domizer nodes (diamonds), and answer nodes (hexagons).
Each question node has one outgoing edge, leading to either
a decision node or a randomizer node. Each decision node
is labelled with one of the persona parameters (recall, there
are more than 60 parameters), and has one or more outgo-
Preparations, Stressors and Perceived Burden, and Caring Connections. Questions within each domain were created by consulting literature on suicide risk assessment, and in consultation with child clinical psychologists and experts in suicide risk assessment. In addition to these risk assessment domains, the Rapport and Repair domains were created, again in consultation with child clinical psychologists. Rapport contains questions and statements used to open a conversation. Repair contains questions and statements used to address a client’s negative reactions during a conversation, and thus “repair” any threats to the therapeutic relationship and productiveness of the session. The decision tree has been reviewed by clinical psychologists and psychology graduate students, who provided feedback on the structure, age-appropriateness, context-appropriateness, and believability of the content.

The SitePal\(^1\) component of the architecture provides the moving avatar image and speech rendering in Flash format, based on the answer provided by the decision tree. The interaction with SitePal goes via the trainees’ web browser, which receives the answer as text from the intelligence server, forwards it to SitePal, and directly receives the rendering in the image view of the interface.

**Conclusion**

This paper has described SAMHT, an intelligent tutoring system for youth suicide risk assessment training. Its interactive avatar interface is based on an intelligent backend that provides a believable interaction that is effective for training mental health professionals.

Immediate future work is to provide trainees with real-time performance feedback, by analyzing the conversation logs. New interface elements that indicate the trainee’s progress in the conversation are being planned, e.g., time spent in the interview, the percentage of questions covered from each domain, the level of rapport achieved, and the amount of useful information obtained from the conversation. More directed feedback to trainees might also be automated, e.g., indications of whether a selected question is (in)appropriate. An ability to compute each avatar’s level of risk, based on risk assessment literature, e.g., (Joiner et al. 1999), will be added. This will allow trainees to receive feedback about the accuracy of their assessment at the end of each conversation. The feedback features will enable the trainer to scaffold learning for novice trainees. A medium term goal is to automate the process of creating new avatar personae, by randomly selecting parameter values subject to constraints that avoid combinations that are illogical, unrealistic, etc. In the longer term the conversation logs will be used to guide the selection of parameters values, so that new avatars help trainees focus on weaknesses in prior conversations. Additional planned features include functionality to encourage rehearsal of behaviors that should happen in a live risk assessment. Examples include adding a medical chart containing patient history data to encourage trainees to consult charts prior to interviewing patients, and adding voice

\(^1\)http://www.sitepal.com
Figure 3: A Decision Tree

recognition and question matching capability so trainees can behaviorally rehearse asking questions.

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References


