

Feasibility Study in Development of a Wearable Device to Enable Emotion Regulation in  
Children with Autism Spectrum Disorder

Manpreet Kaur Hora

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in  
partial fulfillment of the requirements for the degree of

Master of Science  
In  
Computer Science and Applications

R. Benjamin Knapp  
Angela Scarpa-Friedman  
Manuel A. Pérez-Quñones

July 28, 2014  
Blacksburg, VA

Keywords: Autism, Physiology, Psychology, Emotion Regulation, Fuzzy Inference System

**MEMORANDUM**

**DATE:** April 17, 2014

**TO:** Angela Scarpa-Friedman, Martha Ann Bell, Manpreet Kaur Hora, Isabel S Bradburn, Brennon Christopher Bortz, Deanna Swain, Becky Neeley, Catherine Francesca Kilday

**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)

**PROTOCOL TITLE:** Making Emotions Explicit Through Biotechnology

**IRB NUMBER:** 13-894

Effective April 14, 2014, the Virginia Tech Institution Review Board (IRB), at a convened meeting, approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

**PROTOCOL INFORMATION:**

Approved As: **Full Review**  
Protocol Approval Date: **December 9, 2013**  
Protocol Expiration Date: **December 8, 2014**  
Continuing Review Due Date\*: **November 24, 2014**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**FEDERALLY FUNDED RESEARCH REQUIREMENTS:**

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

\* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.



manpreet hora &lt;manpreetkhora@gmail.com&gt;

---

**Permission to use images in my Master's thesis**

---

manpreet hora <khmanp8@vt.edu>  
To: "R. Benjamin Knapp" <benknapp@vt.edu>

Sat, Sep 6, 2014 at 4:49 PM

Thank you so much. This is indeed very helpful.

I will use this email thread as a formal proof of permission for using those images, since the Grad school wants me to have this permission in a written form. Thank you once again.

Kind Regards,  
Manpreet

On Sep 5, 2014 8:38 AM, "Benjamin Knapp" <benknapp@vt.edu> wrote:

Of course J

**From:** manpreetkhora@gmail.com [mailto:manpreetkhora@gmail.com] **On Behalf Of** manpreet hora  
**Sent:** Thursday, September 4, 2014 11:40 PM  
**To:** Benjamin Knapp  
**Cc:** grads; Ewing, Gwen  
**Subject:** Permission to use images in my Master's thesis

Hi Dr.Knapp,

I found two images (attached) related to Mamdani-type Fuzzy System and Sugeno-type Fuzzy System from your course website:

<http://www.cs.princeton.edu/courses/archive/fall07/cos436/HIDDEN/Knapp/fuzzy004.htm>

I wish to use them in my thesis (attached) titled "Feasibility Study in Development of a Wearable Device to Enable Emotion Regulation in Children with Autism Spectrum Disorder". They are very pertinent to my thesis content and I intend to use the images under section 6.1.2 "Comparison of Mamdani-type and Sugeno-type Fuzzy Inference System" on Page 75 of my thesis document.

On the following website, you grant permission to use your website content if appropriate citation is included in the work.

<http://www.cs.princeton.edu/courses/archive/fall07/cos436/HIDDEN/Knapp/fuzzy.htm>

I would be very grateful if you could please allow me to use the attached images in my thesis. If you permit, please let me know how you would want me to cite them.

Thank you very much.

Kind Regards,

Manpreet Kaur Hora

M.S. Computer Science

Virginia Tech