

Methods and Applications for Controlling Biomimetic Robotic Hands

Matthew A. Paluszek

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
Mechanical Engineering

Shashank Priya, Chair
Andrew J. Kurdila
Alfred L. Wicks

November 21st, 2013
Blacksburg, Virginia

Keywords: humanoid robotics, data glove, brain computer interface, strain sensor, force sensor



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Thesis Image usage

2 messages

Matt Paluszek <mattiep9@vt.edu>
To: mkharkcom@mmm.com

Wed, Dec 18, 2013 at 1:08 PM

Kay,

I am a graduate student with Virginia Tech and I was hoping to use the attached images in my thesis about the construction of a cost effective data glove. In my thesis, I use 3M dual lock pads to attach and remove resistive bend sensors to a glove. The two images are included to show how 3M dual lock pads work along with the basic size and shape before they are attached to the glove and sensors. I also use this caption with the images:

3M Dual Lock Fastener™ (left) and close-up of fasteners(right). The adhesive on the backs of the fastener are simple to apply to the glove fabric, while the interlocking plastic makes for a firm hold, while also showing little wear over time.

Thank you,

Matt Paluszek

2 attachments



Duallockcloseup.png
39K



Duallock.png
81K

mkharkcom@mmm.com <mkharkcom@mmm.com>
To: mattiep9@vt.edu

Thu, Dec 19, 2013 at 11:58 AM

Matt, please update the product name as indicated below and your usage is approved. Thanks.



M. Kay Harkcom | Global Communications and Brand Strategy Manager

3M Industrial Adhesives & Tapes

3M Center, 220-5E-06 | St. Paul, MN 55144

Office: [651 733 9105](tel:6517339105) | Mobile: [651 373 4062](tel:6513734062) | Fax: [651 737 6043](tel:6517376043)

mkharkcom@mmm.com | www.3M.com

----- Forwarded by M. Kay Harkcom/US-Corporate/3M/US on 12/19/2013 10:57 AM -----

From: Stacey L. Wagner/US-Corporate/3M/US

To: M. Kay Harkcom/US-Corporate/3M/US@3M-Corporate

Date: 12/19/2013 10:11 AM

Subject: Fw: Thesis Image usage

Kay,

Scott and I approve the use of the images. We ask that the product name be updated to include the appropriate trademarks and a trademark statement be added.

3M(TM) Dual Lock(TM) Fasteners (left) and close-up of 3M Dual Lock Fasteners(right). The adhesive on the backs of the fastener are simple to apply to the glove fabric, while the interlocking plastic makes for a firm hold, while also showing little wear over time.

The trademark statement should read: 3M and Dual Lock are trademarks of 3M Company.

Let me know if he has any questions.

Thank you
Stacey



Stacey L. Wagner | Marketing Communications Administrator

3M Industrial Adhesives & Tapes

3M Center, 220-5E-06 | St. Paul, MN 55144

Office: [651 737 2742](tel:6517372742) | Fax: [651 737 5568](tel:6517375568)

slwagner@mmm.com | www.3M.com/IATD | www.3M.com/VHB

----- Forwarded by Stacey L. Wagner/US-Corporate/3M/US on 12/19/2013 10:05 AM -----

From: Colleen A. Mogren/US-Corporate/3M/US

To: M. Kay Harkcom/US-Corporate/3M/US@3M-Corporate, Stacey L. Wagner/US-Corporate/3M/US@3M-Corporate

Date: 12/19/2013 08:39 AM

Subject: Re: Fw: Thesis Image usage

Oops! It is Stacey's!

Stacey - Please see below.

CAM



Colleen A. Mogren | Marketing Communications
3M Industrial Adhesives & Tapes
3M Center, 220-5E-06 | St. Paul, MN 55144
Office: [651 737 2094](tel:6517372094) | Mobile: [651 334 2540](tel:6513342540) | Fax: [651 733 1771](tel:6517331771)
cabelisle-mogren@mmm.com | www.3M.com

▼ M. Kay Harkcom---12/19/2013 08:19:38 AM---Colleen, can you work with the team and get an answer for Matt?
Thanks. M. Kay Harkcom | Global C

From: M. Kay Harkcom/US-Corporate/3M/US
To: Colleen A. Mogren/US-Corporate/3M/US@3M-Corporate
Date: 12/19/2013 08:19 AM
Subject: Fw: Thesis Image usage

Colleen, can you work with the team and get an answer for Matt? Thanks.



M. Kay Harkcom | Global Communications and Brand Strategy Manager
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From: Matt Paluszek <mattiep9@vt.edu>
To: mkharkcom@mmm.com
Date: 12/18/2013 12:08 PM
Subject: Thesis Image usage

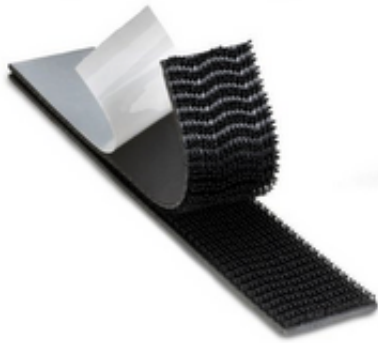
[Quoted text hidden]

Matt Paluszek(See attached file: *Duallockcloseup.png*)(See attached file: *Duallock.png*)

2 attachments



Duallockcloseup.png
39K



Duallock.png
81K

Image usage for thesis

2 messages

Matt Paluszek <mattiep9@vt.edu>

Wed, Dec 18, 2013 at 2:36 PM

To: info@syntouchllc.com

I am a graduate student at Virginia Tech, and I have recently submitted my thesis on methods for controlling robotic hands. In my paper, I discuss methods of robotic feedback, and I would like to include an image of the Syntouch Biotac sensor with the permission of Syntouch. My thesis is purely for academic purposes.

-Matt Paluszek



syntouch.jpg
12K

Matt Borzage <matt.borzage@syntouchllc.com>

Sun, Jan 5, 2014 at 4:43 PM

To: Matt Paluszek <mattiep9@vt.edu>

Cc: SynTouch LLC <info@syntouchllc.com>

Hi Matt,

Yes, you have our permission to include an image of the BioTac in your thesis. You may find better images [here](#). We have a higher resolution version of that same image, as well as some alternative views you might be able to use.

If you'd like I can also add you to our mailing list: we send only a few emails per year, but there's usually either useful info on the sensors, or on where we'll be attending conferences to make it easy to meet up.

If you can let me know when your thesis is published, I'd be interested to see the results; it sounds like an interesting thesis.

Best regards,

Matt Borzage

[Quoted text hidden]



Matt Paluszek <mattiep9@vt.edu>

RE: Robotics

4 messages

Clark Mower <clark@flexpoint.com>

Mon, Dec 23, 2013 at 1:10 PM

To: mattiep9@vt.edu

Matthew,

Please send me the section of your thesis with the picture inserted where it would go and I will review it and respond. Thanks, Clark

Clark Mower
President
Flexpoint Sensor Systems, Inc.

-----Original Message-----

From: mattiep9@vt.edu [mailto:mattiep9@vt.edu]

Sent: Friday, December 20, 2013 10:18 AM

To: info@flexpoint.com

Subject: Robotics

Friday, December 20, 2013, 9:18 am [EST]

From: Matthew Paluszek (mattiep9@vt.edu)

Subject: Robotics

Company: Virginia Tech

Phone: [7576214725](tel:7576214725)

Fax :

Message: I am a graduate student from Virginia Tech interested in using an image from your website for my thesis in which I use flexpoint bend sensors as part of a sensor glove. However, I need to seek written permission to use the image. My work is purely for educational purposes.

Matt Paluszek <mattiep9@vt.edu>

Mon, Dec 23, 2013 at 6:16 PM

To: Clark Mower <clark@flexpoint.com>

Clark,

Here is the portion of my thesis that includes the image in question. I include the paragraph before, and after the picture, to give context of the image. If you would like additional information, I would be happy to provide additional portions of my thesis.

-Matt Paluszek

[Quoted text hidden]

 **Flexpoint Excerpt.docx**
134K

Clark Mower <clark@flexpoint.com>
To: mattiep9@vt.edu
Cc: Dave Beck <dave@flexpoint.com>, Craig Harrington <craig@flexpoint.com>

Tue, Dec 24, 2013 at 11:09 AM

Matt,

Feel free to use the pictures of the Bend Sensor® in your thesis. Thank you, Clark

Clark Mower
President
Flexpoint Sensor Systems, Inc.

From: Matt Paluszek [mailto:mattiep9@vt.edu]
Sent: Monday, December 23, 2013 4:17 PM
To: Clark Mower
Subject: Re: Robotics

[Quoted text hidden]

 **Flexpoint Excerpt.docx**
134K

Matt Paluszek <mattiep9@vt.edu>
To: Clark Mower <clark@flexpoint.com>

Thu, Dec 26, 2013 at 7:09 PM

Clark,

Thank you very much.

-Matt Paluszek
[Quoted text hidden]

Draft 09/01/2009

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Report generated on: 01-31-2014 at : 15:27:53

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Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Draft 09/01/2009

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Factor 3

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Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*



Draft 09/01/2009

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Factor 2

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Factor 3

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Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*



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Report generated on: 01-30-2014 at : 23:16:05

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *against fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*



Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Matt Paluszek

Description of item under review for fair use: (Tekscan. (2013). Tekscan: Flexiforce Sensors. Retrieved from Tekscan Website: <http://www.tekscan.com/flexible-force-sensors>)

Report generated on: 01-30-2014 at : 23:17:57

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *against fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

