

# GigaPan Education

Iain MacQuarrie and Marissa Morgan

December 8th, 2015

# Introduction

Ruby on Rails website based on an existing website for the CREATE Lab

- Background
- Problems with existing website
- Design decisions
- Design and functionality of website
- Security
- Testing
- Maintenance & Support
- Summary

# Background - Client

- Carnegie Mellon University's CREATE Lab
- Socially meaningful innovation and deployment of robotic technologies
- Focused on Technology Fluency and Citizen Science
- Global influence
- 15 years
- Around 30 employees
- Almost entirely grant/donation funded



# Background - GigaPan

- Adaptation of imaging system used on NASA's mars rovers
- Large zoomable giga-pixel panoramas
- Sharable over the Internet
- How it works
  - Camera attached to robot
  - Upper left and lower right corner set
  - Calculate number of photos
  - Robot moves and pushes shutter
  - Import photos to computer
  - Stitch with bundled software
  - Upload to [GigaPan.com](http://GigaPan.com)



# Background - GigaPan.com

- GigaPan Systems
- Portland, Oregon
- Manufacture and sale GigaPan robot
- Maintain gigapan.com website and database of uploaded GigaPans
- Over 100,000 GigaPans
- Size range from .7 giga-pixels to 50 giga-pixels



# Background - GigaPan Education

Secure education oriented website to share GigaPans around the world

- 4965 users from 13 countries representing:
  - 190 schools
  - 31 universities
  - 80 organizations
- Functionality:
  - Teachers create projects with students and GigaPans
  - Users in the project comment and take snapshots of GigaPans
  - Projects can have users from multiple schools



# Problems with Existing Website

- Unsupported for years
- Written in Django
- Confusing admin interface
- Inefficient database
- Unused / obsolete sections
- Inactive users
- Inability to showcase projects
- Useless recent activity section



The screenshot displays the Django administration interface. At the top, there is a blue header with the text "Django administration" in yellow. Below this, the main content area is titled "Site administration" in bold black text. The interface is organized into sections, each with a blue header bar. The "Auth" section includes "Groups" and "Users", each with "Add" and "Change" links. The "Basic" section includes "Experts", "Group tabs", "Projects", "Schools", "Students", and "Teachers", each with "Add" and "Change" links. The "Add" links are represented by a green plus sign icon, and the "Change" links are represented by a pencil icon.

Auth	
Groups	<a href="#">+ Add</a> <a href="#">Change</a>
Users	<a href="#">+ Add</a> <a href="#">Change</a>

Basic	
Experts	<a href="#">+ Add</a> <a href="#">Change</a>
Group tabs	<a href="#">+ Add</a> <a href="#">Change</a>
Projects	<a href="#">+ Add</a> <a href="#">Change</a>
Schools	<a href="#">+ Add</a> <a href="#">Change</a>
Students	<a href="#">+ Add</a> <a href="#">Change</a>
Teachers	<a href="#">+ Add</a> <a href="#">Change</a>

# Design Decisions - Administration

Gem	Ease of Use	Integration with other Gems	Needs of the Client	Documentation and Support
Active Admin	5	7	6	7
RailsAdmin	6	9	7	6

Chose RailsAdmin because:

- Automatic generation
- Integration with other gems
- Easy to use
- Quick to setup



# Design Decision - Authentication

Solution	Ease of use	Speed of integration	Reliability of security	Documentation and Support	Flexibility and Customization
Custom built	<b>10</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>10</b>
Devise	<b>6</b>	<b>8</b>	<b>9</b>	<b>9</b>	<b>5</b>
Authlogic	<b>6</b>	<b>7</b>	<b>9</b>	<b>5</b>	<b>6</b>

Chose Devise because:

- Security
- Continued support
- Documentation / user base

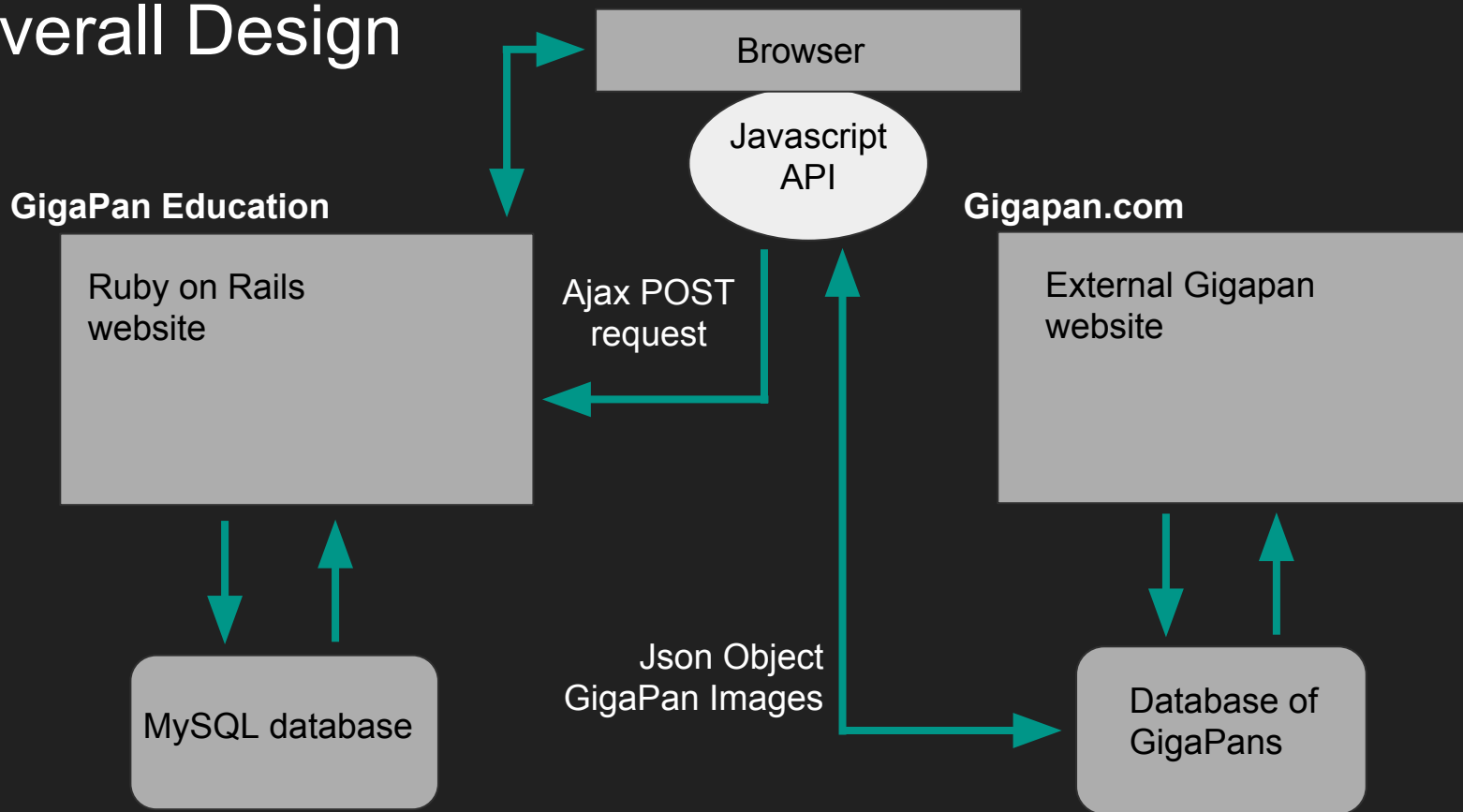
# Design Decision - Authorization

Solution	Ease of use	Speed of integration	Reliability of security	Documentation and Support	Flexibility and Customization	Rails Admin
Custom built	<b>10</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>10</b>	<b>1</b>
Pundit	<b>5</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>8</b>	<b>7</b>
CanCanCan	<b>10</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>10</b>	<b>10</b>

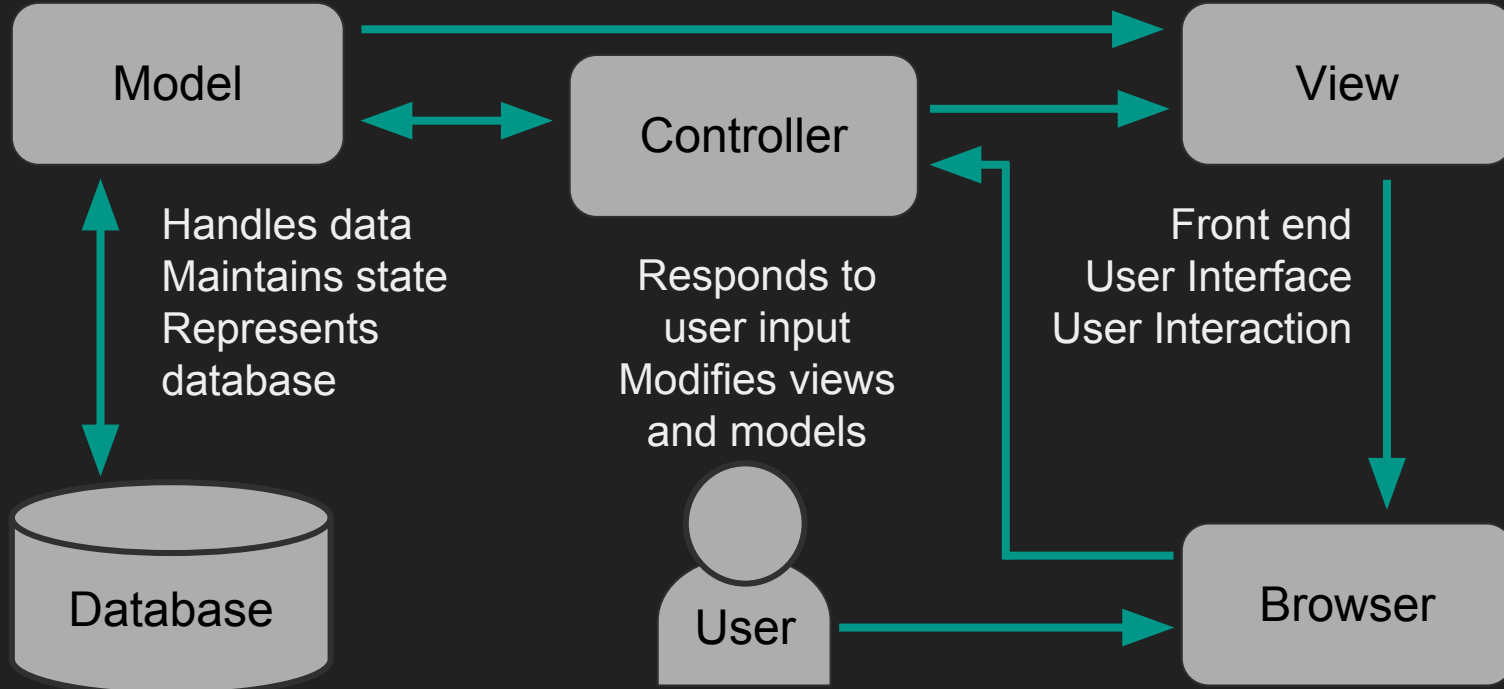
Chose CanCanCan because:

- Simplicity
- Customization
- Integration with RailsAdmin
- Security

# Overall Design



# MVC - Model, View, Controller



# User Privileges

Admin	Teacher	Student
Access to administration interface (add/modify/delete certain attributes of models)	Create projects	Comment
Create new users	Create student accounts	Edit some user info
Create projects	Comment	View project activity
Comment	Edit user info	
Edit user info	View project activity	
View project activity		


# Demo Video

GigaPan Education

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testing

View a description



View all images

**John M. ...**  
This is a work  
This is a work of art. It is a work of art. It is a work of art.

1/1

Support your school's learning and research with GigaPan Education.  
This content is not intended as a substitute for medical advice from your physician.

# Security

- Devise
  - Session management (CSRF Protection)
  - Account lockout (Brute force attack Protection)
  - Encrypted password (Man in the middle attack prevention)
- Input validation and sanitization
  - Rails sanitation method (XSS Protection)
- Restricted Access
  - Public can not access areas with students
  - New teachers can only be added by admin
  - Limited admin tools
- Using HTTPS for all traffic

# Testing

Built in:

- Unit testing
- Integration testing

Browser compatibility:

- BrowserStack
- Chrome, Safari, Firefox, IE

Jasmine for Javascript GigaPan API

```
test "username should be present" do
  @user.username = " "
  assert_not @user.valid?
end

test "username should not be too long" do
  @user.username = "a" * 51
  assert_not @user.valid?
end

test "email should be present" do
  @user.email = " "
  assert_not @user.valid?
end

test "email should not be too long" do
  @user.email = "a" * 244 + "@example.com"
  assert_not @user.valid?
end
```



# Maintenance

## One Time:

- Server setup
- ImageMagick install
- Setup storage space for user avatars
- HTTPS certificate
- Rails production compile
- Seed database with essential data
- Set environmental variables

## Recurring:

- Database backup
- Database flush of inactive users

# Summary

- Delivered
- Secure
- Tested
- Maintainable
- Documented
- Problems of previous website addressed

Questions?