

Innovations in Travel Modeling



Piloting a Contribution Review Process for the VisionEval Framework

ATLANTA, GEORGIA – JUNE 2018



JACOBS



OVERVIEW

OBJECTIVES AND MOTIVATIONS

METHODOLOGY

PILOT RESULTS

IMPLICATIONS FOR OUR INDUSTRY



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OBJECTIVES AND MOTIVATIONS

- **The GreenSTEP, RPAT, EERPAT, and RSPM family of strategic models share a significant amount of similarity**
- **Yet they are implemented in entirely separate code bases owned by separate small groups**
- **This makes software-level collaboration more difficult, expensive, and less flexible/extensible**



OBJECTIVES AND MOTIVATIONS

- We need a shared and collaborative strategic modeling platform
- To reduce the cost to develop and maintain these models, while increasing stability, longevity, transparency, etc.
- This requires consistent thoughtful ownership, *effective cooperation*, and *the right technology*



OBJECTIVES AND MOTIVATIONS

- **Our solution to this dilemma is the Contribution Review Process described today**
- **We learned that substantially more effort and cooperation is required**
- **To build open source modeling tools in practice rather than open source in spirit**



OBJECTIVES AND MOTIVATIONS

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METHODOLOGY

- **Developed a VE Review Team Charter**
 - **Definition of VisionEval**
 - **Roles & Responsibilities**
 - **Contribution Workflow**
 - **Contribution Review Criteria**
 - **Code and Documentation Management**
- **Piloted contribution review**
 - **VE Travel Demand Multi Modal Module**



CHARTER – DEFINITION OF VE

Review Team Charter · gregorbj / VisionEval

Unwatch 13 Unstar 20 Fork 16

Code Issues 22 Pull requests 2 Projects 0 Wiki Insights

Review Team Charter

Ben Stabler edited this page on Sep 14, 2017 · 10 revisions

Edit New Page

The VisionEval Open Source project houses a common code base for a family of strategic planning models for public use which is maintained and supported by a set of agencies (i.e., "Sponsor"). As illustrated below, the "code base," housed in this publicly accessible repository, includes a common set of component "modules" that are assembled in various ways along with a "user interface" and the "services" that allow them to communicate. Together these modules make up functioning "models" (i.e., RPAT, RSPM) that can be applied with local data to support analysis in various communities.

VisionEval Software

repository

- Modules
- Models
- UI
- VisionEval (Framework)

Pages 62

VisionEval

Getting Started

- Getting Started
- Developer Orientation

Software Management

- Goals and Objectives
- Working Together
- Automated Testing
- Contribution Review Criteria
- Modules and Packages
- Development Roadmap
- Documentation Plan

<https://github.com/gregorbj/VisionEval/wiki/Review-Team-Charter>



CHARTER – ROLES

- **Sponsor** – governance, funding, strategy
- **Repository Manager** – maintains VE resources, manages test system, releases software
- **Review Team** – contribution review
- **Developer Community** – develops VE resources
- **User Community** – uses VE



CHARTER – ROLES

- **Review team appointed by Sponsors**
- **About 6 members with competency in software, documentation, and methods**
- **Balance of representatives from academia, consulting and agencies**

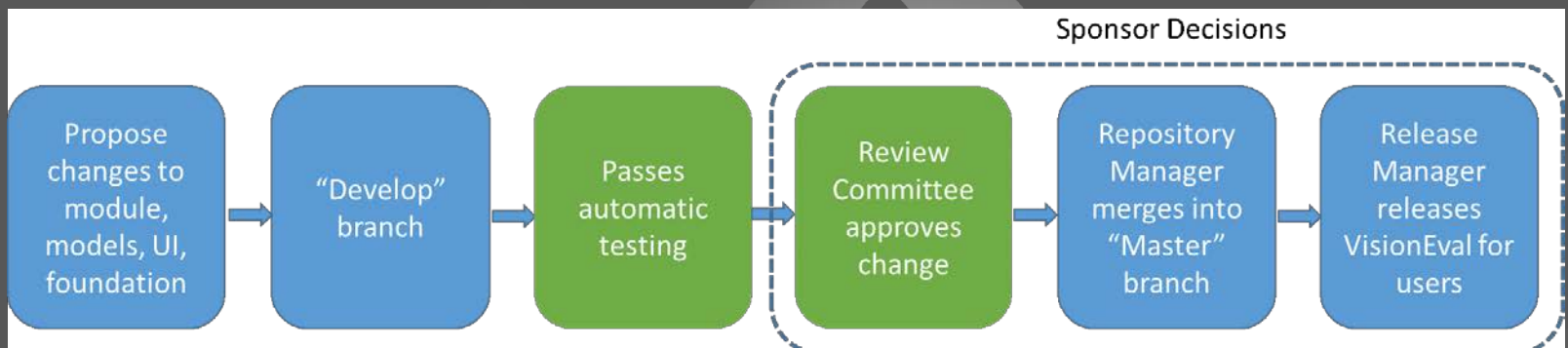
The Review Team will provide feedback to developers via this site. The Review Team will provide feedback for each review criteria and will tag each submittal category as follows:

Status	Software	Documentation	Methods
Accept			
Accept but recommend revisions			
Do not accept			
Abstain			



CHARTER – CONTRIBUTION WORKFLOW

- VE repository has two main branches
 - Master – release version
 - Develop – in-progress development
- All changes must pass the test system *and the contribution criteria* before merging to master



CHARTER – TEST SYSTEM

- **Continuous Integration**
 - All components includes tests and documentation
 - Every commit tests: framework → modules → models → GUI
- **Using TravisCI**
 - Easily integrates with GitHub and free for open source projects
 - Parallel jobs for amazing performance

CHARTER – TEST SYSTEM

nbH [DE] | <https://travis-ci.org/gregorbj/VisionEval>



gregorbj / VisionEval build passing

✓ Pull Request #185 EV Feature

- ↔ Commit a4c4d26
- 🔗 #185: EV Feature
- 📁 Branch develop

👤 Aditya Gore authored and committed

🏆 #266 passed

- 🕒 Ran for 1 hr 15 min 55 sec
- 🕒 Total time 4 hrs 39 min 32 sec
- 📅 5 days ago

🔄 Restart build

Build Jobs

✓ # 266.1	🔗	</> R: 3.4	📁 FOLDER=sources/framework/visioneval SCRIPT=tests/scripts/test.R TYPE=modul...	🕒 6 min 20 sec	🔄
✓ # 266.2	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VE2001NHTS SCRIPT=tests/scripts/test.R TYPE=modul...	🕒 16 min 22 sec	🔄
✓ # 266.3	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VEHouseholdTravel SCRIPT=tests/scripts/test.R TYPE=...	🕒 24 min 13 sec	🔄
✓ # 266.4	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VEHouseholdVehicles SCRIPT=tests/scripts/test.R TYP...	🕒 26 min 3 sec	🔄
✓ # 266.5	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VELandUse SCRIPT=tests/scripts/test.R TYPE=module ...	🕒 20 min 53 sec	🔄
✓ # 266.6	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VESimHouseholds SCRIPT=tests/scripts/test.R TYPE=...	🕒 15 min 13 sec	🔄
✓ # 266.7	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VESyntheticFirms SCRIPT=tests/scripts/test.R TYPE=m...	🕒 7 min 6 sec	🔄
✓ # 266.8	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VETransportSupply SCRIPT=tests/scripts/test.R TYPE=...	🕒 7 min 11 sec	🔄
✓ # 266.9	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VETransportSupplyUse SCRIPT=tests/scripts/test.R TY...	🕒 8 min 32 sec	🔄
✓ # 266.10	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VETravelPerformance SCRIPT=tests/scripts/test.R TYP...	🕒 20 min 23 sec	🔄
✓ # 266.11	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VEPowertrainsAndFuels SCRIPT=tests/scripts/test.R T...	🕒 17 min 14 sec	🔄
✓ # 266.12	🔗	</> R: 3.4	📁 FOLDER=sources/modules/VEReports SCRIPT=tests/scripts/test.R TYPE=module ...	🕒 16 min 20 sec	🔄
✓ # 266.13	🔗	</> R: 3.4	📁 FOLDER=sources/models/VERPAT SCRIPT=run_model.R TYPE=model DEPENDS=V...	🕒 30 min 38 sec	🔄
✓ # 266.14	🔗	</> R: 3.4	📁 FOLDER=sources/models/VERSPM/Test1 SCRIPT=run_model.R TYPE=model DEPE...	🕒 29 min 41 sec	🔄
✓ # 266.15	🔗	</> R: 3.4	📁 FOLDER=sources/VEGUI SCRIPT=run_vegui_test.R TYPE=model DEPENDS=VE200...	🕒 33 min 23 sec	🔄

CHARTER – CONTRIBUTION REVIEW

Review Question	Test System	Software	Docs	Methods
1. Consistent with Design Specs. Does it contain all the elements that are required by the VisionEval system specifications?		X	X	X
2. Valid Theory and Methods. Why is it better, and/or different than existing modules? Does it do good science and provide documentation justifying this claim?			X	X
3. Documentation. Is the module documentation complete?			X	X
4. Regional Estimation Ready (if applicable). If the module allows the estimation of regional parameters, does it provide everything that is needed?		X	X	X
5. Geography. Is it based on geographic definitions that are consistent with the model system definitions?			X	X
6. Runtime. Does the module compute quickly enough and provide documentation justifying this claim?		X	X	
7. Complete Code and Data. Does it include all source files and data?	X	X	X	
8. Non-R code (if applicable). Does the module only call R code and packages that work on all operating systems?	X	X		
9. License. Is it licensed with the VisionEval license?	X			
10. Framework. Does it only interact with the computing environment by returning a properly structured list to the framework?	X	X		
11. Pass Automated Tests. Does it include regression tests to enable checking that consistent results will be returned when updates are made to the framework and/or R programming environment?	X	X		
12. Sufficient Automated Tests. Does it include sufficient test coverage and test data?	X	X		
13. Other. Any other comments?		X	X	X

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PILOT REVIEW RESULTS

- **Piloted the new multi-modal travel demand for individual households module**
- **Developed by Liming Wang, PhD, PSU**
- **VETravelDemandMM package includes models for estimating:**
 - **Annual Average Daily VMT (AADVMT)**
 - **transit trips and person miles travelled (PMT)**
 - **biking trips and PMT**
 - **walking trips and PMT**



PILOT REVIEW TEAM

- **Josh Roll, ODOT**
- **Patrick Hall, ARC**
- **Jana Natarajan, WSDOT**
- **Chris Porter, Cambridge Systematics**
- **Jeremy Raw, FHWA**
- **Kristin Tufte, PSU**
- **Dan Frye, PSU (alternate)**
- **Alex Bigazzi, UBC**
- **Brian Gregor, OSA**
- **Daniel Flynn, Volpe**



GITHUB PULL REQUEST

The screenshot shows a GitHub pull request page. At the top, the browser address bar displays the URL <https://github.com/gregorbj/VisionEval/pull/130>. The repository name is `gregorbj / VisionEval`. The pull request title is `Submit VETravelDemandMM package for VE contribution review #130`. The pull request is from `cities-lab:develop` to `gregorbj:develop`. The pull request is open and has 2 pull requests in the repository. The pull request description includes a comment from `lmwang9527` on Sep 9, 2017, stating that the `VETravelDemandMM` package is submitted for review. The comment includes links to relevant documents and the status of automated tests. The status of automated tests shows that the `VETravelDemandMM` package by itself has a `build passing` status, while the `whole VisionEval repo` has a `build failing` status. The right sidebar shows the reviewers section with `gregorbj`, `bstabler`, and `goreaditya` listed as reviewers.

Submit VETravelDemandMM package for VE contribution review #130

Open lmwang9527 wants to merge 445 commits into gregorbj:develop from cities-lab:develop

Conversation 3 Commits 250+ Checks 0 Files changed 970 +251,654 -190,058

lmwang9527 commented on Sep 9, 2017 • edited Contributor

By this pull request, the VETravelDemandMM package is submitted for the VE contribution review.

Links to relevant documents:

- Overview document of the package
- Slides for the package overview presentation
- Responses to Contribution Review Criteria questions

Status of automated tests:

- VETravelDemandMM package by itself: build passing
- With the whole VisionEval repo: build failing

Reviewers

- gregorbj Request
- bstabler Request
- goreaditya Request

Assignees

No one—assign yourself

Labels

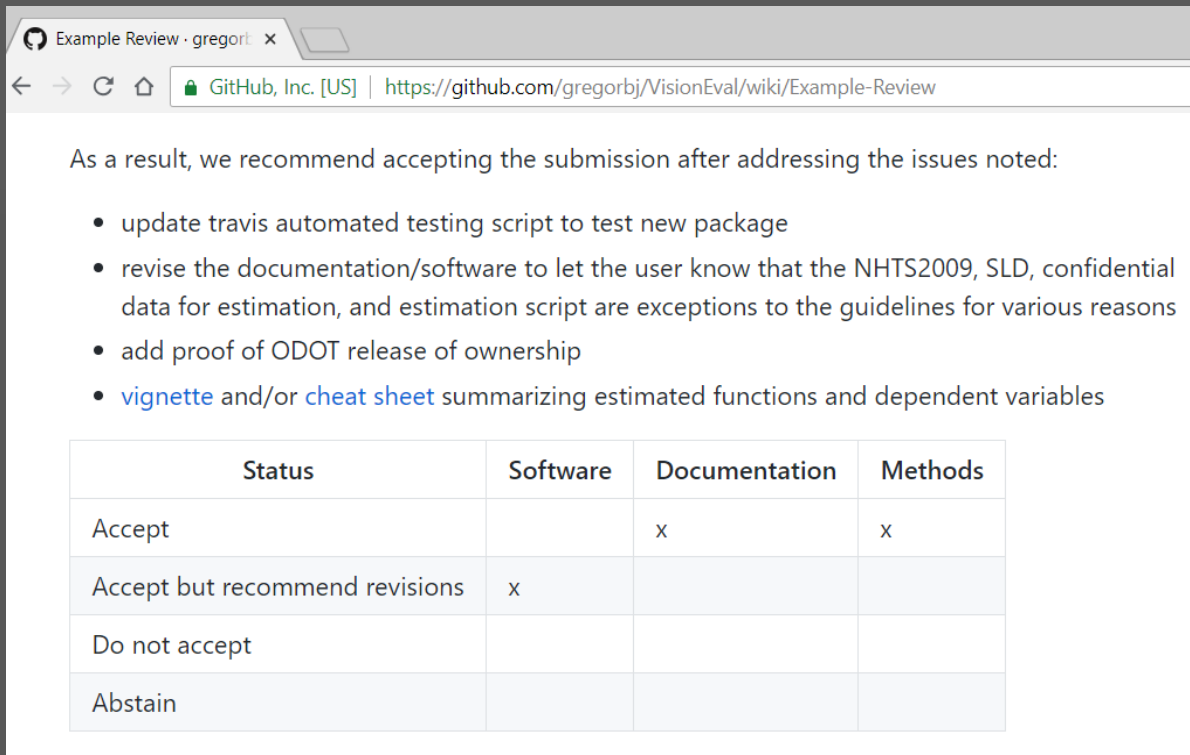
None yet

<https://github.com/gregorbj/VisionEval/wiki/Example-Review>



PILOT REVIEW RESULTS

- All correspondence online, including:
 - Responses to the responses
 - Review team comments and votes



Example Review · gregorj x

GitHub, Inc. [US] | <https://github.com/gregorbj/VisionEval/wiki/Example-Review>

As a result, we recommend accepting the submission after addressing the issues noted:

- update travis automated testing script to test new package
- revise the documentation/software to let the user know that the NHTS2009, SLD, confidential data for estimation, and estimation script are exceptions to the guidelines for various reasons
- add proof of ODOT release of ownership
- [vignette](#) and/or [cheat sheet](#) summarizing estimated functions and dependent variables

Status	Software	Documentation	Methods
Accept		x	x
Accept but recommend revisions	x		
Do not accept			
Abstain			



PILOT REVIEW RESULTS

- **The software review expertise was the most difficult need to fill**
- **The process clearly resulted in a more complete contribution**
- **It took much longer than everyone had hoped for (including the author)**
- **Increased appreciation for the cost of building and maintaining open source modeling tools**



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- **Community developed and maintained tools are becoming more and more popular in our industry**
- **Developing these tools requires significantly more effort, effective cooperation, and the right technology**
- **We believe the piloted contribution review process is an excellent example for others**





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<http://www.visioneval.org>